

Optimized Random Forest Classifier Based on Genetic Algorithm for Heart Failure Prediction

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Abstract—Heart failure is a serious long-term condition that usually gets worse over time. On the other hand, some people do not aware to check their heart health regularly. In this study, the Random Forest will be optimized using the Genetic Algorithm to obtain the best parameters and will be applied to the heart failure dataset from Kaggle. We experimented with two iterations for every nine combinations of the parameters. We compared the results of optimized random forest, stand-alone random forest, decision tree, and Naïve Bayes algorithms. Our finding is that the optimized method is slightly better than the other algorithms. The best F1-score is obtained at the second iteration which is 0.90789 compared to 0.89404 obtained with the sole random forest, 0.85034 obtained with the decision tree, and 0.86195 obtained with Naive Bayes. The best recall value is 0.91925 obtained in the first iteration, and in the second iteration. The best recall is also obtained with the sole random forest algorithm. The best precision value is 0.89937 which was obtained in the first. By these results, the optimized random forest algorithm could be used to result in reliable predictions about heart failure.

Index Terms—decision tree, Naive Bayes, F1-score, recall, precision

I. INTRODUCTION

Heart failure is a serious long-term condition that usually gets worse over time. It is also unpredictable, some people stay stable, but some get worse gradually. It also limits people's activity. People sometimes do not know if they have a problem with their hearts. Some people do not aware to check their heart health regularly.

Along with the times, the implementation of learning algorithms is getting easier with the presence of libraries in Python. One of the widely used learning libraries is scikit-learn, there are already many functions that could work on many kinds of learning. The library also includes many kinds of categories which can be used, such as k-Means, mean-shift, kNN, decision tree, or random forest.

Despite this convenience, a function in scikit-learn needs to include the required parameters. Although there are default parameters, it is often necessary to tune those parameters to

get better performance. Extensive tuning options on parameters could be searched for and optimized (look for the best parameter) with a genetic algorithm.

In this study, we apply a genetic algorithm to find the best parameters in the available random forest classifier function in library scikit-learn, and then compare the performance obtained with other algorithms such as decision tree and Naive Bayesian classifier. The reason for using the genetic algorithm to optimize random forest is the parameters of the genetic algorithm will follow the characteristics of the designed model/system [1]. In [2] the length of the chromosome is defined using the frequency analysis formula of the solved problem, in [3] the length of the chromosome is based on the range of values of a quantum time. We decided to optimize the random forest classifier as many papers found that this classifier always produces the highest performance ([4], [5], [6]).

Some research has been conducted to improve the accuracy of the random forests using a genetic algorithm. One of them relates to a selection of candidate workforces in PT. XYZ, so that the power work in accordance with the profession needed could be obtained [7]. This study used the random forest as the main method which is then optimized using a genetics algorithm for getting better results. Data used is 126 data candidate workforce and obtained accuracy using random forest which ranged from 40-95%. Then, optimization results on random forests using genetic algorithms have succeeded in providing a higher accuracy value, that ranges from 91% to 95%. However, the number of processed data could influence the result accuracy which is obtained.

Another study is conducted by Yoga, Agung, and Wahyu [8]. This study used the random forest algorithm to classify the acceptance data of marketing bank loan applications. Then, the accuracy result of the random forest algorithm was compared with the results of the random forest algorithm accuracy which has been optimized using genetic algorithms and bagging. The results of this study show that the random

forest algorithm produces better accuracy if it is compared to the random forest algorithm which has been optimized. The random forest algorithm gives an accuracy of 88.30%. This is due to data imbalance so the resulting scatter data is still many.

Elyan and Gaber optimized random forest using a genetic algorithm which is applied to class-engineered data [9]. Their experimental study was applied to 22 real data which are obtained from life science applications. The proposed method shows an advantage over other methods.

The genetic algorithm which optimizes the random forest algorithm searches the decision tree of the random forest and generates the most beneficial decision tree combination [10]. Thus, the precision of integrated classification is promoted. As a result, a good performance in predicting the trend of property-related crime and the efficiency of searching for the optimal solution with low computational complexity is improved.

In this paper, we optimize the parameters setting of the random forest classifier provided by scikit-learn. A genetic algorithm is used to do the optimization. This optimized algorithm and the comparison algorithms are applied to the heart failure dataset. We chose this dataset as heart failure is such a condition that is necessary to be considered by everybody so everybody knows whether they have a healthy heart or not. Thus, we propose the optimized random forest algorithm to predict heart failure.

II. METHOD

A. Tool and Material

Conducting this research, we used Python as the language programming, Google Colab Notebook (<https://colab.research.google.com/notebooks>), Library Pythons which is Pandas and Numpy for data management, Matplotlib for doing visualization, and Sklearn for implementing random forest classifier, decision tree, and Naive Bayes. The dataset consists of 918 lines of heart failure detection data with 12 different attributes taken from the site of Kaggle by Fedesoriano account [11]. One of the attributes is the label for heart failure detection which values are Yes, if the person has heart failure, and No, if otherwise.

Table I shows some data from the dataset. We took 10 data from the upper rows, and 10 data from the lower rows.

B. Method Study

1) *Implementation*: After downloading the dataset, we implemented the random forest method classifier which is optimized using the genetic algorithm, the sole random forest method classifier, the decision tree classifier, and the Naive Bayes classifier on the dataset.

2) *Evaluation*: We do an evaluation of all methods, by calculating the precision, recall (sensitivity), and F1-score values. From 918 data, 70% of it was used in the training phase, and 30% was for the testing phase. After the values from the four methods were obtained, we compared the results among the values: precision, sensitivity, and F1-score.

III. RESULT AND DISCUSSION

This study used a random forest classifier which is optimized using a genetic algorithm to process a dataset of recorded heart failure taken from the Kaggle site using the account of Fedesoriano. The shared dataset is used for training and testing. In addition to that, we use also use decision tree and Naïve Bayes algorithms which will be compared with the optimized algorithm, and also to the sole random forest classifier based on the three values.

A. Implementation

The steps used in optimizing the random forest classifier using a genetic algorithm are:

1) *Initialization*: In this study, the chromosome representation uses binary representation (a total of 14 binary digits), and complex representations. The 14 binary digits represent the parameters of the random forest classifier on sklearn library. The population is N. The first nine bits (0-511) represent n_estimators which is the number of trees in the forest and its default value is 100, the next bit represents criterion ({“gini”, “entropy”}), which the default value is “gini” for the Gini impurity, followed by 2 bits for max_features (0-3, default is None) which represents the maximum depth of the tree, the next 1 bit (True/False, Boolean and its default value is True) of bootstrap represents the usage of out-of-bag samples, and the last 1 bit represents oob_score (yes/no). Then the chromosome is also added with a complicated representation in the form of numbers indicating the location of the binary number.

The usage of complicated representation aims such a way to avoid convergence premature. Those binary numbers and complicated representations are then combined in the form of lists, such as ['00010110111010', [6, 11, 13, 1, 7, 4, 9, 0, 12, 5, 3, 8, 10, 2]]

2) *Parent Selection*: The algorithm we used in selecting parents is to take several individuals, k_selection (by random), from the population to be entered into the mating pool. We evaluated each individual by counting their fitness. Finally, we chose the individuals which have the best fitness as parents. Fitness values are taken from the F1-score values.

3) *Recombination/ Crossover*: We use three method crossovers: randomize 1-point, randomize 2-points, and fixed 4-points crossovers. The algorithm starts with inputs of 2 parents, the decision of whether the crossover is conducted or not by taking numbers in the range 0-1 at random and comparing them with the possibility of crossover (Pcrossover) which is 0.65. If the random number is smaller than the Pcrossover, the crossover will be conducted in accordance method which is defined in the crossover point and produces two offspring. On the other hand, if the number obtained is greater than the crossover ratio, then the two offspring are copied from the two parents.

TABLE I
THE DATASET

Age	Sex	ChestPainType	RestingBP	Cholesterol	FastingBS	RestingECG	MaxHR	ExerciseAngina	Oldpeak	ST_Slope	HeartDisease
40	M	ATA	140	289	0	Normal	172	N	0	Up	1
49	F	NAP	160	180	0	Normal	156	N	1	Flat	1
37	M	ATA	130	283	0	ST	98	N	0	Up	0
48	F	ASY	138	214	0	Normal	108	Y	1.5	Flat	1
54	M	NAP	150	195	0	Normal	122	N	0	Up	0
39	M	NAP	120	339	0	Normal	170	N	0	Up	0
45	F	ATA	130	237	0	Normal	170	N	0	Up	0
54	M	ATA	110	208	0	Normal	142	N	0	Up	0
37	M	ASY	140	207	0	Normal	130	Y	1.5	Flat	1
48	F	ATA	120	284	0	Normal	120	N	0	Up	0
...											
63	M	ASY	140	187	0	LVH	144	Y	4	Up	1
63	F	ASY	124	197	0	Normal	136	Y	0	Flat	1
41	M	ATA	120	157	0	Normal	182	N	0	Up	0
59	M	ASY	164	176	1	LVH	90	N	1	Flat	1
57	F	ASY	140	241	0	Normal	123	Y	0.2	Flat	1
45	M	TA	110	264	0	Normal	132	N	1.2	Flat	1
68	M	ASY	144	193	1	Normal	141	N	3.4	Flat	1
57	M	ASY	130	131	0	Normal	115	Y	1.2	Flat	1
57	F	ATA	130	236	0	LVH	174	N	0	Flat	1
38	M	NAP	138	175	0	Normal	173	N	0	Up	0

4) *Mutation*: In this study, we check the probability of mutation. The checking is done by examining the difference in fitness of the best individual of the current generation with the previous generation. If the difference between the two is less than one, the possibility of mutation is raised by 0.05. It is conducted such that to avoid premature convergence. The algorithm starts with 1 individual input, then takes a number in the range 0-1 by random and compares it with Pmutation, the first generation has Pmutation of 1/14. If the random number is smaller than the Pmutation, the value of 0 in the bit is changed to 1 and otherwise. Otherwise, do nothing. This process will be done for each bit of the input.

5) *Selection*: We use SSGA (steady state genetic algorithm) for managing the population. The number of children/offspring could be altered by changing SSGA child size in the range of 0-1. As an example, if SSGA_child_size is 0.1 and the number population is 100, then the offspring produced in each generation is $0.1 \times 100 = 10$ individuals.

In each generation, a comparison of the fitness values among the offspring and the worst individual is conducted to determine which individual remains. In addition, this study also uses the elitism method, in which the elitism rate range from 0-1. As an example, if the elitism rate is 0.1 with a population of 100, then the best individual saved each generation is $0.1 \times 100 = 10$ individuals. In every generation, we compare the fitness of the best individual and the worst individual to determine who will survive. At the end of the iteration, the best individual of the last generation will be obtained.

6) *Test*: We test our system with various parameters of the genetic algorithm. For the number of iterations, there are three possibilities, namely 10, 20, and 30 times. For the total population, there are also three possibilities, they are 100, 200, and 300 individuals. For the number of individuals entered into the mating pool, there are three possibilities, namely 3, 5, and 8 individuals. For the ratio of the number of individuals (elitism rate), and the ratio of the number of offspring each generation (SSGA child's size), there are two possibilities, they are 0.1 and 0.05.

In this study, we used nine variations of parameters that were determined independently at random. Every combination of parameters is executed twice. Tables II shows the scenarios of this experiment which include nine combinations of parameters of the optimized random forest classifier, and the third algorithms, whereas Table III shows the results of the executions.

B. Evaluation

Table III shows that the F1-score value generated by the optimized random forest classifier, 0.90790, exceeds the values of the three algorithms, namely the sole random forest classifier, decision tree classifier, and Naïve Bayes Classifier. However, the differences are not so far. Two combinations of parameters of the random forest classifier, both from the second iteration, have the best F1-score value. For the recall value or the sensitivity value, the best value is obtained by five combinations of parameters of the optimized random

forest classifier: three combinations from the first iteration, the rest from the second iteration, and the sole random forest classifier. The best precision value is obtained in the first generation by a combination of parameters of the optimized random forest.

From those best values, there is none of the combinations that have the best values for each of the metrics. Our finding is that there is one combination that has two best values. The best individual is in the first generation, {'n_estimators': 235, 'criterion': 'gini', 'max_features': 'sqrt', 'bootstrap': False, 'oob_score': False}, with the best recall and precision values.

Our best sensitivity value is better than the one resulting in [12]. In that paper, the sensitivity value is 0.906, and the dataset taken from Kaggle with 303 samples and 14 attributes.

IV. CONCLUSION

We aim to automate the setting of the parameters of a random forest classifier using a genetic algorithm. This automation is to optimize the performance of the random forest classifier. Fortunately, we obtained that the best of the F1-score, the recall/sensitivity, and the precision values of the optimized random forest classifier are never less than the other three algorithms, though they are just slightly better than the other three methods.

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TABLE II
SCENARIOS OF EXPERIMENTS

Parameters						
No	Iteration	Population	Selection	Crossover Point	Elitism Rate	SSGA
1	20	300	3	2	0.1	0.05
2	10	200	5	1	0.05	0.1
3	10	300	5	parameter_based (4 point)	0.05	0.05
4	30	300	8	1	0.1	0.05
5	20	100	3	2	0.05	0.1
6	20	100	8	2	0.05	0.1
7	30	100	8	parameter_based (4 point)	0.1	0.1
8	30	200	3	parameter_based (4 point)	0.1	0.05
9	10	200	5	1	0.05	0.05
10			Default setting of Random Forest Classifier			
11			Default setting of Decision Tree Classifier			
12			Default setting of Naive Bayes Classifier			

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TABLE III
RESULTS OF EXECUTIONS

1st Iteration				2nd Iteration			
Best	F1-score	Recall	Precision	Best	F1-score	Recall	Precision
{'n_estimators': 254, 'criterion': 'entropy', 'max_features': None, 'bootstrap': True, 'oob_score': False}	0.89769	0.90062	0.8875	{'n_estimators': 184, 'criterion': 'entropy', 'max_features': 'log2', 'bootstrap': True, 'oob_score': False}	0.89701	0.91925	0.89506
{'n_estimators': 363, 'criterion': 'gini', 'max_features': None, 'bootstrap': False, 'oob_score': False}	0.89404	0.85093	0.85235	{'n_estimators': 82, 'criterion': 'entropy', 'max_features': None, 'bootstrap': False, 'oob_score': False}	0.89109	0.81988	0.82993
{'n_estimators': 8, 'criterion': 'entropy', 'max_features': 'log2', 'bootstrap': True, 'oob_score': True}	0.90728	0.85093	0.86184	{'n_estimators': 12, 'criterion': 'gini', 'max_features': 'sqrt', 'bootstrap': True, 'oob_score': True}	0.89404	0.86956	0.87417
{'n_estimators': 235, 'criterion': 'gini', 'max_features': 'sqrt', 'bootstrap': False, 'oob_score': False}	0.89474	0.91925	0.89937	{'n_estimators': 326, 'criterion': 'gini', 'max_features': 'log2', 'bootstrap': True, 'oob_score': True}	0.89474	0.91925	0.89441
{'n_estimators': 181, 'criterion': 'entropy', 'max_features': None, 'bootstrap': True, 'oob_score': True}	0.89109	0.88820	0.875	{'n_estimators': 226, 'criterion': 'gini', 'max_features': 'log2', 'bootstrap': False, 'oob_score': False}	0.89180	0.90683	0.87195
{'n_estimators': 217, 'criterion': 'gini', 'max_features': 'log2', 'bootstrap': False, 'oob_score': False}	0.89180	0.91925	0.86747	{'n_estimators': 472, 'criterion': 'gini', 'max_features': 'auto', 'bootstrap': True, 'oob_score': False}	0.89404	0.90683	0.88957
{'n_estimators': 487, 'criterion': 'gini', 'max_features': 'auto', 'bootstrap': False, 'oob_score': False}	0.89180	0.91304	0.88554	{'n_estimators': 6, 'criterion': 'entropy', 'max_features': 'auto', 'bootstrap': True, 'oob_score': False}	0.90728	0.83230	0.88514
{'n_estimators': 380, 'criterion': 'entropy', 'max_features': 'sqrt', 'bootstrap': False, 'oob_score': False}	0.89180	0.91925	0.88889	{'n_estimators': 187, 'criterion': 'gini', 'max_features': 'sqrt', 'bootstrap': True, 'oob_score': False}	0.90789	0.91304	0.88024
{'n_estimators': 363, 'criterion': 'entropy', 'max_features': None, 'bootstrap': False, 'oob_score': False}	0.89180	0.82609	0.82993	{'n_estimators': 377, 'criterion': 'entropy', 'max_features': 'auto', 'bootstrap': False, 'oob_score': False}	0.90789	0.91304	0.87805
-	0.89404	0.91925	0.88623				
-	0.85034	0.86335	0.87975				
-	0.86195	0.88199	0.89308				



CERTIFICATE OF PARTICIPATION



This is to certify that

Maria Ulfah Siregar, Ichsan Setiawan, Najmunda Zia Akmal, Dewi Wardani, Yessi Yunitasari, Ardhi Wijayanto

has written the Paper titled

Optimized Random Forest Classifier Based on Genetic Algorithm for Heart Failure Prediction

*at the 7th International Conference on Informatics and Computing (ICIC 2022)
held between 08-09 December 2022 at Bali*

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Welcome Message from APTIKOM Chairman



Assalamualaikum warahmatullahi wabarakatuh

A new life style is here. Landscape of things are changed. Technology of industrial revolution 4.0 and Covid-19 become the triggering factors to radical changes. Everything is converted to data. Systems of automation proliferate to profit from the digital age. The workforce landscape shifted as well, moving from traditional workforces to digital workforces. In order to take advantage of and respond to the opportunities and challenges in this disruptive environment, more digital skill sets are required.

The skillset required for the workforce in Indonesia is shown and discussed in ICIC 2022, along with how these landscapes of things and workforces are changing. Our educational systems require a drastic reform. In addition, data driven by business should be established to enhance performances. We must hasten the digital revolution in order to thrive and obtain a competitive advantage. All those issues become the main reason of ICIC 2022 choose the theme of this year conference “*Driving Digital Transformation Toward Society 5.0 through Smart Technology and Artificial Intelligence*”.

We have high hopes that this conference will help promote science and technology in Indonesia and prepare us to embrace society, together with all of our coordinated efforts in education, research, and development, and community activities. 5.0.

Welcome to join ICIC 2022

Thank you

Prof. Ir. Zainal Arifin Hasibuan, PhD.
Head of APTIKOM

Message from the General Chair of ICIC 2022



It is my great pleasure to warmly welcome you to the Seventh International Conference on Informatics and Computing (ICIC 2022) held for the first time, in Hybrid mode. Online participation will be held via the Zoom Meeting platform, while offline event will take place in the land on Bali.

The ICIC is a conference series which is conducted annually by APTIKOM, the Indonesian Association of Higher Education in Informatics and Computing. This year the main theme of the conference is "*Driving Digital Transformation Toward Society 5.0 through Smart Technology and Artificial Intelligence*", with an intention to bring up more awareness in our society on the importance of Artificial Intelligence in the current era and beyond.

The ICIC conference series as a flagship conference of APTIKOM serves as an arena for academicians and their students, experts and practitioners from the industry to meet, present, and have fruitful discussions on their research works, ideas, and papers in the wide areas of Computing which covers Computer Science, Information Systems, Information Technology, Software Engineering, and Computer Engineering. The conference is set to provide opportunities for participants from both academia and industry to share and exchange knowledge as well as the cutting-edge development in the computing field. It is expected that the ICIC participants will be able to take away new thinking and horizon from this conferential meeting to further their works in the area.

There are 224 papers submission and only 122 papers are accepted which is around 54% acceptance rate only. The accepted papers will be presented in one of the 8 regular parallel and tracks sessions and will be published in the conference proceedings volume. The diversity of authors come from 9 different countries.

All accepted papers are submitted to IEEE Xplore. IEEE Conference Number: #56845. Catalog Number: CFP22G52-ART ISBN: 979-8-3503-4571-1

On behalf of the ICIC 2022 organizers, we wish to extend our warm welcome and would like to thank for all Keynote Speakers, Reviewers, Authors, and Committees, for their effort, guidance, contribution and valuable support. We would like to also extend our gratitude to IEEE Indonesia Section for technically co-sponsored this event.

I wish you all a most wonderful, enjoyable, and productive conference in this ICIC 2022.

Thank you.

Wa billahi taufiq wal hidayah. Wallahul muwaffiq ila aqwamit tharieq.

Wasalaamu ‘alaykum warahmatullahi wabarakaatuh.

Yusuf Durachman, M.I.T

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Dwiza Riana STMIK Nusa Mandiri
Ridwan Sanjaya Soegijapranata Catholic University, Indonesia
Harry B. Santoso Faculty of Computer Science, Universitas Indonesia
Sunny Arief Sudiro STMIK Jakarta STI&K
Sukemi Sukemi Universitas Sriwijaya
Husni Teja Sukmana Syarif Hidayatullah State Islamic University Jakarta
Aries Susanto UIN Syarif Hidayatullah Jakarta
Evi Triandini Institut Teknologi dan Bisnis STIKOM Bali
Helna Wardhana Universitas Bumigora
Retantyo Wardoyo Universitas Gadjah Mada
Andree E. Widjaja Universitas Pelita Harapan

Program Structures

Thursday, December 8th, 2022

TIME*	PROGRAM	PIC/SPEAKERS	VENUE
08.00 - 08.45	Author and Participant Registration	ICIC Committee	Ballroom Entrance
09.00 – 10.00	Keynote Session ICIC	ICIC Committee	
10.00 – 12.00	Parallel session I ICIC	ICIC Committee	Parallel Room 2 nd FL (Breakout room Zoom)
12.00 – 13.00	Lunch	ICIC Committee	Ground FL Restaurant
13.00 – 14.45	ICIC Opening join with APTIKOM National Conference (MUNAS)		Ballroom
15.00 – 17.00	Parallel session II ICIC	ICIC Committee	Parallel Room 3 rd FL (Breakout room Zoom)
17.30 – 18.00	ICIC Closing	ICIC Committee	Parallel Room 3 rd FL

***) All time are in Central Indonesia time (WITA), or UTC +8**

Presentation Schedule

DAY	TIME	Track 1 TABANAN			Track 2 AMLAPURA			Track 3 BANGLI			Track 4 SINGARAJA			Track 5 VIRTUAL			Track 6 VIRTUAL			Track 7 VIRTUAL			Track 8 VIRTUAL		
THURSDAY	Session 1	CS/I	3	Onsite	CS/I	24	Onsite	CS/I	55	Onsite	IS/IT	161	Onsite	CS/I	36	Virtual	CS/I	148	Virtual	IS/IT	13	Virtual	IS/IT	126	Virtual
8 Nov 2022	10.00-12.00	CS/I	17	Onsite	CS/I	31	Onsite	CS/I	59	Onsite	IS/IT	163	Onsite	CS/I	37	Virtual	CS/I	154	Virtual	IS/IT	28	Virtual	IS/IT	136	Virtual
		CS/I	18	Onsite	CS/I	39	Onsite	CS/I	61	Onsite	IS/IT	214	Onsite	CS/I	51	Virtual	CS/I	170	Virtual	IS/IT	46	Virtual	IS/IT	137	Virtual
		CS/I	76	Onsite	CS/I	54	Onsite	CS/I	86	Onsite	IS/IT	134	Onsite	CS/I	67	Virtual	CS/I	175	Virtual	IS/IT	52	Virtual	IS/IT	192	Virtual
		CS/I	75	Onsite	CS/I	112	Onsite	CS/I	183	Onsite	SE	33	Onsite	CS/I	108	Virtual	CS/I	184	Virtual	IS/IT	69	Virtual	IS/IT	200	Virtual
		CS/I	74	Onsite	CS/I	117	Onsite	CS/I	190	Onsite	SE	123	Onsite	CS/I	139	Virtual	CS/I	186	Virtual	IS/IT	72	Virtual	IS/IT	202	Virtual
		CS/I	98	Onsite	CS/I	172	Onsite	CS/I	208	Onsite	SE	193	Onsite	CS/I	146	Virtual	CS/I	199	Virtual	IS/IT	94	Virtual	IS/IT	216	Virtual
		CS/I	104	Onsite	CS/I	181	Onsite	CS/I	141	Onsite	IS/IT	158	Onsite	CS/I	147	Virtual	CS/I	225	Virtual	IS/IT	116	Virtual	IS/IT	223	Virtual
		Track 1 TABANAN			Track 2 AMLAPURA			Track 3 BANGLI			Track 4 SINGARAJA			Track 5 VIRTUAL			Track 6 VIRTUAL			Track 7 VIRTUAL			Track 8 VIRTUAL		
	Session 2	IS/IT	49	Onsite	IS/IT	93	Onsite	MM	207	Onsite	CS/I	171	Onsite	CE/CS	27	Virtual	CS/I	22	Virtual	CS/I	70	Virtual	IS/IT	44	Virtual
	15.00-17.00	IS/IT	53	Onsite	IS/IT	95	Onsite	MM	1	Onsite	CS/I	176	Onsite	CE/CS	50	Virtual	CS/I	191	Virtual	CS/I	79	Virtual	IS/IT	106	Virtual
		IS/IT	68	Onsite	IS/IT	100	Onsite	MM	206	Onsite				CE/CS	66	Virtual	CS/I	205	Virtual	CS/I	101	Virtual	IS/IT	85	Virtual
		IS/IT	92	Onsite	IS/IT	115	Onsite	MM	122	Onsite				CE/CS	198	Virtual	CS/I	119	Virtual	CS/I	103	Virtual	IS/IT	224	Virtual
		CE/CS	57	Onsite	CE/CS	91	Onsite	IS/IT	209	Onsite				CS/I	14	Virtual	CS/I	77	Virtual	SE	107	Virtual	CS/I	2	Virtual
		CE/CS	65	Onsite	CE/CS	195	Onsite	IS/IT	213	Onsite				CS/I	182	Virtual	CS/I	110	Virtual	SE	135	Virtual	CS/I	40	Virtual
		CE/CS	23	Onsite	CE/CS	90	Onsite	IS/IT	41	Onsite				MM	15	Virtual	CS/I	187	Virtual	SE	16	Virtual	CS/I	62	Virtual
		CE/CS	84	Onsite	CE/CS	82	Onsite	IS/IT	12	Onsite				MM	179	Virtual	CS/I	121	Virtual				CS/I	73	Virtual

*) All time are in Central Indonesia time (WITA), or UTC +8

Tracks:

CE/CS CE and Computer Systems

CS/I CS and Informatics

MM Multimedia

IS/IT IS, IT and Management

SE Software Engineering

Presentation Schedule Session 1 – 10.00 – 12.00

	Track 1 - TABANAN ROOM			
	Session Chair:			
CS/I	3	The Estimating of Nutrient Value in Apples Based on Size Employing the Canny Edge Detection Algorithm	Anis Fitri Nur Masruriyah, Muhammad Haidar Ijlal, Rahmat Rahmat, Hanny Hikmayanti Handayani, Deden Wahiddin and Ahmad Fauzi	Onsite
CS/I	17	Garbage Classification Using CNN Architecture ShuffleNet v2	Eka Setya Wijaya, Andy Mizwar, Ahmad Mujaddid Islami, Yuslena Sari, Erika Maulidiya and Irham Maulani Abdul Gani	Onsite
CS/I	18	Bankruptcy Prediction using Ensemble Support Vector Machine	Nurul Fathanah Mustamin, Jeffry, Supriyadi La Wungo, Firman Aziz and Nurafni Shahnyb	Onsite
CS/I	23	Mobile Application Performance Improvement with the Implementation of Code Refactor Based on Code Smells Identification: Dutataniku Agriculture Mobile App Case Study	Argo Wibowo, Antonius Rachmat Chrismanto, Maria Nila Anggia Rini and Lukas Chrisantyo	Onsite
CS/I	75	Improvising Low Contrast Malaria Images Using Contrast Enhancement Techniques on Various Color Models	Doni Setyawan, Retantyo Wardoyo, Moh Wibowo and E. Elsa Hardiana Murhandarwati	Onsite
CS/I	74	A Study on Text Feature Selection Using Ant Colony and Grey Wolf Optimization	Joan Angelina Widians, Retantyo Wardoyo and Sri Hartati	Onsite
CS/I	98	Analysis of Face Data Augmentation in Various Poses for Face Recognition Model	T.M. Syahril Nur Alamsyah, Taufik Abidin, Ridha Ferdhiana, Muhammad Dirhamsyah and Muhammad Chaidir	Onsite
CS/I	104	Dual Cluster Head Selection Based on LEACH and Differential Search Algorithm to Extend Network Lifetime in Wireless Sensor Network	Kun Nursyaiful Priyo Pamungkas, Supeno Djanali, Radityo Anggoro, Paliling, Puhrani Burhan and Feriyadi	Onsite

	Track 2 - AMLAPURA ROOM			
	Session Chair:			
CS/I	24	Public Sentiment Analysis of Indonesian Tweets About COVID-19 Vaccination Using Different Machine Learning Approaches	Valentinus Paramarta, Adele Mailangkay, Hilda Amalia and Desta Christmas	Onsite
CS/I	31	Fire Detection In Wetland Using YOLOv4 And Deep Learning Architecture	Andreyan Rizky Baskara, Yuslena Sari, Auria Andeni Anugerah, Eka Setya Wijaya and Ricardus Anggi Pramunendar	Onsite
CS/I	39	A Systematic Literature Review Enhanced Felder Silverman Learning Style Models (FSLSM)	Supangat Supangat and Mohd Zainuri Bin Saringat	Onsite
CS/I	54	Vanishing Point Detection using Angle-based Hough Transform and RANSAC	Dea Angelia Kamil, Agus Harjoko and Wahyono Wahyono	Onsite
CS/I	112	Systematic Literature Review of Text Feature Extraction: Research Trends, Datasets, and Methods	Agus Mulyanto, Sri Hartati and Retantyo Wardoyo	Onsite
CS/I	117	A Time-Window Approach to Recommending Emerging and On-the-rise Items	Tubagus Mohammad Akhriza and Indah Dwi Mumpuni	Onsite
CS/I	172	Energy Efficiency in Buildings Using Multivariate Extreme Gradient Boosting	Triando Hamonangan Saragih, Rahmat Ramadhani, Muhammad Itqan Mazdadi and Muhammad Haekal	Onsite
CS/I	181	Sentiment Classification of Visitors in Yogyakarta Palace using Support Vector Machine	Cahya Damarjati, Fadia Rani and Slamet Riyadi	Onsite

Track 3 - BANGLI ROOM				
Session Chair:				
CS/I	55	Classification and Sentiment Analysis on Tweets of the Ministry of Health Republic of Indonesia	Apriandy Angdresey, Indah Yessi Kairupan and Kenshin Gerald Emor	Onsite
CS/I	59	Conditional Random Field for Crime News Information Extraction with SMOTE	Viny Christanti Mawardi, Veronika Veronika and Dali Santun Naga	Onsite
CS/I	61	The Implementation of Real-ESRGAN as An Anticipation to Reduce CER Value in Plate Number Extraction Results Employing EasyOCR	Geo Septian, Deden Wahiddin, Hilda Novita, Hanny Hikmayanti Handayani, Ayu Ratna and Anis Fitri Nur Masuriyah	Onsite
CS/I	86	Classification of Chili Plant Condition based on Color and Texture Features	Deffa Rahadiyan, Sri Hartati, Wahyono Wahyono and Andri Prima Nugroho	Onsite
CS/I	183	Hate Speech Detection in Code-Mixed Indonesian Social Media: Exploiting Multilingual Languages Resources	Endang Wahyu Pamungkas, Azizah Fatmawati, Dedi Gunawan, Yusuf Sulisty Nugroho and Endah Sudarmilah	Onsite
CS/I	190	Comparison of Convolutional Neural Network Models to Detect Covid-19 on CT-Scan Images	Slamet Riyadi, Suci Rahmadina M. Rasyid and Cahya Damarjati	Onsite
CS/I	208	Analysis of Indonesian Discussion Tendency on Twitter with Text Classification	Reyvan Rizky Irsandy and Ayu Purwarianti	Onsite
CS/I	141	1D Convolutional Neural Network to Detect Ventricular Fibrillation	Sava Savero, Muammar Sadrawi and David Agustriawan	Onsite

Track 4 - SINGARAJA ROOM				
Session Chair:				
IS/IT	161	Adaptation on Education after Covid-19 – Optimizing Cognitive Load on Nervous System Science Learning for Higher Education Students through the Usage of Chunking Style Animation in Social Learning Media	Ng Melissa Angga, Cicilia Caroline Phieranto, Fonny Tejo, Dionisius Yovan, Angelica Angelica and Felicia Sumarsono Putri	Onsite
IS/IT	163	Topic Modeling for Cyber Threat Intelligence (CTI)	Hatma Suryotrisongko, Hari Ginardi, Saeed Dehqan and Yasuo Musashi	Onsite
IS/IT	214	Evaluation of Enterprise Resource Planning (ERP) and Open-source ERP Modification for Performance Improvement	Ananda and Jansen Wiratama	Onsite
IS/IT	134	M-Government Adoption in Indonesia: Self-Determination Theory	Dedi I. Inan, Achmad Nizar Hidayanto, Ratna Juita, Antares Firman, Ali Muktiyanto, Hermawan Wibisana Arifin, Muhammad Rizky Darmawan, Nabilla Yuli Shafira and Cassie Michelle	Onsite
SE	33	Design and Build a Attendance System and Employee Performance Assessment with a Website-Based Profile Matching Method	Hata Maulana, Noorlela Marcheta, Asep Taufik Muharram, Kamil Raihan Permana and Alifiah Putri Aisyah	Onsite
SE	123	GeoJSON Implementation for Demographic and Geographic Data Integration Using RESTful Web Services	Alam Rahmatulloh, Bambang Tri Handoko, Rahmi Nur Shofa and Irfan Darmawan	Onsite
SE	193	Development of Portal Signer for Digital Products by Using Iterative Model at PT RST	Manogunawan Resqi Gultom, Riyanthi Angrainy Sianturi, Rince Septriana Parhusip, Ova Ferdinan Marbun and Yohanssen Pratama	Onsite
IS/IT	158	Adoption Technology at MSMEs: A Conceptual Model with TOE	Evi Triandini, I Gusti Ngurah Satria Wijaya, I Ketut Putu Suniantara and Sugiarto Sugiarto	Onsite

Presentation Schedule Session 2 – 10.00-12.00 (VIRTUAL)

Track 5 Session Chair:		
CS/I	36	Comparison of the K-Nearest Neighbor and Decision Tree algorithm to the Sentiment Analysis of Investment Applications Users in Indonesia Doni Purnama Alamsyah, Rizkiansyah Rizkiansyah and Asti Herliana
CS/I	37	Investigation of Netizen Sentiment Analysis Toward The Controversy of Information and Electronic Transaction Law Fahdi Saidi Lubis, Muharman Lubis and Lukmanul Hakim
CS/I	51	Sentiment Analysis of "Hepatitis of Unknown Origin" on Social Media using Machine Learning Nova Agustina, Harya Gusdevi, Iis Ismawati, Diyah Wijayati and Candra Nur Ihsan
CS/I	67	Multiclass Intent Classification for Chatbot Based on Machine Learning Algorithm Wan Mohd Amir Fazamin Wan Hamzah, Mohd Kamir Yusof, Ismahafezi Ismail, Mokhairi Makhtar, Hasnah Nawang and Azwa Abdul Aziz
CS/I	108	Low Cloud Type Classification System Using Convolutional Neural Network Algorithm Muhammad Naufal Fikriansyah, Hapsoro Agung Nugroho and Marzuki Sinambela
CS/I	139	Rice seed classification using machine learning and deep learning Budi Dwi Satoto, Devie Rosa Anamisa, Budi Irmawati, Muhammad Yusuf, Mohammad Kautsar Sophan and Siti Oryza Khairunnisa
CS/I	146	Analysis for Data Mobility and Covid-19 Positive Rate with Multilayer Perceptron Arie Vatesia, Ruvita Faurina and Riki Zulfahmi
CS/I	147	Multibranch Convolutional Neural Network For Gender And Age Identification Using Multiclass Classification And FaceNet Model Haris Setiawan, Mudrik Alaydrus and Abdi Wahab

Track 6 Session Chair:		
CS/I	148	Detecting Online Outlier for Data Streams using Recursive Residual Yasi Dani
CS/I	154	Implementation of Adaptive Bit Decision Point to Improve Receiver Performance in Li-Fi System Juan S. Biantong, Mudrik Alaydrus and Ahmad Sony Alfathani
CS/I	170	LongSpam: Spam Email Detection using LSTM Algorithm Nurhadi Wijaya
CS/I	175	LSTM and ARIMA for Forecasting COVID-19 Positive and Mortality Cases in Indonesia Syafrial Fachri Pane, Adiwijaya Adiwijaya, Mahmud Dwi Sulistiyo and Alfian Akbar Gozali
CS/I	184	Semantic Segmentation of Landsat Satellite Imagery Herlawati Herlawati, Rahmadya Trias Handayanto, Prima Dina Atika, Sugiyatno Sugiyatno, Rasim Rasim and Mugiarto Mugiarto
CS/I	186	DeepRec: Efficient Product Recommendation Model for E-Commerce using CNN Hamzah Hamzah, Erizal Erizal and Mohammad Diqi
CS/I	199	Adopting Haar Cascade Algorithm on Mask Detection System Based on Distance Jemakmun Jemakmun, Rudi Suhirja, Darius Antoni, Hadi Syaputra and Darius Antoni
CS/I	225	E-Archive Document Clustering Information System Using K-Means Algorithm Aida Fitriyani, Wowon Priatna, Dani Yusuf, Tri Dharma, Sri Rejeki and Amri Amri

Track 7 Session Chair:		
IS/IT	13	The Influence of The COVID-19 Pandemics in Indonesia On Predicting Economic Sectors Heriyanto Heriyanto, Syafrial Fachri Pane, Aji Gautama Putrada, Nur Alamsyah and Mohamad Nurkamal Fauzan
IS/IT	28	Validation and Verification of Business Architecture Process Based On The V . Model Widia Febriyani, Firna Muningsgar Kistianti and Muhamman Lubis
IS/IT	46	Acceptance Rate Analysis of Internal Management Operational Application on Pt. Sigma Cipta Caraka Using Technology Acceptance Model (TAM) Fatimah Azzahra Ashari, Muhammad Qamra Zahran Muharam, Junia Himmayati and Teguh Prasandy
IS/IT	52	ONLINE LEARNING AND STUDENTS' ETHICAL BEHAVIOR DURING COVID-19: FOR BETTER OR FOR WORSE? CASE STUDY FOR CREATIVEPRENEURSHIP STUDY PROGRAM, BINUS BANDUNG Febri Tri Intan Azhana, Rosita Widjojo, Khusnul Khotimah, Doni Purnama Alam Syah, Muchamad Rizky Zakaria and Balqis Putri Hidayatullah
IS/IT	69	Analysis of Design Implementation Guidelines for Data Governance Management Based on DAMADMBOKv2 Fadhil Rozi Hendrawan, Tien Fabrianti Kusumasari and Rokhman Fauzi
IS/IT	72	Enterprise Architecture Planning based on One Data in Indonesian Higher Education Hery Dian Septama, Muhamad Komarudin, Puput Budi Wintoro, Mahendra Pratama, Titin Yulianti and Bambang Sundari
IS/IT	94	Motivation and Drivers for Online Fashion Rental: Study by Social Networking Sites in Indonesia Margareth Setiawan, Sandy Setiawan, Aris Darisman and Rosyidah Rahmah
IS/IT	116	Model Implementation of Application Programming Interface for E-Government Data Integration Agus Sifaunajah, Tholib Hariono, Moh. Anshori Aris Widy, Primaadi Airlangga, Sujono and Siti Sufaidah

Track 8 Session Chair:		
IS/IT	126	Android-based Matrix Learning Media to Increase Student Interest in Learning Isna Wardiah, Rahimi Fitri, Reza Fauzan, Seberan and Fuad Sholihin
IS/IT	136	Digital Transformation Impact Analysis towards Transition in the Role of Information Technology for Organization in New Digital Bank Yosua Pangihutan Sagala, Muhammad Akmal Juniawan, Vina Ardelia Effendy, Rahmawati Putrianasari, Vien Aulia Rahmatika, Muhammad Rifki Shihab and Benny Ranti
IS/IT	137	Analysis of Critical Success Factors in Information Technology Projects: A National Shipping Company Case Study Ivan Eka Aditya, Ardhy Wisdarianto and Teguh Raharjo
IS/IT	192	User Experience Evaluation of IT Support Mobile Application Using System Usability Scale (SUS) and Retrospective Think Aloud (RTA) Imanuel Revelino, Sunardi Sunardi, Ratih Muthiah Kamilia, Ganis Maulia Yusuf and Rizki Kurniawan
IS/IT	200	Impact of Leadership in Transitioning IT Roles from Turnaround to Strategic: Case Study of PT. XYZ Paulus Donny Junianto, Rizal Fathoni Aji and Ryan Randy Suryono
IS/IT	202	Usability Evaluation on Educational Chatbot using the System Usability Scale (SUS) Arief Hidayat, Agung Nugroho and Safa'Ah Nurfa'Izin
IS/IT	216	Adaptive: A Personalized Adaptive E-Learning System based on Learning Style and Prior Knowledge Mohammed Rishard, Sandaru Jayasekara, Piumi Ekanayake, Jayani Wickramathilake, Kalpani Manathunga and Jagath Wickramaratne
IS/IT	223	Data Balance Optimization of Fraud Classification for E-Commerce Transaction Aida Fitriyani, Wowon Priatna, Dani Yusuf, Tri Dharma, Sri Rejeki and Amri Amri

Presentation Schedule Session 2 – 15.00 – 17.00

	Track 1 - TABANAN ROOM			
	Session Chair:			
IS/IT	49	Examining User Acceptance of MOOCs: The Role of Openness, Task Technology Fit, and Social Recognition	Bernardinus Harnadi, Fx Prasetya and Albertus Widianoro	Onsite
IS/IT	53	ISO 15489 Attributes Prioritization in Electronic Document Management System of the First Level Healthcare Facilities	Intan Dzikria, Luvia Friska Narulita, Agus Hermanto and Geri Kusnanto	Onsite
IS/IT	68	IoT-Agri: IoT-based Environment Control and Monitoring System for Agriculture	Adimas Ketut Nalendra, Dona Wahyudi, M Mujiono, M. Nur Fuad and Ni'Ma Kholila	Onsite
IS/IT	92	The Follower-Influencer Experience Affecting the Intention to Follow Recommendation: PAD Perspective	Dedi I. Inan, Achmad Nizar Hidayanto, Ratna Juita, Adam Maulana, Dinda Mutiara Qur'Ani Putri, Muhammad Fariz Farhan, Siti Kaamiliaa Hasnaa and Marlinda Sanglise	Onsite
CE/CS	57	Can We Predict Our Electricity Consumption?	Apriandy Angdresey, Lanny Sitanayah and Zefanya Marieke Philia Rumpesak	Onsite
CE/CS	65	Learner Action Patterns in the Problem-Solving Process Related to Program Code Composition Based on Tracking System Activities	Aulia Akhrian Syahidi, Ahmad Afif Supianto, Tsukasa Hirashima and Yutaka Watanobe	Onsite
CE/CS	76	Comparison of Smoothing Methods for Noise Reduction on Baseline Electroencephalogram Signals	I Made Agus Wirawan, Retantyo Wardoyo, Danang Lelono and Sri Kusrohmaniah	Onsite
CE/CS	84	Oil Well Monitoring System Based on IoT Technology and Machine Learning	Evizal Abdul Kadir, Muslim Abdurrahman, Sharul Kamal Abdul Rahim, Agus Arsad, Sri Listia Rosa and Apri Siswanto	Onsite

	Track 2 - AMLAPURA ROOM			
	Session Chair:			
IS/IT	93	Adaptive Cooling System for Comfortable Learning	David Habsara Hareva	Onsite
IS/IT	95	UT Metaverse: Beyond Universitas Terbuka Governance Transformation and Open Challenges	Antares Firman, Ali Muktiyanto, Dedi I. Inan, Ratna Juita, Ghassan Beydoun and Daryono Daryono	Onsite
IS/IT	100	Utilization of Linguistic Data for Learner Assessment on e-Learning: Instrument and Processing	Wenty Dwi Yuniarti, Sri Hartati, Sigit Priyanta and Herman Dwi Surjono	Onsite
IS/IT	115	Food Vloggers: Mapping the Relationships between Personal Relevance, Customer Engagement, and Repurchase Decision	Arif Murti Rozamuri, Johan Setiawan, Christian Haposan Pangaribuan, Hidayanti, Tri Wismiarsi and Maria Wahyuni	Onsite
CE/CS	91	Design of Blind Community Assistance Devices with Indoor Positioning System Technology	Cen Choi Bong, David Habsara Hareva and Samuel Lukas	Onsite
CE/CS	195	Portable Monitoring Systems for Rivers Based on Internet of Things	Henderi Henderi, Mumammad Hudzaifah Nasrullah, Laura Belani Nudiyah, Po Abas Sunarya, Jana Utama and Didik Setiyadi	Onsite
CE/CS	90	Face Recognition System Using Feature Extraction Method of 2-D Gabor Wavelet Filter Bank and Distance-Based Similarity Measures	R Rizal Isnanto, Ajub Ajulian Zahra and Andre Lukito Kurniawan	Onsite
CE/CS	82	An experimental study on binary optimization using quantum annealing in D-Wave	Nongmeikapam Brajabidhu Singh, Gopal Krishna, Arnab Roy, Joseph L Pachauu and Anish Kumar Saha	Onsite

Track 3 - BANGLI ROOM				
Session Chair:				
MM	207	Learn Japanese Vocabulary and Hiragana Letters with Augmented Reality for Indonesian Children	Riri Safitri, Resnia Trya Muslima and Sandra Herlina	Onsite
MM	1	Aw...The Museum is so "Dark": The Effect of Thermal Stimuli for Virtual Reality Experience and Emotion	Gabriel Indra Widi Tamtama, Halim Budi Santoso, Jyun-Cheng Wang and Nila Armelia Windasari	Onsite
MM	206	Interaction Design of Indonesian Anti Hoax Chatbot	Ryan Daniel, Ayu Purwarianti and Dessi Puji Lestari	Onsite
MM	122	Automatic Determination of Seeded Region Growing Parameters in Watershed Regions to Segmentation of Tuna	Wanvy Arifha Saputra, Agus Zainal Arifin, Nuruddin Wiranda, Edi Yohanes, Zainal Abidin and Bambang Suriansyah	Onsite
IS/IT	209	Usability Improvement Through User Interface Design With Human Centered Design (HCD) Method On Junior High School Websites	Saepul Aripriyanto, Riana Munawarohman, Muhamad Azhari, Siti Umami Masruroh, Dewi Khairani and Husni Teja Sukmana	Onsite
IS/IT	213	Educational question classification with Graph Neural Network	Said Al Faraby, Adiwijaya Adiwijaya and Ade Romadhony	Onsite
IS/IT	41	A Systematic Literature Review of Barriers and Drivers E-Government in Developing Countries: TOE Framework Perspective	Dony Martinus Sihotang, Bambang Aria Yudhistira, Solikin, Dana I Sensuse, Achmad Nizar Hidayanto, Widjanto Satyo Nugroho and Wahyu Catur Wibowo	Onsite
IS/IT	12	Influence of Electronic Word Of Mouth (e-WOM), Hedonic Motivation, and Price Value On Consumer's Purchase Intention Using Social Commerce "TikTok Shop"	Mutia Maulida, Yuslena Sari and Siti Rohmah	Onsite

Track 4 - SINGARAJA ROOM				
Session Chair:				
CS/I	171	Improving Candle Direction Classification in Forex Market using Support Vector Machine with Hyperparameters Tuning	Raymond Oetama, Yaya Heryadi, Lukas Lukas and Wayan Suparta	Onsite
CS/I	176	Sentiment Analysis on Cryptocurrency Based on Tweets and Retweets Using Support Vector Machines and Chi-Square	Isabella Donita Hasan, Raymond Oetama and Aldo Lionel Saonard	Onsite

Presentation Schedule Session 2 – 15.00 – 17.00 (VIRTUAL)

Track 5 Session Chair:		
CE/CS	27	Modeling and Simulation of Long Range (LoRa) Communication System on Smart Grid Ismindari Isminarti, Amil Ahmad Ilham, Ardiaty Arief and Syafaruddin Syafaruddin
CE/CS	50	Follicle Detection Model on Ovarian Ultrasound Image Sri Hartati, Aina Musdholifah, Putu Desiana Wulaning Ayu and Jaswadi Dasuki
CE/CS	66	Mobile Device Positioning by Using Dynamic Weighted Centroid Model Rifki Kosasih and Ahmad Sabri
CE/CS	198	The Development Indoor Air Quality Monitoring System of Library of Universitas Multimedia Nusantara using Internet of Things Rahmi Andarini and Moeljono Widjaja
CS/I	14	A PSO-GBR Solution for Association Rule Optimization on Supermarket Sales Syafrial Fachri Pane, Aji Gautama Putrada, Nur Alamsyah and Mohamad Nurkamal Fauzan
CS/I	182	The Comparison of Sentiment Analysis Algorithm for Fake Review Detection of The Leading Online Stores in Indonesia Pius Hans Christian and Ririn Ikana Desanti
MM	15	SI-BIME Smart Learning Multimedia Platform for Students: a Solutions for the Pandemic-19 in the Regions Dina Fitria Murad, Titan Titan, Taufik Darwis and Hardiyansyah Hardiyansyah
MM	179	Augmented Reality English Education Based iOS with MobileNetV2 Image Recognition Model Doni Purnama Alamsyah, Yudi Ramdhani, Ahmad Setiadi and Agus Tiyanisya Syam

Track 6 Session Chair:		
CS/I	22	Text Normalization on Code-Mixed Twitter Text using Language Detection Rafi Dwi Rizqullah and Indra Budi
CS/I	191	Data Pipeline Framework for AIS Data Processing Ni Kadek Bumi Krismentari, I Made Oka Widyantara, Ngurah Indra Er, I Made Dwi Putra Asana, I Putu Noven Hartawan and I Gede Sudiantara
CS/I	205	Real Time Web-based Facemask Detection Implementation Gerald Pan, Suryasari Suryasari, Haditya Setiawan and Aminuddin Rizal
CS/I	119	Topic Modeling on COVID-19 Vaccination in Indonesia Using LDA Model Nurul Mutiah, Dian Prawira and Ibnur Rusi
CS/I	77	Decision Tree Algorithm in Visual Novel Game using RenPy Games Engine Diena Rauda Ramdania, Maisevli Harika, Maulana Hamdani, Yana Aditia Gerhana, Nurhadi Qomaruddin, Cepy Slamet and Dian Sa'Adillah Maylawati
CS/I	110	Dynamic Pricing Analytic of Airbnb Amsterdam Using K-Means Clustering Fitrianingsih Fitrianingsih and Figa Rizfa
CS/I	187	Analyze and Improve Production Process Using VSM Method: A Case Study of Microplate HT96 Production at PT. Promanufacture Indonesia Muh Ikhsan and Sri Susilawati Islam
CS/I	121	Prediction of Work From Home Post COVID-19 using Classification Model Risanti Galuh and Johan Setiawan

Track 7 Session Chair:		
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Aw...The Museum is so "Dark": The Effect of Thermal Stimuli for Virtual Reality Experience and Emotion

Abstract -

Virtual Reality (VR) is an emerging technology that can enhance tourists' experiences through digital multisensory, such as human senses and thermal stimuli. Prior studies are missing to understand the impact of thermal stimuli on the VR experience. Therefore, this study tries to fill the research gap in a dark tourism context with three conditions: cold, warm, and no thermal stimuli. Using a randomized lab experiment with 15 participants, this study found that cold thermal stimuli trigger less arousal and valence than warm and neutral conditions. Moreover, we also reported users' emotions by capturing psychophysiological data (electrodermal activity and heart rate) to increase the robustness of the study. We extend this study by interviewing participants to understand cognitive and affective experiences that lead to eudemonic wellbeing as the outcome of this VR experience.

Keywords: Virtual Reality, Thermal stimuli, Dark Tourism, Emotion, Customer Experience

Random Forest Classifier Based on Genetic Algorithm Optimization for Heart Failure Prediction

Abstract -

The Random Forest algorithm is one of the supervised learning algorithms used in object classification. Several parameters are needed to be set before the random forest can be executed. In this study, the random forest will be optimized using the genetic algorithm to obtain the best parameters which in the end, the accuracy will be improved. We experimented with two iterations for each combination of the parameters and there are 9 combinations of parameters. The dataset is the heart failure prediction obtained from Kaggle. We compare the results of optimized random forest, stand-alone random forest, decision tree, and Naïve Bayes algorithms. Our finding is that the optimized method is slightly better than the other algorithms. The best F1-score is obtained at the second iteration which is 0.9078947368 with {187, 'gini', 'sqrt', True, False} or {377, 'entropy', 'auto', False, False} parameters of random forest classifier.

Keywords: dataset, decision tree, Naïve Bayes, parameters, accuracy

The Estimating of Nutrient Value in Apples Based on Size Employing the Canny Edge Detection Algorithm

Abstract -

Apples are relatively easy to find by the public and have good health benefits. When someone wants to adopt a healthy diet, apples become part of the food menu they consume because of their good nutritional content. Some consumers do not really pay attention to the nutritional content consumed; they only focus on the size of the fruit. So, this study proposes to estimate the nutrients in apples using the Canny Edge Detection algorithm. This research begins by taking an image of apples and collecting data using a caliper to determine the height and width of the apples. Furthermore, the image that was ready to be processed uses image preprocessing to be prepared for the next process. Then the canny edge detection algorithm was applied to determine the edges of the apple image so that the volume of apples can be calculated, and the nutritional value was known based on the weight of the apples.

Keywords: Apple, Canny Edge Detection, Image Processing, Nutrient, Size

Influence of Electronic Word Of Mouth (e-WOM), Hedonic Motivation, and Price Value On Consumer's Purchase Intention Using Social Commerce "TikTok Shop"

Abstract -

A part of e-commerce with the concept of collaboration between commercial and social activities is called social commerce (s-commerce). TikTok Shop is a new feature development in the business realm of the social media platform TikTok. Electronic Word of Mouth (e-WOM) is the factor that influences consumers' purchase intention in online shopping using TikTok Shop. The goals of this study are to determine the factors influencing consumers' purchase intention in using TikTok Shop and determine whether hedonic motivation and price values significantly affect consumers' purchase intention. The model used in this study uses a modified theory of Electronic Word of Mouth (e-WOM) and the model Unified Theory of Acceptance and Use Of Technology2 (UTAUT2), which focuses on variable hedonic motivation, and price value on the purchase intention of every consumer's in using TikTok Shop. A quantitative approach is used to collect the data by distributing questionnaires to 479 respondents who are using TikTok Shop. Data analysis was carried out using the PLS-SEM method using the SmartPLS application. This study accepted 8 of 9 hypotheses. The findings of this study indicate that the information quality constructs, the performance expectancy, the social influence construct, the trust construct, and the influencer construct influence consumer's purchase intention in using TikTok Shop. In contrast, the perceived risk construct does not significantly affect consumers' purchase intention in using TikTok Shop. The hedonic motivation constructs, habit, and price constructs influence consumers' purchase intention. The hedonic motivation construct is the biggest factor influencing consumers' purchase intention. The mediation test shows that trust and habit variables partially mediate the purchase intention.

Keywords: TikTok Shop, Electronic Word of Mouth (e-WOM), UTAUT2, Purchase Intention, PLS-SEM

The Influence of The COVID-19 Pandemics in Indonesia On Predicting Economic Sectors

Abstract -

Several studies have tried to prove the link between the economic sectors in Indonesia with the COVID-19 pandemic. However, research has yet to observe the influence of the COVID19 pandemic on the predicted performance of regression models. This study proposes the development of previous research following the impact of the COVID-19 pandemic on machine learning performances in predicting economic sectors in Indonesia. The economic sectors mentioned include the exchange rate, CPI, and stock price. The proposed methods for comparison are decision tree (DST) and random forest (RF). Comparison of prediction performance with legacy uses root mean squared error (RMSE), mean squared error (MSE), mean absolute error (MAE), and mean absolute percentage error (MAPE). Test results show that the RF regression model has superior performance compared to DST with the best MSE, RMSE, MAP E, MAE, and r^2 value of 0.010, 0.102, 0.64%, 0.100, and 0.89, respectively. Using the TTest, we prove that the COVID-19 pandemic does not significantly affect machine learning predictions on the exchange rate but significantly affects machine learning predictions on CPI and stock prices.

Keywords: economic sectors, exchange rate, consumer price index, stock price, prediction, COVID-19, machine learning, regression, random forest, Indonesia

A PSO-GBR Solution for Association Rule Optimization on Supermarket Sales

Abstract -

In the era of big data and cloud computing, digital records of supermarket sales data and other accompanying factors are ubiquitous. However, less than optimal Weekly Sales can occur due to several factors influencing it. This study proposes particle swarm optimization with gradient boosting regression (PSO-GBR) as a solution for optimizing the association rule in supermarket sales based on a regression model that can predict Weekly Sales. As a benchmark for this research, we compare our proposed GBR with two legacy prediction methods: linear regression (LR) and AdaBoost Regression (ABR). The first step is data preparation. Then we develop a model that can predict sales from the dataset using GBR. The next step is to evaluate the model with benchmark methods. Then with an optimum regression method, we optimize sales using PSO. The last step is to show that the method provides optimum Weekly Sales results. The results show that our proposed GBR has a higher R score than LR and ABR, namely 0.95 and 0.94 for train data and test data, respectively. Then PSO is proven to optimize sales using the GBR model as a cost function. PSO can increase the ten lowest Weekly Sales of the actual dataset from a total of US \$ 45 to a total of US \$ 2,296.9 by selecting a more optimized Department according to the GBR prediction. This research proves that we can use a regression model with good performance for a cost function in PSO optimization for department sales.

Keywords: particle swarm optimization, gradient boosting regression, supermarket, association rule, optimization, sales

SI-BIME Smart Learning Multimedia Platform for Students: a Solution for the Pandemic-19 in the Regions

Abstract -

The impact of the Covid-19 pandemic is not only experienced by a handful of people but by all lines of life in this world. One of the biggest impacts is related to the provision of education at the primary, secondary, and senior levels. This study uses the prototype method which is targeted to produce applications that are ready to be implemented to produce an intelligent learning application. This study uses a quantitative method for evaluating results. This study aims to assist schools, especially those in the regions, in overcoming the problem of decreased learning activity because it has been identified as the cause of decreased student learning outcomes. This research was conducted at the high school level because students were prepared to continue to a higher level. This research resulted in a smart learning SI-BIME (BINUS Multimedia Edutainment Information System) which was prepared to support e-learning-based learning processes in schools. Based on the evaluation of learning, the results of this study proved to be very helpful for schools and support a better learning process. As well as focus group discussions with school authorities, students, and parent representatives, assessments are also provided by higher-level authorities. The results of this study can also help schools and teachers to prepare better learning media for students and can be used comprehensively and sustainably even though COVID-19 is over.

Keywords: SI-BIME, e-learning, smart learning, Covid-19

A. A. Istri Ita Paramitha, I Ketut Agus Juliana, Ketut Queena Fredlina, Helmy Syakh Alam, I Made Artana and I Nyoman Yudi Anggara Wijaya

Designing Mobile Banking Prototype Using Design Thinking Approach (Case Study: BPD Bali Mobile)

Abstract -

This study discusses the design of the User Interface on the BPD Bali Mobile application so that the application is more user-friendly. BPD Bali Mobile is one of BPD Bali's innovative mobile banking products launched in 2015. However, the current BPD Bali Mobile application has user interface and user experience problems. Based on interviews and observations, many users find it challenging to use the application, especially on the login display, dashboard, notifications, and transaction details. These problems caused a lack of interest in using the BPD Bali Mobile application. Improvements are needed to the user interface on the BPD Bali Mobile to provide a good user experience so the users will be more accessible to use the application. The design thinking method is used in designing the interface of BPD Bali Mobile. This method has iterations in stages to improve the design according to user needs. The result of this study is a prototype of the BPD Bali Mobile user interface that is more user-friendly by testing with the SUS method. The prototype design managed to get a score of 82.5, which is in the “acceptable” category.

Keywords: User Interface, Design Thinking, Prototype, Mobile Banking

Garbage Classification Using CNN Architecture ShuffleNet v2

Abstract -

The increase in population has a serious impact on aspects of an area or city, one of which is the overflow of waste volume. According to data from the National Waste Management Information System (SIPSN) quoted on the official SIPSN website, in 2021 the amount of Indonesia's waste piles will be 28.57 million tons/year and 78.27 million tons/day. Reduction of waste by 15.62% or 4.4 million tons from the previous year, but waste management in Indonesia can only be managed as much as 64.52% or 18.43 million tons/year. This is due to the lack of knowledge and awareness of the surrounding community in classifying waste when disposing of waste that is not in accordance with its type. The practice of garbage disposal is sometimes still confused about the type of waste category they have by reason of the large number of materials that make up the waste. Based on these problems, a study was conducted on the classification of types of waste to determine whether the category can be recycled. This study will classify the types of waste using 6601 waste image data with the division of waste types as many as 4 classes, namely plastic waste, organic paper and others using ShuffleNet v2. And it can be concluded that the ShuffleNet v2 architecture is able to classify garbage images with four data groups that have been selected from different sources on the Kaggle website with recall, precision, and f1-score values on ShuffleNet v2 with a number of epochs are 50, are 97.32%, 96.79%, and 97.03%.

Keywords: garbage, shufflenet v2, convolutional neural network, digital image processing



Paper ID #18

Nurul Fathanah Mustamin, Jeffry, Supriyadi La Wungo, Firman Aziz, Nurafni Shahnyb, Ampauleng

Bankruptcy Prediction using Ensemble Support Vector Machine

Abstract -

Companies or financial institutions need bankruptcy predictions to make the right decisions for the company's sustainability. Determining predictions is undoubtedly tricky if done manually with the most significant data. Therefore, prediction techniques are mainly used to determine company policies using statistical and machine learning approaches. Based on several studies that have been conducted, the standard SVM method has a low level of accuracy in bankruptcy prediction. Then, this study suggests using the Ensemble approach because it can improve SVM performance. Ensemble Techniques in statistical methods can overcome problems in bankruptcy prediction by obtaining the best performance. This research predicts bankruptcy using the Ensemble SVM Classification to improve accuracy. The experimental results indicate that the proposed technique increases the performance of a conventional SVM by around 5%

Keywords: bankruptcy, prediction, SVM, Ensemble, Bagging, Adaboost, Stacking

Text Normalization on Code-Mixed Twitter Text using Language Detection

Abstract -

Presence of code-mixed language become a challenge for NLP research that focused on Twitter text normalization. Some challenges include normalize text containing words with more than one language. But recent method for text normalization still has problems related to language, either on identifying language or normalize a word. This research report covers the solution that can be given to overcome those problems. The approach is using language detection module alongside with transformer model. A BERT model tagger was used as a language detection, and two ByT5 models was used as a normalization. The research shows that proposed method has ERR score 1.01 percent lower than baseline.

Keywords: text normalization, twitter, multilingual, code-mixed language, language detection

Mobile Application Performance Improvement with the Implementation of Code Refactor Based on Code Smells Identification: Dutataniku Agriculture Mobile App Case Study

Abstract -

Technology can be a supporter of business processes, even playing an important role in business acceleration. Conventional businesses will slowly move towards technology-oriented businesses. The need for a good application and system becomes a fundamental need today. All sectors are already supported by technology, including the agricultural sector. Agriculture in Indonesia is, slowly but surely, undergoing changes towards modern and precision agriculture. The information system prepared of course needs to have a good code architecture so as to produce a well-performed system. To ensure this, one approach is by identifying the code smell. This study will try to test and compare the code on a mobile-based agricultural information system before and after the code smell-based code refactor is carried out. The code smell of the program will be identified, gets refactored, then its code smell and performance will be re-tested. The result obtained is code smell-based code refactor increases the application's performance. In this study, the average decrease in code smell was 16%, and the average increase in application performance was 2.9%.

Keywords: code smell, refactor, performance, agriculture, information system, mobile

Paper ID #24

Valentinus Paramarta, Adele Mailangkay, Hilda Amalia, Desta Christmas

Public Sentiment Analysis of Indonesian Tweets About COVID-19 Vaccination Using Different Machine Learning Approaches

Abstract -

More than two years after the start of the coronavirus disease (COVID-19) pandemic, the whole world continues to be impacted by this global crisis. Indonesians use the social media platform Twitter to share information and opinions about coronavirus disease (COVID-19) vaccination. This study was conducted to determine the views of Indonesians toward the government's COVID-19 vaccination program and to test the capability of several machine learning techniques to classify sentiments expressed on Twitter. The performance of four machine learning algorithms was tested: the Naïve Bayes, k-Nearest Neighbors (kNN), Decision Tree, and Support Vector Machine (SVM) algorithms. The findings show that the SVM algorithm exhibited the best performance in terms of accuracy (92%) compared to the Naïve Bayes, kNN, and Decision Tree algorithms. A grid search technique was also used to optimize performance based on parameter settings in the algorithm used.

Keywords: Twitter, Sentiment Analysis, Machine Learning, Covid-19

Modeling and Simulation of Long Range (LoRa) Communication System on Smart Grid

Abstract -

A large amount of sensing data generated by multiple sensors is collected through the cloud platform, while the amount of data over the network is increasing rapidly. IoT applications use several wireless technologies, such as Long Range (LoRa), which has many advantages, one of which is the level of reliability. However, there are still many cases that test the reliability of the LoRa communication system. This study builds a communication system model on a smart grid network that focuses on the communication network layer. This study discusses the reliability of data transmission from transmitter to receiver to produce high reliability on the receiving side. This research method is descriptive-analytic in building a smart grid model of information and communication systems over a wide area network (WAN) employing chirp spread spectrum (CSS) modulation. This study uses additive white gaussian noise (AWGN) to decrease noise in the demodulation process. It has been validated using MATLAB with a signal-to-noise-and-interference-ratio (SINR) value equal to 0 dB, a bit error rate of 0.2×10^{-4} , a symbol error rate of 0.5×10^{-4} , and a packet error rate of 0.1×10^{-3} . The occupied bandwidth is 99% accurate.

Keywords: CSS, LoRa, WAN, SINR, Error rate

Validation and Verification of Business Architecture Process Based On The V . Model

Abstract -

Abstract—Enterprise architecture (EA) is a program that is supported by multiple frameworks, which are able to coordinate various aspects that from the fundamental essence of an organization as a whole. Many companies fail to achieve their responsibilities in implementing Enterprise Architecture because in documenting process modeling semantic validation to prove the suitability and accuracy of the model according to the scenario. Therefore, by testing whether the company architecture has a good impact on companies, that need to verify and validate the design results of the Enterprise Architecture, which is on one of the important roles of the composing domain of the Enterprise Architecture, namely Business Architecture. In leveraging and validating the business process design, it will be carried out using the Petri-net with its supporting tools, namely Woped, to perform simulations that show the determined business processes consistently meet the requirements specified before implementation. So, this research identifies and introduces a verification and validation model of business process to achieve business processes to achieve business goals in implementing Enterprise Architecture designs using Petri nets are a good approach when doing business process modeling error checking.

Keywords: Enterprise Architecture, verification, validation, business process, BPMN, Business Architecture, Petri net, Woped

Fire Detection In Wetland Using YOLOv4 And Deep Learning Architecture

Abstract -

One of the problems in wetlands is fire. Apart from material loss, land fires also cause vegetation degradation which has an impact on biodiversity and indirect effects such as haze. Current fire detection approach is utilizing Wireless Sensor Networks (WSN), but its use has disadvantages, namely the possibility of false alarms, limited space, and high-power consumption when using many sensors and additional cameras. Based on the shortcomings of WSN, several studies have suggested the use of Computer Vision. This is because the use of computer vision has advantages in terms of direct verification and only requires a camera device. One of the computer vision techniques is object detection, where fire and smoke are objects in an image. The current development of object detection that has good accuracy performance is YOLOv4. Therefore, YOLOv4 is used for detection and classification of wetland fires with image and video input. YOLOv4 model training using the transfer learning method resulted in 92.39 mAP performance on the CSPDarknet53-PAN-SPP architecture and experimental results on CSPResnet50-PAN-SPP (Full Mish Activation) resulted in mAP 92.13. In testing images and videos, CSPDarknet53-PAN-SPP has a higher accuracy result of 94% on images and 90% on video. The YOLOv4 average speed of the CSPResnet50-PAN-SPP model reaches a higher average value of 275.63 milliseconds in the image and 14.7 FPS in the video than CSPDarknet53-PAN-SPP. Therefore, the YOLOv4 model CSPDarknet53-PAN-SPP is better to serve as a prototype for detection and classification of fires in wetlands in term of accuracy.

Keywords: Darknet, Fire, Resnet, Wetland, YOLOv4

Design and Build a Attendance System and Employee Performance Assessment with a Website-Based Profile Matching Method

Abstract -

Attendance and performance appraisal of employees in a company have an important role because they can be used as consideration for the directors to review these employees, including PT Cakra Jasa Pacific. The performance assessment of PT Cakra Jasa Pacific is still carried out conventionally, namely by filling in the assessment sheet, so that the resulting assessment is subjective and less transparent. Attendance is one of the criteria used to assess employee performance at PT Cakra Jasa Pacific. However, attendance at PT Cakra Jasa Pacific is still manually by filling out attendance sheets. Therefore we need a system to evaluate employee performance in which there is a presence feature to reduce subjectivity in the assessment and change the attendance method so that it is not done manually. The method used as a decision support system is Profile Matching, and the system development method uses the waterfall. This system is built using the Laravel framework and MySQL database. The results of the percentage of system testing are 100% using BlackBox testing. The results of testing the profile matching method in the system run well and accurately with a precision value of 100%.

Keywords: blackbox testing, laravel, mysql, employee performance assessment, employee presence, profile matching, decision support system.

Comparison of the K-Nearest Neighbor and Decision Tree algorithm to the Sentiment Analysis of Investment Applications Users in Indonesia

Abstract -

Investment is a familiar thing, especially for millennials, now investment can be done easily only with a smartphone, through applications on the Google Play Store, you can invest. But these apps have the highest downloads and high ratings on the Google Play Store. Many stock investing apps have nearly the same downloads and ratings, so the title of best app is a problem. Based on this, this sentiment analysis research aims to analyze user feedback of stock investment applications as a variable to determine which stock investment application is the best. This research was conducted by using the comparison of the K-Nearest Neighbor and Decision Tree algorithms. To see the level of accuracy between the 2 algorithms. The research uses google colab tools as data retrieval tools and rapidminer as data preprocessing tools. From this research, resulting in sentiment data, the highest positive sentiment results are the Ajaib Application at 74% and Negative 26%. It can be concluded that the Ajaib application as the best stock investment application based on user comments reviews where this application has the most positive sentiment reviews with a high accuracy value

Keywords: Sentiment Analysis, Decision Tree, Investment, K-NN.

Paper ID #37

Fahdi Saidi Lubis, Muharman Lubis, Lukmanul Hakim

Investigation of Netizen Sentiment Analysis Toward The Controversy of Information and Electronic Transaction Law

Abstract -

the society has important roles for ITE implementation that were regulated in several articles. With the explosion of social media network enabling several governments across the world become closer to their citizen to achieve transparency and engagement. This opportunity has been changing the way of government in order to understand about facts and realities that evolving in the society, particularly involving public policy implementation. Moreover, in the world of big data, the feedback from social media users can be profitably used to extract useful information to support actions that policymakers take throughout the policy cycle. This study work used text mining to explore the twitter data to help the government see what urgent issues, challenges, and benefits arise from the implementation of policies, especially the implementation of ITE which is attracting the attention of "netizens" today. The overall process of the method used are text extracting, text cleaning, and text representation. This study resulted that it is clearly stated that the users talked about the elastic interpretation of UU ITE article which can potentially be abused by the certain person. The original tweets attracted user's attention to re-post that message repeatedly

Keywords: Text Mining, Assessment, UU ITE, Implementation.

A Systematic Literature Review Enhanced Felder Silverman Learning Style Models (FSLSM)

Abstract -

Student's learning style was identified and considered a critical factor in personalizing the learning process to meet student's learning preferences, specifically in intelligent e-learning system development. Learning style theories state the importance of student's profiles during learning. One of them is Felder-Silverman Learning Style Model (FSLSM). However, FSLSM has a lack of comprehensive literature review about how to improve intelligent e-learning system performance. Thus, this study analyzed and classified prior studies between 2011 and 2020 regarding FSLSM implementation and intelligent e-learning system development, including the trend. This study categorized several techniques found: identification system technique, recommendation system technique, recommendation learning object, and evaluation system technique. This study shows that FSLSM enhancement in e-learning may improve system quality using a recommendation technique. Furthermore, combining identification, recommendation, and evaluation system techniques may improve the effectiveness and efficiency of the learning process in an intelligent e-learning system.

Keywords: evaluation system, felder-silverman learning style model (FSLSM), identifier system, intelligent e-learning, recommender system

Prediction of Automobiles Prices Using Exploratory Data Analysis Based on Improved Machine Learning Techniques

Abstract -

The fast development of on-demand ridesharing services, especially those that incorporate driving technologies, has the potential to revolutionize mobility provision. Nonetheless, a worrying disparity exists between vehicle availability and trip demand over space and time. Researchers and professionals in the transportation industry are renewing their focus on automobiles and mobility in an effort to identify the elements that affect the cost of pre-owned vehicles. Standard machine learning algorithms are used to provide cost predictions in several articles. However, people rarely think about the efficiency of individual models and instead disregard the less well-known but more intricate ones. A multi-period theoretical model for dynamic pricing is presented here. In this analysis, we will examine several state-of-the-art models by utilizing both traditional and state-of-the-art machine learning techniques to assess the impact of features on prediction strategies. As an added bonus, this research will provide robust validation for numerous regression model implementation strategies, offering promise for future price forecasting of automobiles.

Keywords: automobiles, prices, prediction, machine learning

A Systematic Literature Review of Barriers and Drivers E-Government in Developing Countries: TOE Framework Perspective

Abstract -

The adoption and implementation of e-government is a necessity for governments in developing countries. However, there are many barrier factors faced in its implementation. At the same time, there are also driver factors that can support it. We used the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) to identify barriers and drivers in e-government implementation in developing countries. Several theories or frameworks are used in related studies, one of which is the Technology-Organization-Environment (TOE) framework. This study reveals that the previous studies were still focused on the municipal and central government levels. This study also found that there are 15 barriers and 17 driver factors. Based on TOE framework, we classified 7 factors in the technology dimension, 13 factors in the organization dimension, and 10 factors in the environment dimension. These findings can help other developing countries identify the barriers and potentials that can guide them to successful use of e-government.

Keywords: Barrier, driver, e-government, systematic literature review, PRISMA, TOE framework, developing countries

User Experience Analysis Using Usability Testing on Library and Knowledge Center BINUS University with SmartPLS

Abstract -

In the current era of information technology development, libraries, which are mandatory facilities at universities, are required to be able to transform into digital libraries. BINUS University with its library (LKC BINUS) has participated in digital library transformation, but the results of observations and interviews with LKC BINUS found various problems in the LKC BINUS web application, including log-in issues, too much information on the homepage, errors when searching for content, and the lack of content previews such as a book. This research is expected to increase the use value of LKC BINUS both with a friendlier user interface and a better overall user experience. The method used is Usability Testing by distributing questionnaires to 60 BINUS Online Learning students as respondents whose data will be processed using SmartPLS. Based on the Construct Reliability and Validity test, the Composite Reliability section, the Satisfaction variable has a value of 0.964. From this value can be concluded that LKC BINUS has excess content and features that make too high satisfaction for its users. The recommendation for the new design improvement has focused on simplifying the homepage section by moving some feature components into feature groups such as "About Us" and creating a web footer for contact reference

Keywords: Digital Library, User Interface, User Experience, Usability Testing, Satisfaction

Acceptance Rate Analysis of Internal Management Operational Application on Pt. Sigma Cipta Caraka Using Technology Acceptance Model (TAM)

Abstract -

The use of internal office applications is increasingly being applied by companies to facilitate employees' work. One of them is PT. Sigma Cipta Caraka (Telkomsigma) uses the Operational Management application to record and report the daily activity of the services offered. This research goal is to measure user experience on the acceptance of applications by employees where there are still some troubles regarding the use or flow that is not efficient. The researcher uses the TAM (Technology Acceptance Model) method, which aims to explain the influence of factors on the acceptance of an application or system. The research was conducted by distributing questionnaires to 29 employees who had used internal operational management applications. The result of the questionnaires will be processed using SmartPLS. The result showed that the value of R square on perceived usefulness was 0.350, perceived ease of use was 0.396, attitude toward using 0,641, intention to use was 0.554, and actual usage was 0.554. for the value of F square of attitude toward using on intention to use has a value of 1.313, compatibility towards perceived usefulness of 0.492, compatibility towards perceived usefulness 0.654, complexity toward perceived ease of use 0.059, complexity towards perceived ease of use 0.003, intention to use toward actual usage 1.244, perceived usefulness towards attitude toward using 0.528, and perceived ease of use against attitude toward using 0.289.

Keywords: User Experience, Technology Acceptance Model (TAM), Operational Management, Internal Office Applications

Examining User Acceptance of MOOCs: The Role of Openness, Task Technology Fit, and Self-Efficacy

Abstract -

This study has purpose to understand the main psychological processes in technology acceptance of massive open online courses (MOOCs). We proposed extending expectation confirmation model (ECM) model with openness, task technology fit, and self-efficacy. A sample of 210 high school and university students participated as respondents in this study. After the sample data passed the validity and reliability checking, the research hypotheses were examined with correlation analysis to prove the relationship among variables and causal effect analysis using structural equation analysis (SEM) to prove the causal effect among the variables. The results revealed that: openness and task technology fit have significantly direct effect on perceived usefulness and then on continue intention to use MOOCs; self-efficacy and task technology fit have significantly direct effect on satisfaction and then on continue intention; and the last, task technology fit has significantly direct effect on confirmation and then on perceived usefulness and satisfaction. This significantly factors of the study can contribute to people who interest on the development of MOOCs leaning model through keeping the factors to gain continue intention to use MOOCs.

Keywords: MOOCs, ECM, openness, task technology fit, self-efficacy

Paper ID #50

Sri Hartati,Aina Musdholifah,Putu Desiana Wulaning Ayu

Follicle Detection Model on Ovarian Ultrasound Image

Abstract -

every woman has two ovaries. Ovaries have several follicles, which consist of oocytes or eggs which are filled with granulosa cells. Some women can have a difference in the number of follicles in each ovary. There are cases of several follicles that are coincided, making it difficult to calculate the number of follicles. In this study, the separation of adjoining follicles and automatic follicle counting was carried out from the results of ovarian ultrasound image segmentation. The segmentation results obtained feature information in the form of follicular feature extraction as many as eight features. The techniques used in this work for feature selection was carried out using Principal Components Analysis (PCA) to reduce the feature. In this study, the PCA and Support Vector Machine (SVM) classifier produced higher accuracy than the classification without PCA. The experimental results also show that the proposed method produced higher classification accuracy than previous work, which yielded 90.39% accuracy, 90.27 % sensitivity, and 90.43 % specificity.

Keywords: Follicle, Principal Components Analysis, Support Vector Machine

Sentiment Analysis of "Hepatitis of Unknown Origin" on Social Media using Machine Learning

Abstract -

Hepatitis of Unknown Origin worries civil society around the world. The public's fear of the emergence of the mysterious hepatitis disease caused panic and expressed views and criticisms and poured them on social media Twitter. The government's policy in considering the spread of unknown hepatitis can be taken from the public's view, especially on social media, which accommodates various public sentiments. This study aims to analyze public sentiment on "hepatitis of the unknown origin" using the Twitter dataset. We conducted sentiment analysis using various machine learning algorithms to get the best model accuracy in analyzing public sentiment against "hepatitis of unknown origin". The algorithms used in this research are Random Forest, Extra Tree Classifier, Decision Tree, Naïve Bayes, Support Vector Machine, and XGBoost Classifier. We tested the model's accuracy against the data set using 20-fold cross-validation. The results showed that the public discussed the spread of unknown hepatitis to children, with each algorithm detecting a greater number of negative sentiments than neutral and positive sentiments. In addition, the results of the comparison of the Decision Tree algorithm obtained a model accuracy of 81.92%, Random Forest 78.99%, Extra Tree Classifier 79.82%, Naïve Bayes 77.79%, Support Vector Machine 75.52%, and XGBoost Classifier 71.49%. We conclude that the Decision Tree is the best model for analyzing public sentiment about "Hepatitis of Unknown Origin".

Keywords: Hepatitis of Unknown Origin, Sentiment Analysis, Media Social, Machine Learning

Online Learning and Students' Ethical Behavior During Covid-19: For Better or for Worse?

Abstract -

With Covid-19 limiting social interaction to prevent the spread of viral infections, the education sector in Indonesia, “forced” schools and higher education to carry out online learning. However, there is a concern that online learning may affect the students’ ethical behavior. As there is no human interaction, students are getting used to not meeting people or socializing, so they tend to ignore ethical norms in socializing. The purpose of the study is to find out if students’ ethical behavior is related to interpersonal and communication skills. The study used a quantitative method with a sample of 132 active students at the Creativepreneurship Study Program using purposive sampling. The findings showed online learning supports communication and interpersonal skills, but unable to form students’ ethical behavior. Online learning behavior, online courses require definite objectives, inner motives, synchronous feedback, and independence of the learners. Even though there are rules regarding ethical behaviour, the rules themselves are not able to influence the student’s ethical behavior. Online learning and students’ behavior is not only the responsibility of the lecturer, but also the responsibility of the students and their parents.

Keywords: Covid-19, Communication Skills, Interpersonal Skills, Online Learning, Student Ethical Behavior

ISO 15489 Attributes Prioritization in Electronic Document Management System of the First Level Healthcare Facilities

Abstract -

First Level Healthcare Facilities in Indonesia face many challenges to record and manage their medical and nonmedical data or information in a systematic location. Healthcare Electronic Document Management System (EDMS) is one of the solutions to create, store, track, discover, and manage massive documents that the institutions needed. However, most prior studies and practitioners focused only on the patient's medical records regarding their information privacy. Meanwhile, healthcare institutions have massive types of documents concerning the business process, healthcare service, regulations, and mandates that are updated over time. Thus, ISO 15489 as an international standard records management system may be used to provide better records governance in first-level healthcare facilities. This study aims to investigate the perception of ISO 15489 adaptation in healthcare EDMS using systematic literature reviews within research communities. The results show the security of the records system, records metadata's information conserved and records document reliability are the most important characteristics of ISO 15489 when adapted in healthcare EDMS. The results of this study may be used as a benchmark in prioritizing ISO 15489 characteristics during EDMS development and maintenance, as well as institutional records governance.

Keywords: electronic document management system, iso 15489, healthcare system, systematic literature review

Vanishing Point Detection using Angle-based Hough Transform and RANSAC

Abstract -

The information provided by vanishing points is essential for Intelligence Transportation Systems (ITS) such as self-driving or driving scene technology. Vanishing points are representations of infinity points or lines that offer orientation data. Geometrically, a line's vanishing point is found by crossing through the camera's center and intersecting the line of the picture plane. In other words, the vanishing point can be represented by the intersection of two straight lines. Detecting lines in the road image is complex work because the shape of the line is not always straightforward and has much noise. Moreover, vehicles that appear in the image can bother detection. Therefore, this study aims to detect vanishing points using a geometrical-based approach using Hough Transform and Random Sampling Consensus (RANSAC) algorithm and analyze several road conditions that can affect the detection of vanishing points. The lines are restricted at a certain angle. The result shows that RMSE reached 13.33 of 25 images with different traffic conditions. It is a fair result but can be improved. The authors suggest that future study use motion vectors or features of optical flow generate vanishing points better.

Keywords: Vanishing Point, Hough Transform, RANSAC Algorithm, Intelligent Transportation.

Classification and Sentiment Analysis on Tweets of the Ministry of Health Republic of Indonesia

Abstract -

Government agencies in this modern era are greatly assisted by the rapid development of information technology, so transparency and speed are imperative in providing services to the public. The use of social media by government agencies is one of the innovations by maximizing technology, one of which is the Ministry of Health of the Republic of Indonesia which is the ministry in charge of organizing government affairs in the health sector. The information contained on the Twitter social media account of the Ministry of Health of the Republic of Indonesia is various types of information uploaded randomly, therefore Twitter users often cannot distinguish the types of information provided by the Twitter of the Ministry of Health of the Republic of Indonesia. Based on this case, Twitter users can provide responses or comments that often lead to pros and cons. The extreme gradient boosting (XGBoost) algorithm is a tree-based algorithm such as the decision tree algorithm, which uses an ensemble principle that combines several weak learning sets and makes a new model that is strong to produce strong predictions. In this study, our aim is to implement extreme gradient boosting to classify the tweet topics and analyze the sentiment towards comments made by the public on the tweets of the Ministry of Health of the Republic of Indonesia. The results of this study indicate the highest level of accuracy in the classification, i.e. 89.35% with a precision of 88.76%, and 88.58% for the recall value from 2243 tweets. Furthermore, the best accuracy in sentiment analysis was obtained at 91.22%, 89.17% for precision, and for recall at 89.06% with 304 comment data.

Keywords: Text mining, Classification, Sentiment analysis, Extreme Gradient Boosting, Twitter.

Paper ID #57

Apriandy Angdresey, Lanny Sitanayah, Zefanya Marieke Philia Rumpesak

An Electricity Consumption Monitoring and Prediction System Based on The Internet of Things

Abstract -

Electricity cannot be separated from our life nowadays, but using it wastefully means wasting money. Therefore, if we can predict our electricity consumption, can we use it wisely? This paper presents an Internet of Things-based electricity consumption monitoring and prediction system. The system has a sensor device with one PZEM-004T sensor to read power data, two NodeMCUs, and three relays to connect and disconnect electric current. The k-Nearest Neighbor algorithm is implemented in the system's web application to predict electricity consumption. Our evaluation results show that this system can give good predictions with Mean Absolute Error around 1 Watt and Mean Absolute Percentage Error around 1-1.7% when the standard deviation of power consumption is low.

Keywords: Internet of Things, Sensors, Data Mining, k-NN Algorithm, Intelligent System.

Conditional Random Field for Crime News Information Extraction with SMOTE

Abstract -

Unnecessary information in a news can cause difficulties to understand the main information of the news. This work describes an information extraction system which is a system used to perform automatic information extraction on Indonesian online news to obtain the main information includes 5W1H (what, when, where, who, why, how) information. The classification process for information extraction is performed using 16 features and 13 classes with one of a machine learning approach, Conditional Random Field (CRF) algorithm. This work also employs Synthetic Minority Over Sampling (SMOTE), a method to handling unbalanced dataset. The best result achieved using CRF algorithm without SMOTE method with 90.465% of accuracy, 0.710 of recall, 0.924 of precision, and 0.797 of f-measure in the process of information extraction on Indonesian online news. In other hand, the results with addition of SMOTE method are 84.336% of accuracy, 0.612 of recall, 0.719 of precision, and 0.644 of f-measure.

Keywords: 5W1H, conditional random field, information extraction,online news,SMOTE

The Implementation of Real-ESRGAN as An Anticipation to Reduce CER Value in Plate Number Extraction Results Employing EasyOCR

Abstract -

The accuracy of the number plate extraction is an important thing that must be considered. This was done to prevent false positive number plate extraction results in the e-ticket system. The efforts to reduce the most optimal CER value could be done by upscaling utilizing Real-ESRGAN, especially by operating anime mode which had been done with grayscaling and thresholding processes. This treatment was able to reduce the average CER and CER Norm values, respectively, at 30.97% and 29.72%. When compared with the treatment before the image was upscaled, namely Original-Skewed (Grayscale + Thresholding), this treatment had a lower average CER and CER Norm about 10%. Anime mode in the upscale process utilizing Real-ESRGAN without grayscaling and thresholding processes were able to produce pixel arrays that have minimal noise or excess texture as well as emphasize outlines. This may reduce the number of image features that cause an increase in the CER value but make the thresholding process cleaner because the noise in the image is much reduced.

Keywords: Computer Vision, Real-ESRGAN, Image Upscaling

Paper ID #62

Christine Lusiana Debataraja, Mudrik Alaydrus and Umaisaroh Umaisaroh

Air Temperature Prediction Using Autoregressive Artificial Neural Network Method with Variations of The Number of Hidden Layer

Abstract -

In this paper, we aim to predict the value of air temperature using the Autoregressive Artificial Neural Network (NAR) method with variations in the number of hidden layers. The number of hidden layers used ranges from 1 to 20 hidden layers. As for the criteria for the results of the prediction data using MAPE. All MAPE values for the specified number of hidden layers are below 10%. From the experimental results obtained the smallest MAPE value in 12 hidden layers with a MAPE value of 3.06. The largest MAPE value with the number of hidden layers is 4 hidden layers, which is 8.79. The number of hidden layers affects the prediction value but no pattern has been found between the number of hidden layers and the accuracy of the prediction data.

Keywords: Autoregressive Artificial Neural Network (NAR), hidden layer, air temperature, data prediction

Learner Action Patterns in the Problem-Solving Process Related to Program Code Composition Based on Tracking System Activities

Abstract -

Learning activities are an indicator of the learner's desire to learn during the learning process. The pattern of learner action is related to learning activities. In this case, in extracting the learning process, it is necessary to collect a lot of data through analysis of the learning process. The purpose of this study is to recommend and report the performance of an activity tracking system equipped with visual artifacts as an educational data mining approach to analyze action patterns when learners complete the arrangement of program code lines in each programming problem. In this study, data were taken from activity recordings when learners used interactive learning media for a basic programming subject called TOLSYASUPI-EduMed which had problem-solving learning models embedded in their interactions. Learning Analytics is used as a method of this research and data relationships from learner actions during the learning process using the “if-then” rule. Log data is used for recording and detecting activities carried out by learners. We confirm that the results of the study are based on the findings of the data relationship that if the lines of program code are too long (more than five lines) then almost all learners experience a bottleneck condition. The completion time of each question and the number of iterations in completing the program code lines for each question have also been recorded and have a pattern of connection between the data. The information that has been obtained is then forwarded to teachers or stakeholders as key information to make appropriate feedback to learners based on the results as a means of analyzing and evaluating the programming learning process.

Keywords: educational data mining, learning analytics, problem-solving, programming learning, tracking system activity

Mobile Device Positioning by Using Dynamic Weighted Centroid Model

Abstract -

GPS signals are used to locate a GPS-enabled mobile device. However, this method consumes a lot of energy on the device. An alternative way to overcome this problem is by using cellular signals instead of that of GPS. We propose the dynamic weighted centroid model to predict the device location. The method utilizes signal strengths (RSSI) to define the weights, and uses those weights to find the centroid of all detected cells. We apply two models based on how the weight is defined. The first model (model A) uses $w_i = 1/(RSSI_i)$ and the second model (model B) uses $w_i = RXLEV_i$. To test the model, we build signal fingerprint from collected Network Measurement Reports (NMR) in the determined area. Based on the experimental results, model A has smaller minimum and maximum error, that are 0.7860 m and 290 m, respectively. As for model B, the results give smaller mean error, median and standard deviation, that are 107.5686 m, 99.5500 m and 54.7201 m, respectively. The results show that the error of model A spreads more than that of model B.

Keywords: GPS, Network cell, Weighted, RSSI, RXLEV

Multiclass Intent Classification for Chatbot Based on Machine Learning Algorithm

Abstract -

In recent years, the use of Chatbots has grown significantly in various industries, including support systems, education, health care, tourism, entertainment, and banking. Chatbot for education can provide instant feedback in interactions session with students. The responses from Chatbot can be based on machine learning algorithms or multiple heuristics techniques to select responses from the predefined library. The generated response depends on the user's intent of using the Chatbot. There are various classes or categories in the user's intent. However, the user's intent class cannot simultaneously belong to multiple classes. Therefore, this research proposed a multiclass intent classification for the Chatbot based on the machine learning algorithm. The findings of this research showed that Linear SVC is the best machine learning algorithm model for multiclass intent classification. The results of the analysis proved the accuracy of the prediction using Linear SVC.

Keywords: chatbot, intent, classification, machine learning

IoT-Agri: IoT-based Environment Control and Monitoring System for Agriculture

Abstract -

Problems in the agricultural sector are common, such as crop failures, soil damage, and pest attacks. Moreover, if the harvest quality and quantity are not good, losses are clearly inevitable for the farmers. Internet of Things (IoT), which is built from several components consisting of sensors, applications, network elements, and other electronic devices, is the most productive and important methodology for these problems. The Internet of Things (IoT) allows creativity and strategies to be formulated to solve problems in the agricultural sector. IoT-Agri is developed to help farmers in monitoring data on soil, water, and the environment. Soil data includes pH, humidity, and temperature. The water data includes pH, salinity, and water capacity in the reservoir. Environmental data includes temperature, humidity, and sunlight intensity. The IoT-Agri device fulfills the need in monitoring soil, water, and environmental data, as well as controlling the flow of water and fertilizer mixtures to crops on agricultural land. Furthermore, this research intends to aim that IoT-Agri creates effective and efficient agriculture to achieve smart and precise agriculture.

Keywords: IoT, agriculture, monitoring, and control

Analysis of Design Implementation Guidelines for Data Governance Management Based on DAMADMBOKv2

Abstract -

Decisions taken by the company depend on data and require quality data. The amount of data that is held and managed makes it difficult for companies to organize data-related activities. Data governance can assist the process of authorization and control of data assets, including the planning, monitoring, and implementation processes. This study focuses on designing data governance guidelines based on DAMADMBOKv2. The DAMA-DMBOK Framework has defined general data governance processes. An approach that contains details of the data governance management process is needed following DAMA-DMBOK. The design of process guidelines requires an assessment in order to find out whether the process is good to implement and reliable in a company. It is important to carry out this research to make it easier for companies or organizations to improve data quality, make decisions, and manage data more efficiently

Keywords: Data Governance, DAMA-DMBOK, DAMADMBOKv2, Guideline

Implementation of Modified Linear Congruent Methods in Randomizing Exam Questions to Optimize the Learning Environment

Abstract -

Linear congruent methods are pseudo-random number generator algorithms often used for randomizing exam questions. The problem with LCM is that the questions that appear will be repeated several times, making the exam ineffective. If we select an improper parameter in LCM, the system will raise the same question in the next period. In this study, we modify LCM by converting linear equations into logarithmic equations. Furthermore, the proposed modification makes the quasi-random results into a full period so that the randomization of the exam questions produces different questions. This LCM modification is applied to a question randomization application using Visual Basic 6.0 software.

Keywords: Linear congruent methods, LCM, randomizing exam, modified LCM



Paper ID #72

Hery Dian Septama, Muhamad Komarudin, Puput Budi Wintoro, Mahendra Pratama, Titin Yulianti, Bambang Sundari

Enterprise Architecture Planning based on One Data in Indonesian Higher Education

Abstract -

The higher education institution continues to compete to increase its ranking in the world-class universities. There are many university ranking institutions with different criteria for ranking classification. However, good university governance will greatly help to achieve higher rankings. Good university governance certainly needs to be supported by accurate data and an integrated information system. One data regulation has potential benefits for universities to re-design its process business and information system in order to support data sharing and using integrated data source. This paper uses TOGAF ADM to design enterprise architecture planning based on one data and integrated application. The results show enterprise architecture designed in order to support one data and integrated application that aligned with the university vision and mission to become a world class university.

Keywords: enterprise architecture, one data, togaf

Spelling Correction Using the Levenshtein Distance and Nazief and Adriani Algorithm for Keyword Search Process Indonesian Qur'an Translation

Abstract -

The Qur'an consists of 114 letters which has a total of 6,236 verses and 77,340 words which contains a lot of important information. The length of time used to obtain the expected information becomes an obstacle when the search is done manually. Therefore, it takes a search engine that can help to get that information. The problem with the search engine is that the input spelling of words is wrong, resulting in incorrect information. Levenshtein Distance algorithm can provide a solution to correct key input errors. The Levenshtein Distance algorithm is an edit distance algorithm that has three operations that are used to measure the distance between two strings. We conducted experiments to correct spellings that did not match the search keywords for the Indonesian translation of the Qur'an using the Levenshtein Distance and Nazief and Adriani Stemming algorithms. Based on Levenshtein Distance operation, 70% success in Insert operation, and 100% success in remove and replace operation while on Stemming.

Keywords: quran, search, spelling correction, levenshtein, distance algorithm, nazief and adriani algorithm

A Study on Text Feature Selection Using Ant Colony and Grey Wolf Optimization

Abstract -

Text classification (TC) is widely used for organizing digital documents. The issues in TC are numerous characteristics and high-element dimensions. Many pattern classification issues require feature selection (FS), which is pertinent. FS removes unneeded and redundant data from the dataset. The Ant Colony Optimization (ACO) and Grey Wolf Optimizer (GWO) for FS are the main topics of our thorough assessment of the literature on the Swarm Intelligence (SI) algorithm. Furthermore, it illustrates how the hybrid SI technique is used in FS across various sectors. The hybrid SI technique uses applicable data from various FS methods to find feature subsets with smaller sizes and better classification performance than those found by regular FS algorithms.

Keywords: Text classification, Feature selection, Swarm Intelligence, Ant Colony Optimization, Grey Wolf Optimizer.

Improvising Low Contrast Malaria Images Using Contrast Enhancement Techniques on Various Color Models

Abstract -

The digital malaria image acquisition may result in low-contrast images. The low contrast images make it difficult to visualize and analyze the morphological features among plasmodium species, which can increase the false diagnosis rate. Therefore, various types of contrast improvement methods have been proposed to increase the contrast of malaria images. Comparison of these methods is essential to determine the appropriate technique for improvement and further processing. This study applied and analyzed the HE, AHE, CLAHE, and GE methods in the grayscale and green channel malaria image and GCS, LCS, MGCS, and MLCS methods in color malaria images. In grayscale malaria images, based on MSE and PSNR measurements, the best results were obtained using the CLAHE, GE, AHE, and HE methods, respectively. In the green channel malaria image, based on the MSE measurement, the smallest error was produced by the CLAHE method, while based on the PSNR measurement, the best quality was obtained by the GE method. CLAHE and GE can visually clarify the texture and morphology of plasmodium and erythrocytes with minimal noise. In color images, based on PSNR and AMBE measurements, the GCS and MGCS methods provide better color quality and preservation than the LCS and MLCS methods. Malaria images with good contrast are expected to help visually examine malaria and facilitate the segmentation process in an automatic malaria diagnosis system.

Keywords: malaria, contrast enhancement technique, grayscale, green channel, color malaria image

Comparison of Smoothing Methods to Remove Artifacts in Emotion Recognition based on Electroencephalogram Signals

Abstract -

Although the baseline reduction approach improves emotion recognition accuracy, artifacts in the baseline Electroencephalogram signal can affect emotion recognition accuracy. This study examines and compares three smoothing methods to remove artifacts in the baseline Electroencephalogram signal to overcome these problems. Based on the experimental scenario design, the Mean filter method is proven to remove the artifacts contained in the baseline Electroencephalogram signal. This effort has an impact on increasing the accuracy of emotion recognition. Through the tests carried out on the DEAP dataset, the baseline Electroencephalogram signal feature that has been smoothed using the Mean filter method can produce a high accuracy of emotion recognition when applied to the Relative Difference method, with an average accuracy of 95.64%, 95.18%, and 92.82% for each emotion of High/Low Arousal, High/Low Valence, and four class emotion. The same thing also happened to the Fractional Difference method, where the value of the baseline Electroencephalogram signal feature that had been smoothed using the Mean filter method also produced the highest average accuracy values of 95.68%, 95.02% and 92.70% for each High/Low Arousal, High/Low Valence, and four class emotions, respectively. Based on the results of this experiment, using the baseline Electroencephalogram signal feature that has been smoothed using the Mean filter method can improve the baseline reduction approach.

Keywords: emotion recognition, electroencephalogram, baseline reduction, smoothing approach, noise reduction, the mean filter, the savitzky-golay filter, the gaussian filter.



Paper ID #77

Diena Rauda Ramdania, Maisevli Harika, Maulana Hamdani, Yana Aditia Gerhana, Nurhadi Qomaruddin, Cepy Slamet and Dian Sa'Adillah Maylawati

Decision Tree Algorithm in Visual Novel Game using RenPy Games Engine

Abstract -

As an approach to increasing reading literacy, visual novels can be used as an option. A visual novel is a type of game that focuses on story aspects. The story of the visual novel game will run according to the choices made by the player. This game can make players feel fun while increasing interest in reading literacy. This study aims to create a visual novel game by applying the Decision tree algorithm. The choices that players make in the game are based on this algorithm. The game is then tested through black-box testing and white-box testing. Based on testing, the visual novel game can run all the functionality well.

Keywords: decision tree algorithm, game, visual novel, Renpy

New Approach of Covid-19 Prevention by Implemented Combination of Decision Support System Algorithm

Abstract -

Indonesia and Malaysia from 2020 to 2021 were exposed to COVID-19 pandemic. Both countries implemented a policy of restricting entry areas based on almost the same criteria, In Indonesia namely as PPKM which applying some level of exposure to those infected with covid-19. The determination of this level was all based on the growth in numbers exposed to covid-19, but on pandemic cases, the number of people who do not suffer from COVID-19 disease but have the same symptoms as the symptoms of COVID-19 also need to be considered as the pandemic agent to their environment. We named it as Precaution Covid-19 Pandemic (PCP) Level. The current level of the COVID-19 pandemic has not been fully determined by this idea. So, the idea of this research is to determine the pre-pandemic or precaution level of covid-19 in an area interfere by surrounding area. PCP level was not based on the growth of those infected with the covid-19 disease, but influenced by the number of patients whose have the symptoms similar to the dominant symptoms of the covid-19. The PCP Level determination can be used for precaution policy and support the previous Level Pandemic Methods. To accomplish this idea, three algorithms are used, they are K-Mean algorithm as a pattern clustering and the AHP algorithm as a level determination of the Covid-19 pandemic, While the relationship of candidate symptom pairs to Covid-19 transmission is carried out using the Naïve Bayes algorithm. The results of this study show that the combination of the three proposed algorithms provides and using data symptoms closely to dominant covid-19 symptoms can give an alternative for precaution level of covid-19 pandemic. The model for determining Covid-19 transmission based on four candidate symptoms has 89% precision and 85% accuracy.

Keywords: Covid-19, Naïve Bayes, K-Mean, AHP, Precaution



Paper ID #80

Hery Dian Septama, Muhamad Komarudin, Puput Budi Wintoro, Mahendra Pratama, Titin Yulianti, Wahyu EKO Sulistiono

Development of Lecturer Profile Information System based on One Data for Key Performance Indicator Monitoring

Abstract -

The Key Performance Indicators (KPI) released by the Indonesian Ministry of Education, Culture, Research, and Technology in 2021 are a new performance indicator for state universities that concern to output-based. It consists of 8 indicators that focus on quality of university graduates, the quality of the lecturer, quality of curriculum and learning. These papers focus on developing an integrated lecturer information profile with university one data database and ministry integrated human resource information system. The information focused on KPI 3 and KPI 4 to measure lecturer quality. The development process is presented using extreme programming (XP) methodology. The results show that all user stories are fulfilled and tested successfully.

Keywords: KPI, extreme programming, one data

An experimental study on binary optimization using quantum annealing in D-Wave

Abstract -

Quantum annealing is a field of quantum computing to solve complex optimization problems. NP problems are hard to obtain the optimal result in polynomial time, and quantum annealing is able to fasten the process of computation. This article proceeds through a brief introduction to quantum annealing and then performs an experimental study on unconstrained binary optimization. Two mathematical models, namely, QUBO and Ising, are used for the design of the optimization to experiment with a quantum computer architecture named D-Wave. Ising model maps the problem statement for realization into a time dependent Hamiltonian. The obtained results are finally analyzed and explained

Keywords: Quantum annealing, Qubit, Quadratic unconstrained binary optimization, Ising, D-Wave

Oil Well Monitoring System Based on IoT Technology and Machine Learning

Abstract -

The process of crude oil mining in oil wells takes a long time and requires good supervision to avoid unwanted things. This process requires full 24-hours monitoring of oil parameters such as oil temperature and flow rate. Currently, the supervision process is still done manually which may occur some errors. Based on this fact, this paper aims to design a surveillance or monitoring system that is more effective and efficient. The testing of this monitoring system uses an oil pump machine prototype with the assistance of a MAX-6675 temperature sensor and an ultrasonic flowmeter TUF-2000m as well as a sensor TM-1 transducer as an input tool. Raspberry Pi 3 as a microcontroller and a web application as an output that displays data in the form of graphs. The test stage is carried out by heating the temperature sensor, slowing down the flow of oil on the prototype, and checking the values displayed on the graph. The results of the test when the temperature sensor received heat, the microcontroller ran well, as evidenced by the data that was successfully stored on the web server and a graph showing the increase in the oil temperature value. Likewise with the flow rate sensor when it receives resistance or the flow is slowed down, the graph shows a decrease in the flow rate value in the oil. With the results of this test, the prototype of the monitoring system on oil wells with the Internet of Things (IoT) technology runs as expected, namely being able to monitor the value of oil parameters in real-time which allows effectiveness and efficiency in work to increase.

Keywords: Oil Well, Monitoring System, Internet of Things

Gamification using Octalysis Framework in Knowledge Management System for Vocational High Schools during the Covid-19 Pandemic

Abstract -

Knowledge management systems enable teachers and students to interact directly in the knowledge transfer process during the Covid-19 pandemic. In addition, applying the gamification concept in vocational disciplines could enhance the quality of teaching to increase motivation and student learning outcomes which tend to decline. Octalysis Framework, which supports the gamification concept, consists of eight cores that focus on creativity, self-expression, social dynamics, logic, thinking, and ownership depicted in an octagon making an application more fun and helpful to motivate users to enjoy and be involved in an activity. This condition is crucial and urgent in the Covid-19 pandemic that requires online and student-centered learning. This study discussed the application of Octalysis Framework-based Gamification in a Computer Learning Knowledge Management system in Vocational High Schools during the Covid-19 Pandemic. The Gamification concept with the Octalysis Framework was implemented in the Knowledge Management System. Some game mechanics in a non-game context consisting of four phases, namely the Discovery, Onboarding, Scaffolding, and Endgame was applied to improve student performance and motivation in learning. Meanwhile, The Knowledge Management System software achieved an overall quality score of 5.14 out of 6 (85.6 percent of quality achieved) covering functionality, reliability, usability, efficiency, maintainability, and portability characteristics of the ISO 9126 quality indicator.

Keywords: knowledge management system, gamification, octalysis framework, vocational high school, covid-19, software quality

Paper ID #86

Deffa Rahadiyan, Sri Hartati, Wahyono, Andri Prima Nugroho

Classification of Chili Plant Condition based on Color and Texture Features

Abstract -

Plant health conditions can be identified destructively and non-destructively. However, the destructive method was considered ineffective due to human error because of repeated sample tests, limited equipment, queue duration, and reading errors. Non-destructive methods such as digital image processing can be used to determine plant health conditions more quickly and objectively. This study combines two features, color, and texture, based on the statistical characteristics of RGB, Grayscale, and Local Binary Pattern (LBP) images. The results of feature extraction are processed using the Multi-Layer Perceptron learning method. Based on the experiments, the combination of RGB, Grayscale, and LBP features provides the best performance compared to a single feature. In addition, good MLP performance is obtained using three hidden layers with the number of nodes respectively 2048, 512, and 256. MLP can help determine seven plants health conditions with the highest accuracy of 79.67%.

Keywords: Chili leaves image, Feature combination, Multi-Layer Perceptron, Region of Interest

Face Recognition System Using Feature Extraction Method of 2-D Gabor Wavelet Filter Bank and Distance-Based Similarity Measures

Abstract -

Face recognition is a computer vision task which has a capability to recognize human according to their corresponding face features. Face recognition application in computer system have been developed in recent year including surveillance, human-computer interaction, and multimedia application. Some challenges will possibly be undergone in face recognition research mostly lie on deformation of face condition such as pose, expression, illumination, and accessories use that lead to a noticeable impact on recognition rate. In this research, two-dimensional Gabor wavelet filter bank was implemented to extract face image. Gabor filter has characteristic similar to wavelet that is localized in both time and frequency domain able to extract local feature on face image. Convolution process produces a face representation feature called Gaborface in a terms of magnitude information obtained from sinusoidal complex function. Features are formed as a column matrix concatenation which is called feature vector. At the end of process, one distance-based similarity measure, i.e., Euclidean Distance was implemented to perform a test measurement on data features vector with database features. Testing has been done by giving variation in some aspects, i.e., number of training data, face image deformation such pose and expression, and the variant of filter with variation in scale and orientation. The best system, based on this research, is achieved by 5 x 8 filter bank with accuracy up to 98,67%. The proposed method also shows a very well performance in recognizing the expression changes, but it cannot accommodate properly in pose changes.

Keywords: Face Recognition, Computer Vision, 2-D Gabor Wavelet Filter Bank, distance-based similarity measure, Euclidean Distance

Design of Blind Community Assistance Devices with Indoor Positioning System Technology

Abstract -

In mobility, the visually impaired community poses a high risk to their safety. They know the existence of an object only by the physical touch of the blind stick they are wearing. Thus, this study will develop a tool in the indoor area using indoor positioning system technology. In making an indoor positioning system, we need a floor plan that is connected to several iBeacons (blue-tooth modules) as the main input. iBeacon itself is the main tool needed for an indoor positioning system to show the coordinates on the floorplan. And as feedback, the zone feature is used to trigger the text-to-speech feature to show the user directions. The test results show 73.4% level of system accuracy in determining the coordinates and 68.55% for the error rate. Therefore, this system has a fairly good level of accuracy. However, this system also has a big problem in system quality which can decrease by 68.55%, if there are many obstacles blocking the signal from the iBeacon.

Keywords: visually impaired, indoor positioning system, text-to-speech

Dedi I. Inan, Achmad Nizar Hidayanto, Ratna Juita, Adam Maulana, Dinda Mutiara Qur'ani Putri, Muhammad Fariz Farhan, Siti Kaamiliaa Hasnaa, Marlinda Sanglise

The Follower-Influencer Experience Affecting the Intention to Follow Recommendation: PAD Perspective

Abstract -

In harnessing social media, concerns are mostly concentrated on the influencer side of social media for the followers to follow the recommendation from the influencer. However, the follower's experience is equally important as the follower determines whether or not to follow the influencer's advice above all other influences. This research investigates the follower experience in deciding whether the follower will follow the influencer's advice. The emotional dimensions: Pleasure-Arousal-Dominance (PAD) is employed as a theoretical lens to portray these phenomena. 314 screened responders were collected and analysed in total using Structural Equation Modelling. The results show that the PAD significantly improves the commitment of the followers which might lead them to intention to follow the influencer's recommendation. Theoretically, this study indicates that please-arousal-dominance can well mediate the follower-influencer experience that might affect the intention to follow a recommendation. In practice, this study tells the influencer and the brand that knowing the experiences of the followers is equally essential for a more effective impact. Limitations and future research directions are also discussed

Keywords: Instagram, Intention to Follow, Purchase Intention, Commitment, Follower-Influencer Experience

Paper ID #93

David Habsara Hareva, Andre, Benny Hardjono, Calandra Alencia Haryani Irene Astuti Lazarusli,

Adaptive Cooling System for Comfortable Learning

Abstract -

The development of IoT technology has penetrated the world of education by integrating multimedia facilities such as smart classroom with room ecosystem facilities in smart home. Temperature as part of room ecosystem is related to one's performance and productivity such as the teaching and learning process. The problem of temperature is always changing due to various factors. controlled temperature is required, but with high energy consumption, optimization of its use needs to be considered. Adaptive approach solutions are used to regulate the temperature of classroom. This room has a maximum capacity of 32 participants and is equipped with 2 Air Conditioners (ACs). The use of air conditioning is regulated through 3 rules, namely student attendance, class schedules, and room temperature. We developed an IoT system consisting of sensors to detect student attendance, measure room temperature, and remote AC that is integrated with the lecture scheduling system. The system that is built is tested using several scenarios according to the rules that have been set in a conditioned learning room and can run as expected with success approaching 100%. Then the classroom ecosystem can indirectly affect the improvement of the teaching and learning process from the comfort point of room temperature.

Keywords: internet of things, smart classroom, motion sensor, infrared sensor, adaptive cooling system

Motivation and Drivers for Online Fashion Rental: Study by Social Networking Sites in Indonesia

Abstract -

This empirical study aimed to examine factors influencing consumer's behavioral intentions to rent fashion items online through social network sites. Social network sites were chosen because more and more businesses use them to sell online. Expectancy values (relative advantage and ecological importance) and past sustainable behavior were tested to see the relationship with attitude toward online fashion renting. Afterwards, the path analysis of the attitudes and subjective norms was conducted to reveal the relationships with consumer's behavioral intentions to use online fashion renting. The proposed theoretical model consists of relevant variables developed from the current literature on the circular economy, especially fashion rental, where the Theory of Reasoned Action (TRA) is the main theory. This quantitative study uses purposive sampling to obtain survey data from 244 respondents in Indonesia. Structural equation modelling and confirmatory factor analysis were used to test the model's validity, reliability, and relationship. The findings showed that expectancy values and past sustainable behavior are positively related to attitude toward online fashion renting. Moreover, consumers' attitude and subjective norms positively influence their behavioral intention to use online fashion renting. These results reaffirmed the positive effect of consumer's attitude and subjective norms to their behavioral intention to use an online service in supporting sustainable behavior.

Keywords: Expectancy value, Theory of Reasoned Action, online fashion rental, collaborative consumption, consumer motivation

UT Metaverse: Beyond Universitas Terbuka Governance Transformation and Open Challenges

Abstract -

The Open and Distance Learning (ODL) system as we know is among the field that will be altered by Metaverse technology due to the benefits it offers. Various initiatives for embracing the Metaverse for distance learning are now underway. Universitas Terbuka (UT), the earliest government-mandated university for managing ODL in Indonesia, is also now at the first stage of preparing to harness the benefit of the Metaverse. This initiative is called Universitas Terbuka Metaverse (UT Verse), a Metaverse framework architecture developed by UT encompassing all its business processes. Towards this purpose, UT Verse Audit Centre (UTVAC), an instantiation as a sub-UT Verse, is proposed. This paper presents the complete architecture of the UT Verse as the foundation of the UT governance transformation to be a cyber university and the initiative for the VAC. As both initiatives are still in their infancy, we aim to share our lessons learnt and highlight the challenges to obtain feedback for mitigating their ongoing developments as earlier as possible which might be costly otherwise.

Keywords: Universitas Terbuka, Open University, Metaverse, Virtual Audit Centre, University Governance Transformation

Analysis of Face Data Augmentation in Various Poses for Face Recognition Model

Abstract -

When constructing a face recognition model, many face images for each person are required to perform well. Face data augmentation is a popular technique to create variations of face poses via angular head movements, e.g., yaw, pitch, and roll. This study used convolutional neural networks, ResNet-50, MobileNetV3-Large, and SeResNet18 models, to evaluate the impact of face data augmentation on the performance of the models. The training was performed using the FaceScrub dataset to evaluate the performance of the face data augmentation approach using a batch size of 20, a learning rate of 0.001, and 150 epochs. The results demonstrate that the SeResNet18 model obtained the highest accuracy (0.8719) with a loss of 1.5106. Before increasing the amount of face data through various poses, the accuracy of the SeResNet18 model was only 0.8108, with a loss of 1.5513. We also discovered that the original data combined with all angular head movements (yaw, pitch, and roll) produced the best result for all models.

Keywords: Deep Learning, Face Recognition, Data Augmentation, Yaw, Pitch, Roll

Utilization of Linguistic Data for Learner Assessment on e-Learning: Instrument and Processing

Abstract -

The increasingly massive use of e-Learning illustrates the speed and need for innovation in learning. According to the National Higher Education Standards (SN-Dikti), constructive alignment is required between learning outcomes, processes, and assessments to properly implement learning in e-Learning. Assessment is an essential component of e-Learning. Unfortunately, the problem of assessment in e-Learning is still found. One of them is the limitations of e-Learning in accommodating and processing various assessment data, primarily linguistic. Even though the variety of assessment data, both numerical, linguistic, and a combination of the two, supports a comprehensive assessment. On the other hand, the accommodation of linguistic data raises problems regarding how to process of unifying linguistic data is carried out. Research related to linguistic data using computing with words has been carried out, but it still needs more precise results from the unification of the linguistic data. Therefore, this study proposes providing an assessment instrument to accommodate linguistic data in e-Learning, as well as showing how to process of unifying linguistic data is carried out using 2-Tuple Fuzzy Linguistic. This approach can avoid the loss of assessment information by presenting more informative and precise results in a 2-tuple (s, α) where s indicates the ability level, and α shows a comparison of abilities with other learners and the potential of the learner to achieve higher abilities. This proposal has the potential to be applied in a learner assessment system for higher education e-Learning.

Keywords: learner assessment, e-Learning, linguistic data, e-Rubric, 2-tuple fuzzy linguistic

Grading Problem-Solving for Clustering Students' Score Using Dynamic Programming Procedure in The Context of Dynamic Time Warping

Abstract -

Clustering is the solution for grouping a plenty of data when there is no knowledge of the classes. Clustering is typically a well-known algorithm in the origins of machine learning or artificial intelligence. However, artificial intelligence is, unfortunately, relatively hard to understand for some reasons, hence, followed by the rise of explainable artificial intelligence research. In this paper, we propose an alternative approach to grouping problem-solving by using a dynamic programming procedure in the context of dynamic time warping. We conduct a cluster analysis in stagewise optimization with the following four steps; (1) define an optimal value function, (2) formulate recurrence relation, (3) set the boundary condition, and (4) answer is given by. We also demonstrate a numerical example along with its table-filling solution in the case of grading students' scores into k clusters. The results conclude that dynamic time warping algorithm may have preferences to be an alternative solution for certain machine learning tasks beyond traditional unsupervised methods instead.

Keywords: clustering, dynamic time warping, pattern recognition, student score grouping, dynamic programming.

The 7-Phases Preprocessing Based On Extractive Text Summarization

Abstract -

Extractive text summarization is an approach to automatic text summarization whose main purpose is to reduce the size of the document while preserving the information of the original document. In this study, 7-phase preprocessing is proposed as a preprocessing composition to clean text data so that it is ready to enter data into the summary method such as machine learning. The composition of 7-phase preprocessing is data frame by sentence, remove title from data frame, lower case-ing, remove punctuations, remove stop words, tokenizing and stemming. The preprocessing model was tested on the DUC 2002 dataset which is a news document. The performance of the proposed preprocessing stage for extractive summarization showed superior results compared to the combination of other comparison preprocessing stages with ROUGE-1 measurements (recall, precision, and F-1).

Keywords: preprocessing, text summarization, extractive, machine learning, news

Paper ID #104

Kun Nursyaiful Priyo Pamungkas, Supeno Djanali, Radityo Anggoro, Paliling, Puhrani Burhan, Feriyadi

Dual Cluster Head Selection Based on LEACH and Differential Search Algorithm to Extend Network Lifetime in Wireless Sensor Network

Abstract -

The key component of a wireless sensor network (WSN), the sensor node, has a lot of restrictions. Since sensor nodes must run for a long time, energy is their biggest drawback. Therefore, energy efficiency is a significant highlight in many studies at WSN. A well-known cluster-based technique in the WSN is the Low-Energy Adaptive Clustering Hierarchy (LEACH). However, the selection of cluster heads (CH) in the LEACH does not consider the availability of energy and distance. This article presents a new protocol based on LEACH and Differential Search Algorithm (DSA) to select CHs and Deputy CHs to extend network lifetime. Additionally, the LEACH protocol is used as a comparison to evaluate the functionality of the proposed protocol. The simulation results show that the proposed protocol has a more extended period of stability and network lifetime than LEACH

Keywords: Wireless sensor network, Cluster head, LEACH, Differential search algorithm, Energy efficiency, Stability period, Network lifetime.

The Evaluation on Acceptance of the Use of Social Media in the Implementation of Blended Learning in Private Higher Education in Indonesia

Abstract -

Distance learning using the blended learning method is encouraged to be implemented in higher education. This is deemed suitable to be implemented in teaching and learning activities in the current conditions that can optimize the integration of oral communication as in face-to-face learning in class and written communication through online learning, through the use of social media. However, in practice, the actual use of blended learning by the faculty is at a minimal level. Therefore, it is not known for sure how is the acceptance of its use by higher education in general. In this case, the researcher is interested in measuring its acceptance. The purpose of this research is to determine the level of acceptance of the use of social media and the implementation of blended learning in higher education. This research uses a model developed by comparing, combining, and adapting the technology readiness model, technology acceptance model, information literacy variable, truth perception variable, and trust perception variable with a quantitative approach and distributing questionnaires to obtain data from respondents. The distribution of the questionnaires was carried out by collecting samples using a purposive sampling technique. Furthermore, the data obtained were analyzed using Ms. Excel 2016 with the PLS-SEM approach using SmartPLS 3.0. This study reveals that 42% of the data stated that the percentage of university acceptance of the use of social media in the implementation of blended learning was more than 75% and 84% stated that higher education was ready to implement it.

Keywords: Technology acceptance model, Technology Readiness Model, Blended learning, Social Media

Paper ID #107

Handi Sutriyan, Agung Sunaryadi, Marzuki Sinambela

Blockchain-Based Multiple Server Database System Prototype on BMKG Automatic Weather Station (AWS) Center Architecture

Abstract -

Abstract— BMKG stores weather observation data from AWS (Automatic Weather Station) centrally on the BMKG Database Center server. However, centralized storage has the vulnerability of data being damaged or lost if the server experiences a crash, which can affect BMKG's service quality. One alternative to deal with this problem is to use a storage system with multiple blockchain-based database servers. Blockchain is a technology with an architecture consisting of a series of blocks where each new block is cryptographically linked to the previous block which ensures data integrity without any centralized authority. With this system, the data is automatically backed up and distributed so that data recovery can be done when there is a disturbance/attack on one of the nodes. And with the help of blockchain, data integrity between the servers used is guaranteed. The system consists of three main components, namely: MQTT Server, Blockchain, and REST API. The MQTT Server functions to receive data from AWS using the MQTT protocol, then the data is passed to the blockchain via the REST API as a blockchain interface with other components. The REST API also serves requests for data retrieval from the client to the blockchain environment. The blockchain environment consists of seven docker container nodes that are interconnected by a blockchain mechanism to process each transaction. These servers are hosted in cloud environment which deployed in two different location. Based on the results of implementation and testing, all system components are functionally running well. However, the result of performance testing shows that system is still lacking in handling high amounts of transactions. Therefore, it requires an improvement to get better system performance.

Keywords: AWS (Automatic Weather Station), Blockchain, MQTT, REST API

Paper ID #108

Muhammad Naufal Fikriansyah, Hapsoro Agung Nugroho, Marzuki Sinambela

Low Cloud Type Classification System Using Convolutional Neural Network Algorithm

Abstract -

Clouds are one of the most important parameters in doing weather observations. Meteorologist and atmospheric experts are able to determine short-term and long-term weather conditions by observing atmospheric parameters, one of which is cloud types. The goal of this research is to develop a system which is able to recognize cloud patterns through imagery to determine the types so that the subjective factor in cloud observations can be decreased and help observers to observe cloud types more easily. This system was built by implementing the Python programming language and one of the deep learning models, named as Convolutional Neural Network (CNN). The data used in the system are low cloud image data which are divided into 5 (five) classes, namely Cumulonimbus, Cumulus, Stratus, Stratocumulus, and Nimbostratus. The result shows that the accuracy achieved the number of 92.22% in the training process with the total loss of 0.20%

Keywords: Deep Learning, CNN, Python, Cloud Types

Paper ID #110

Fitrianingsih, Dewi Agushinta Rahayu, Figa Rizfa Zazila

Dynamic Pricing Analytic of Airbnb Amsterdam Using K-Means Clustering

Abstract -

The development of the world of providing accommodation services in the world is increasingly showing a very rapid development. One of these developments is in the field of information technology. One of the developments in tourism technology is the Airbnb company. Airbnb is an online-based booking or rental service for private rooms, apartments or houses. Owners can rent back accommodations on a daily basis such as hotel rooms. This research will conduct a dynamic pricing analysis that can help Airbnb hosts choose the optimal property price based on the selected season. This research uses clustering method with K-Means algorithm. The data that will be processed is Airbnb data in Amsterdam, which comes from the Airbnb dataset website for one year from 04 March 2021 to 06 March 2022. This research is expected to provide an overview of one marketing strategy by giving companies the freedom to adjust the price of service products when the situation arises. suitable and possible. Dynamic pricing is one of the marketing strategies for companies to compete with competitors. The accuracy of the research using the K-Means Clustering model is 96.21%. The net income result is 24201, the actual income is 16068, the expected profit or loss is 8133. Where this amsterdam airbnb is right to use the Dynamic Pricing method, because the income generated is optimal

Keywords: Airbnb, Dynamic Pricing, K-Means Clustering, Revenue



Paper ID #112

Agus Mulyanto, Sri Hartati, Retantyo Wardoyo

Systematic Literature Review of Text Feature Extraction

Abstract -

Text data has essential information depending on the party who can process it. Text feature extraction techniques have opened various ways to analyze data from structured to unstructured data. Based on the development of text extraction, which is widely used today. This Systematic Literature Review (SLR) paper analyzes the methods widely used in current text extraction research studies. Writing this SLR implements the PICOC method. Trends in previous studies regarding text extraction have been analyzed in this study. The total publications used are 23 articles that have been carefully observed in a systematic literature review to answer the research questions that have been formulated.

Keywords: feature extraction, text, machine learning, text analysis

Food Vloggers: Mapping the Relationships between Personal Relevance, Customer Engagement, and Repurchase Decision

Abstract -

To advertise their companies and products on social media, businesses are increasingly turning to influencers. There is a dearth of research on culinary influencer endorsements, particularly in the area of food influencers, and its theoretical underpinnings are still in their infancy. This study aims to get knowledge about how food influencers affect the likelihood that people will repurchase goods they have suggested in order to develop a theoretical framework that sufficiently explains how food influencers influence their followers. Using a non-probability convenience sampling method, an online questionnaire is used to test the suggested framework. The suggested conceptual framework and hypothesized correlations have been tested using SEM. Results show that the two key determinants of the choice to repurchase are suggested to be personal relevance and customer engagement. Customer engagement is influenced by personal relevance, which in turn affects the decision to repurchase the recommended foods. It is clear from this that customer engagement serves as a mediator between personal relevance and the choice to repurchase. The direct relationship between personal relevance and the decision to repurchase was also significant. Future study can benefit from the research model that is offered because it clarifies the connections between personal relevance and repurchase decision. The research can help marketers decide which culinary influencers will best help them advertise their products and services.

Keywords: food influencers, personal relevance, customer engagement, repurchase decision

Model Implementation of Application Programming Interface for E-Government Data Integration

Abstract -

The challenge in implementing information systems to realize good e-government governance is to minimize the burden on information system users but not reduce data validity. The Jombang Regency Agriculture Office, as part of the Jombang district government, seeks to apply information technology in its activities. Over time, seven applications are in their scope of work. The problem stems from the existence of many complaints from employees about the amount of data that must be input into the application, even though a lot of the same or almost the same data is input into the various applications, so it is felt necessary to carry out the integration between existing applications. By using observation and interviews, research data were collected. The Service Oriented Architecture approach is used in the Application Programming Interface (API) application to carry out the integration process between these applications. The conclusion from this research is that API can integrate the systems to eliminate repetitive work that can burden existing employees.

Keywords: API, E-Government, Integration Data

A Time-Window Approach to Recommending Emerging and On-the-rise Items

Abstract -

The recommendation system (RS) filters large sales transaction data, to promote item Y as an alternative or pair to item X that the application user is looking for. Items that are no longer in season usually decrease in transactions, even to zero. Constantly recommending these items is irrelevant, while other items that are more relevant and profitable are not recommended, such as the emerging and on-the-rise items. The proposed solution to this problem is the time window approach, which is a block of data of a certain size and recorded at a certain time stamp. Item combinations (itemsets) are mined from each window with an association rule approach, and changes in the number of transactions containing these items are evaluated from window to window. From the number of transactions that contain the itemsets, the system distinguishes status items into four types: risky, normal, emerging, and on-the-rise. Items that are currently suffering from zero sales risk the same fate in the next window, so they are called risky items. The system will notify admins to review this item, and look for other emerging or on-the-rise items to promote along with item X. Experiments were carried out on two datasets, and it was found that 42.7% and 59.4% items from each dataset are risky.

Keywords: association rule, emerging patterns, recommendation system, time-windows

Topic Modeling on Covid-19 Vaccination in Indonesia Using LDA Model

Abstract -

According to data from covid19.go.id, there is a lot of hoax news about Covid-19 vaccinations spread across various social media in Indonesia. Meanwhile, the ability to monitor and track misinformation and trends regarding Covid-19 and its spread is an important part of the response process by the media and government to dealing with fake news about Covid-19. Twitter is a social media that is actively used in spreading issues. Twitter users in Indonesia reached 18.45 million users as of January 2022. To find out useful information on Twitter social media comments regarding the Covid-19 Vaccination, a method, namely Topic Modeling, can be used. This study aims to obtain the distribution of the Covid-19 Vaccination topic on Twitter Data in Indonesia to assist the government in knowing the trend of topics related to Covid-19 vaccination and the trend of changing the topic. The dataset on Twitter used is 10,140 pieces about Covid-19 vaccinations in Indonesia in the period August 2021 to April 2022. Based on the Latent Dirichlet Association (LDA), the 5 most popular topics were obtained for each model, and spread in the fields of health, religion, society. Based on the alpha and beta hyperparameter tuning, it was found that the topic with $K=5$, $\alpha=\text{asymmetric}$, and $\beta=0.61$ was a relevant LDA topic model for the research dataset because good in topic diversity and have coherence value=0.590.

Keywords: topic model, covid-19 vaccination, LDA, hyperparameter tuning

Prediction of Work From Home Post COVID-19 using Classification Model

Abstract -

This study aims to predict the continuance of the adoption of WFH after COVID-19 and other factors that also influence these preferences. This study was conducted using data mining techniques with the CRISP-DM framework based on the Decision Tree, Naïve Bayes, and Random Forest Algorithms. The dataset was taken based on a questionnaire survey distributed online via Google Forms with a target of 200 respondents and returned from 183 respondents from four divisions. The results of this study indicate the Decision Tree model has the best performance with an accuracy of 85.45%. Based on the prediction and questionnaire results, employees tend to agree to continue implementing WFH after COVID-19 with a Hybrid working model. These preferences influence work improvement, employee performance, and work environment.

Keywords: CRISP-DM, classification model, GORP Kompas Gramedia, Predictive Analytics, Work From Home

Automatic Determination of Seeded Region Growing Parameters in Watershed Regions to Segmentation of Tuna

Abstract -

Seeded region growing has two main parameters, namely seed initialization and threshold determination. Parameter values can be done manually or automatically. Automatic parameter assessment is suitable to be applied on a real time basis, but the parameter assessment must be precise. This is due to the greater risk of segmentation errors than manual. This research aims to propose automatic determination of seeded region growing in the watershed region for image segmentation of tuna. The tuna image was processed into the hue, saturation, and intensity (HSI) color space. The hue color space was then taken up in the formation of the watershed region. After that, the density of a region was calculated, then the density was sorted and the highest density was taken. The region that had the highest density was taken based on the highest gray level intensity, then the threshold was obtained from the difference between the average number of regions used and the average intensity of the region left. The results of tuna image segmentation were successfully carried out by proving the average values of relative foreground area error (RAE), missclassification error (ME), and modified Hausdroff distance (MHD) respectively for category 1 data of 6.77%, 1.78% and 0.18%, while for category 2 data of 3.44%, 1.30% and 0.66%.

Keywords: fish, image processing, seeded region growing, segmentation, watershed

Paper ID #123

Alam Rahmatulloh; Bambang Tri Handoko; Rahmi Nur Shofa; Irfan Darmawan

GeoJSON Implementation for Demographic and Geographic Data Integration Using RESTful Web Services

Abstract -

There are 69 urban villages in Tasikmalaya, and each one has its own information system including demographic and geographic information. The fundamental issue with this study is that the demographic and geography data for each urban village have not been integrated. The answer is to use Restful API to build a comprehensive urban village information system. The technology is used to integrate spatial and population data by connecting them. The performance of access to demographic and geographic data information in each urban village in Tasikmalaya City can be improved by an integrated system. For population data, JSON is utilized, and for geographic data, GeoJSON. Each REST API is put through tests using Jmeter to gauge how well it performs in terms of response time and the volume of data the urban village information system receives. The study's findings, specifically how well each urban village information system integrated geography and population data. According to Jmeter test findings, it typically takes 14.7 seconds for the REST API SIKEL to load population data. The loading of geographic data in GeoJSON format via the typical GIS REST API takes 38.4 seconds.

Keywords: GeoJSON, Information Systems, Integration, Restful API

Android-based Matrix Learning Media to Increase Student Interest in Learning

Abstract -

Conventional learning media such as diktat or modules are often considered boring by students and unable to generate learning motivation, so lecturers must use technology to create innovative, effective learning media and increase student interest in learning. This research aims to produce a valid android-based matrix learning media to increase student interest in learning. The subjects of this study were students of the Informatics Engineering Study Program at the Banjarmasin State Polytechnic. Learning media was developed using the Construct 3 application. Research has succeeded in producing android-based matrix learning media. Based on the media experts' test, the application has met the "Good" category with a percentage of 69.4%. In contrast, the test by material experts gave the result that this learning media has met the criteria for the content of the material with the "Very Good" category at number 82, 7%. Therefore, the learning media can be said to have been valid and can be used. Based on the N-gain test, it is concluded that this android-based matrix learning media has increased student interest in learning with a coefficient of 0.73, which is in the "High" change category.

Keywords: Android, Learning Interest, Learning media, Matrix

Dedi I. Inan, Achmad Nizar Hidayanto, Ratna Juita, Antares Firman, Ali Muktiyanto, Hermawan Wibisana Arifin, Muhammad Rizky Darmawan, Nabilla Yuli Shafira, Cassie Michelle

M-Government Adoption in Indonesia: Self-Determination Theory

Abstract -

Delivering public service to its stakeholders as easy and effective as possible has been a challenge for the government. The advancements and ubiquities of smartphones facilitating efficient access to government services by the government do not necessarily mean that it can be effectively undertaken. In the end, that is the stakeholders who decide whether or not they will adopt it. Thus, understanding the determinants leading to the decision is crucial, particularly its motive. This research aims to investigate mobile self-efficacy and personal innovativeness as intrinsic motivations leading to the intention to adopt the mobile government. Self-Determination Theory (SDT), comprising perceived competence, relatedness, and autonomy, is the most representative theoretical lens to portray this issue. A total of 303 valid respondents were collected to analyse further using Partial Least Square-Structural Equation Modelling (PLS-SEM). The findings reveal that both antecedents significantly affect the intention to adopt m-gov. Although mobile self-efficacy has no significant influence on perceived relatedness, altogether, the model accounted for 49% of the variance in adoption intention, with perceived ease of use contributing more to intention than the other constructs. These findings provide several important implications for mobile government adoption in Indonesia, in terms of both research and practice. Limitations and future research directions are also discussed.

Keywords: Mobile government, mobile self-efficacy, personal innovativeness, self-determination theory, adoption intention



Paper ID #135

Anita Hidayati, Iklima Ermis Ismail, Ade Rahma Yuly and Henry Edison

Games for Scrum Team Collaboration in the Global Software Development Environment: A Literature Review

Abstract -

Global Software Development (GSD) is commonly used in software development companies. A competent Scrum team supports the success of the GSD project. This research aims to identify the game components in the form of types, elements, and technologies that contribute to building experience for the Scrum team in a GSD environment. We used a systematic literature review with the Kitchenham and snowball method. From the 12 papers, it is concluded that none of the games specifically focused on the competence of the Scrum team at GSD. The literature study results also identify ten game elements and technologies as a reference for game development to meet the challenges in GSD. The conclusion is that there are still great opportunities to develop a game that can improve the competence of the GSD Scrum team. Game development should refer to elements and technologies that have been identified.

Keywords: scrum, game, global software development, systematic literature review, competence

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Digital Transformation Impact Analysis towards Transition in the Role of Information Technology for Organization in New Digital Bank

Abstract -

The role of Information Technology in the banking industry has been playing an important role in providing better services to customers and open new opportunities. Bank XYZ is a conventional bank that is transforming into a digital bank to improve bank XYZ's position in financial services sector, specifically in the banking industry. In the process of transforming into digital banking, Information Technology leadership in the organization is important. However, publications regarding the impact of digital transformation in Information Technology role and leadership, especially in the banking industry are scarce, so this research is importance. The benefit of this research is to be organization consideration for designing corporate information strategy & management and can be a reference and contribution of ideas that can enrich knowledge and further research about corporate information strategy & management. This study aims to identify digital transformation impact in IT role and leadership specifically in new digital bank. Qualitative approach with data collection from semi-structured interviews and document was used to identify the impact of digital transformation towards transition in the role of information technology and do benchmarking Bank XYZ's case with a few new digital banks in the world. Based on the comparison and benchmarking, learned lesson as an input for Bank XYZ to improve the digital transformation process into a digital bank. Integrated big data, agile team, automation process, cloud computing, machine learning, and artificial intelligence was the common capability of a digital bank.

Keywords: Digital Bank, Digital Transformation, Leadership, Role of Information Technology, Strategic

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Analysis of Critical Success Factors in Information Technology Projects: A National Shipping Company Case Study

Abstract -

The positive of the Covid-19 pandemic is being a catalyst for the company's digital transformation plan. However, the targets set have not been achieved with the increasing demand for digitizing business processes and not being matched by increased resources. This research is focused on the IT projects that became quick wins for the Information Technology Division, which experienced delays in the middle of the year, but the target can still be achieved at the end of the year. This research aims to analyze the Critical Success Factors (CSFs) of Information Technology projects in a National Shipping Company. The Analytical Hierarchy Process (AHP) was used in this research to determine the ranking of the Critical Success Factors (CSFs) found so that company can set priorities in making decisions and project success can be achieved. Based on the analysis, the top three success factors that become the highest priority are User Involvement, IT Readiness, and Top Management Commitment & Support. In contrast, the bottom three success factors with the lowest priority are Trends, Hardware/Software Selection, and Change Management.

Keywords: critical success factors, information system, information technology, IT projects, shipping company

Rice seed classification using machine learning and deep learning

Abstract -

Abstract— Rice is a staple crop for Indonesian citizens. The need for rice increases along with population growth, and farmers need quality rice seeds. This study compares machine learning and deep learning to identify rice seeds. The method used is artificial intelligence by applying machine learning and convolutional neural networks. The shape feature extraction approach is necessary for machine learning. Convolutional neural networks use a group of labeled image data to train. The author's contribution is to use 34 custom layers to reduce the computing burden of deep learning. The secondary data used are five rice seeds classes, Arborio, Basmati, Ipsala, Jasmine, and Karacadag, with 1000 files per class. A combination of methods is needed to obtain numerical and image validation. The test results for the two classifications of rice seeds show the accuracy of machine learning with random forests and extreme learning machines at 98% with an average time of 2 minutes. Convolutional neural networks with 34-layers obtained an average accuracy of 99.92% and an average training process computing time of 20 minutes and 54 seconds. However, the testing process only takes a few seconds

Keywords: Rice seed, shape feature, machine learning, convolutional neural network, custom layers

Paper ID #141

Sava Savero, David Agustriawan, Muammar Sadrawi

1D Convolutional Neural Network to Detect Ventricular Fibrillation

Abstract -

Ventricular fibrillation (VF) contributes to the majority of arrhythmia mortality and morbidity rate, as studies show the survival rate of patients who have been discharged from the hospital less than forty percent, while the mortality rate of patients who did not have fast access to defibrillator exceeds 90 percent. The research aims to develop another method of ventricular fibrillation detection. The research utilizes a convolutional neural network (CNN) with ten-second ECG data gathered from PhysioNet database CU Ventricular Tachyarrhythmia Database (CUDb) to determine ventricular fibrillation reading from normal reading. An accuracy of 90%, a sensitivity of 96%, and a specificity of 84% of test data were obtained. In conclusion, the CNN can be possibly implemented for the VF early detection system.

Keywords: ventricular fibrillation, neural network, ECG, health technology, cardiovascular

Paper ID #146

Arie Vatesia; Ruvita Faurina

Analysis for Data Mobility and Covid-19 Positive Rate with Multilayer Perceptron

Abstract -

COVID-19 has been affecting human mobility to avoid the risk of infection. Movement restriction was one of the government policies to reduce the rate of infection. However, the mobility was still occurred to be recorded during the policy. This action has led to the problem of the number of beds on hospital have to be prepared for the peak of infection. This study developed a model using Multilayer perceptron as a useful theorem in regression analysis to see the fitness approximation over this problem. Five layers neural networks combination have been used to see the performance of the model to reach the best fit of the model. The process of the study includes data acquisition of the influence of community mobility over the positive number of COVID-19, managed hyperparameters, and calculate the results of prediction in the form of the length of time the patient would be infected with COVID-19 from 2020 to 2021. This study found that the infection was happening mostly after 12 days of human mobility activity in public area such as ATM, market, park, and any public area recorded by Google mobility data. It was also showed the number of infections after 12 days in order to prepare the number of beds on hospital. Furthermore, this study found the best model with smallest loss value on 0.01452617616472448 with the gap number of infection from public area as much as 77 persons.

Keywords: Multilayer perceptron, Positive rate, Covid-19, Neural Networks, Mobility data

Paper ID #147

Haris Setiawan, Mudrik Alaydrus, Abdi Wahab

Multibranch Convolutional Neural Network For Gender And Age Identification Using Multiclass Classification And FaceNet Model

Abstract -

The human face provides a wealth of information regarding gender, age, ethnicity and emotions. Gender and age are considered as important biometrics and attributes for the identification process. However, the identification of gender and age is influenced by many dynamic factors that can change over time such as aging, hairstyles and expressions. The identification process have a problem in accuracy and the loss, several face recognition methodologies have been tried to overcome these dynamic factor problems, one of them is multibranch convolutional neural networks. The previous studies used these methods to deal with overfitting and backpropagation, but other supporting methods are still needed to increase the accuracy. The goal of this work is to optimize accuracy and mean absolute error (MAE), multiclass classification it's used to grouping data for age and facenet is used to solve problems related to face verification and overfitting, multibranch convolutional neural network (CNN) can be used to optimize backpropagation and reduce the error rate by adjusting weight based on the difference in output and the desired target

Keywords: Face Recognition, Multibranch CNN, Multiclass Classification, FaceNet

Detecting Online Outlier for Data Streams using Recursive Residual

Abstract -

Outlier analysis is a statistical procedure that involves the identification of anomalous observations. Outlier detection is important in many fields and involved in numerous applications since if the outliers are not detected then it can lead us to a wrong decision. There are a wide variety of techniques that can be used to identify outliers in datasets. Most of the existing methods are based on static data, while in case of data stream these methods are computational inefficiency and require big memory storage. This is due to the data stream being a dataset that is generated in a real-time data stream and requires real-time data analysis. The recursive least squares approach is mainly used in many regression analysis and the outlier detection process is referred to as supervised outlier detection. In this paper, we propose an online outlier detection algorithm using recursive residuals via recursive least squares method. The recursive residuals are sequentially calculated on the distance of the observation and the prediction values. To estimate online parameters in this research, we apply a recursive least squares method to predict an iterative model. In recursive least squares method a single new data point is analyzed each algorithm iteration to improve the estimation of our model parameters. Then, our simulation is performed on historical data for Tesla stock for a given period. Results that our online algorithm can demonstrate its ability to maintain high accuracy and find better outliers with low computational cost for anomaly detection.

Keywords: outlier detection, recursive residual, recursive least squares, data stream, online algorithm

Implementation of Adaptive Bit Decision Point to Improve Receiver Performance in Li-Fi System

Abstract -

The growing demand for high-reliability and low-latency wireless links requires increasingly modern wireless technologies predicted in 5G and beyond. In general, wireless communication devices currently use Radio Frequency (RF) in the data transmission process, so the exponential increase continues to make the radio spectrum below 10 GHz insufficient. While most of the mobile data traffic is consumed indoors, where Light Fidelity (Li-Fi) associated with Visible Light Communication (VLC) offers many special advantages and effective solutions to various wireless communication problems. Based on the current development of Li-Fi, researchers see that the receiver is very dependent on the processes that occur in the detector in interpreting changes in light intensity (signal) as data. For this reason, through this research, the researcher proposes an Adaptive Bit Decision Point (BDP) algorithm that allows the receiver to adapt to changes in the intensity of light captured by the detector, both changes to Ambient Light and changes to distance and angle to improve data reception performance on the Li-Fi system. The results show that the application of the Adaptive Bit Decision Point algorithm on the receiver of the Li-Fi system can provide a very significant performance increase.

Keywords: Light Fidelity, Wireless Technology, Ambient Light, Adaptive Bit Decision Point (BDP)

Paper ID #158

Evi Triandini, I Gusti Ngurah Satria Wijaya, I Ketut Putu Suniantara and Sugiarto Sugiarto

Adoption Technology at MSMEs: A Conceptual Model with TOE

Abstract -

Empowerment of MSMEs (Micro, Small and Medium Enterprises) in the midst of globalization and high competition has forced MSMEs to be able to face global challenges, such as increasing product and service innovation, developing human resources and technology, and expanding the marketing area. MSMEs as the pillars of the Indonesian economy show a low contribution to exports because they only reach 14% of the total export value of the non-oil and gas sector, which is inversely proportional to the data on the number of MSMEs compared to the number of large businesses. Based on the literature review, this paper proposes to identify the role of Digital Technology to increase the competitiveness of export-oriented SMEs based on The Technology, Organization, And Environment (TOE) framework. The results of this study are expected to be able to contribute to the management of MSMEs in managing their business to increase export competitiveness by taking into account the factors resulting from the TOE framework

Keywords: Conceptual Model, Technology Adoption, TOE, MSMEs, Framework

Chunk Learning Media for Cognitive Load Optimization on Science Learning

Abstract -

The sudden shift in the education world due to the pandemic of Covid-19 bring both challenge and opportunity at the same time. Since decades ago, the understanding of the importance to manage cognitive load for effective learning had been applied in multiple methods. Having said that, only a few addresses the opportunity to combine it with the latest trend attractive for today's young learners to minimize more extraneous cognitive load. This research discusses the matter by proposing the adoption of the combination of chunk learning, animation, and super short video in social media platforms to convey learning materials on nervous system science, which has been stamped as a hard subject for high school students. The adaptation of super short video animation on nervous system science successfully helps students cope with the daunting pile of materials align with the cognitive load theory.

Keywords: cognitive load, chunk learning, short video, animation, nervous system



Paper ID #163

Hatma Suryotrisongko, Hari Ginardi, Henning Titi Ciptaningtyas, Saeed Dehqan, Yasuo Musashi.

Topic Modeling for Cyber Threat Intelligence (CTI)

Abstract -

Topic modeling algorithms from the natural language processing (NLP) discipline have been used for various applications. For instance, topic modeling for the product recommendation systems in the e-commerce systems. In this paper, we briefly reviewed topic modeling applications and then described our proposed idea of utilizing topic modeling approaches for cyber threat intelligence (CTI) applications. We improved the previous work by implementing BERTopic and Top2Vec approaches, enabling users to select their preferred pre-trained text/sentence embedding model, and supporting various languages. We implemented our proposed idea as the new topic modeling module for the Open Web Application Security Project (OWASP) Maryam: Open-Source Intelligence (OSINT) framework. We also described our experiment results using a leaked hacker forum dataset (nulled.io) to attract more researchers and open-source communities to participate in the Maryam project of OWASP Foundation.

Keywords: cyber threat intelligence, Maryam, OWASP, threat recommendation, topic modeling



Paper ID #170

Nurhadi Wijaya, Yudianingsih, Evrita Lusiana, Sugeng Winardi, Zaidir, Agus Qomaruddin Munir

LongSpam: Spam Email Detection using LSTM Algorithm

Abstract -

The email has swiftly become one of the most popular forms of communication because of its ease of use and speed on the internet. Not only is the email used for formal and informal correspondence, but it is also frequently utilized to transmit confidential information. Despite its widespread use, email has its drawbacks due to the persistent issues that its users continue to confront. Today's internet community faces serious challenges due to spam or unsolicited commercial communication. These flaws allow spammers to utilize email to spread their unwanted communications to tens of thousands of people. Here, we propose a detection model based on the LSTM algorithm for identifying spam and non-spam emails using a dataset from Kaggle comprising a total of 5.572 entries. The experimental findings show that the proposed model can successfully collect 1.115 samples as the test data and 4.457 samples as the training data. LongSpam has promise as a countermeasure against spam attacks since it can result in a lower threshold.

Keywords: Detection, Spam Email, Deep Learning, LSTM

Paper ID #171

Raymond Sunardi Oetama, Yaya Heryadi, Lukas, Wayan Suparta

Improving Candle Direction Classification in Forex Market using Support Vector Machine with Hyperparameters Tuning

Abstract -

Foreign Exchange market is the world's largest daily currency turnover. Two of the popular currencies Euro and Pound sterling traded against the US Dollar. Since the Russia and Ukraine war started in February 2022, their exchange rates decrease to the lowest rate ever. Even though the general trend is bearish, several daily candles increase for some days making challenges for forex analysts. To solve this problem, classification is applied. The data is labeled downward and upward. By utilizing Linear Kernel and Radial Basis Function (RBF) Kernel-based Support Vector Machines (SVM), the candle direction can be classified and optimized by tuning the Hyperparameters. The accuracy of candle direction classifications are highly improved. After tuning, in general, classification using Linear Models can outperform RBF Models. The best accuracy found on the Pound sterling against US Dollar by using the Linear model is 98.11% and the accuracy becomes 100% on data testing at a ratio of 70:30. Whilst for the Euro against the US Dollar, the best accuracy found the same for both Linear and RBF models on a ratio of 80:20 at 97.53%. However, on data testing, it decreases to 94.51% for Linear Model and 93.41% using RBF Model. The implication of this study is SVM can successfully classify candle direction on pairs in the Forex Market that are affected by a big event that comes for such a long period as long as the hyperparameter is tuned.

Keywords: Forex, Linear Kernel Based SVM, RBF Kernel Based SVM

Energy Efficiency in Buildings Using Multivariate Extreme Gradient Boosting

Abstract -

Humans need energy. Energy is often used in our daily activities, from helping with work and household chores to lighting our homes and on the street. Waste of light energy often occurs in households and large buildings. Lots of people do wasteful things like turning on all the lights in the room to make it look bright when they're not needed. A lot of research has recently been done on concerns about wasting energy and its long-term negative effects on the environment. A previous study in 2012 by Tsanas and Xifara used statistical machine learning to assess the energy efficiency of buildings. Their research focuses on calculating results individually rather than calculating all results directly. Other studies were also conducted using Multivariate Random Forest, resulting in a fairly good performance. In this study using the Multivariate Extreme Gradient Boosting method. The concept of this method is the same as the Extreme Gradient Boosting method, but is suitable for multivariate data types. The best results were obtained with MSE 0.537471 and RMSE 0.733124 733124 with gamma parameters 0.1, n-estimator 200 and a combination of training and testing data 90:10 by testing the data without normalization. Based on this test, it proves that Multivariate Extreme Gradient Boosting can produce better performance than previous studies.

Keywords: Energy Efficiency, Building, Multivariate, Extreme Gradient Boosting, Prediction

Paper ID #175

Syafrial Fachri Pane, Adiwijaya, Mahmud Dwi Sulistiyo, Alfian Akbar Gozali

LSTM and ARIMA for Forecasting COVID-19 Positive and Mortality Cases in DKI Jakarta and West Java

Abstract -

The spread of COVID-19 in Indonesia is still classified as a pandemic until October 31, 2022. Even though the endemic has been enforced in several nations worldwide. However, the fact that people's mobility is increasing means that this condition can increase the number of new cases of COVID-19. The Indonesian government remains vigilant about any decisions that will be taken to maintain the stability of the country's health sector, economy, and population mobility. First, The purpose of this our reasearchis to forcast of daily positive confirmed and daily mortality for the next 13 days using COVID-19 epidemiological data in Indonesia, i.e. DKI Jakarta and West Java. Second, The forecasting model uses a deep learning approach, i.e. LSTM and ARIMA. furthermore, The LSTM method and ARIMA modeling results are compared based on their respective to regions. Finally, The LSTM method has good model performance and the ability to forecast COVID-19 cases based on RMSE and MAPE.

Keywords: Forecasting, LSTM, ARIMA, DKI Jakarta, West Java, Indonesia

Sentiment Analysis on Cryptocurrency Based on Tweets and Retweets Using Support Vector Machines and Chi-Square

Abstract -

The high public interest in cryptocurrencies is increasing over time. Cryptocurrencies are gaining worldwide attention because of their unique and unpredictable nature. Nowadays, cryptocurrencies can be used for various things, one of which is for investment. In investing in cryptocurrencies, various analyzes are needed to consider trade flows. One way to analyze it is by analyzing public sentiment which consists of positive and negative sentiments.

However, there has been no previous research on the use of machine learning approaches and feature selection in sentiment analysis of Twitter tweets and retweets. The research was conducted by analyzing public sentiment using a machine learning algorithm, namely the Support Vector Machine. In addition to using the Support Vector Machine, Chi-square is also used in feature selection to help reduce noise in a sentence. Retweets will considerably improve sentiment label classification. The performance of sentiment analysis can be improved across the board by at least 91%. The sentiment analysis findings from this study are positive. This implies that a trader can take cryptocurrencies like Bitcoin, Ethereum, and Ripple into account while deciding on the type of investment.

Keywords: chi-square, cryptocurrency, support vector machine

Augmented Reality English Education Based iOS with MobileNetV2 Image Recognition Model

Abstract -

The ability to speak English is a must-have currently. Along with the development of the times, the ability to speak English is very important for everyone. Learning English is very important, especially in terms of education and work. Therefore, with the urgent need for English in the national and international arena, English must be introduced from an early age. By taking advantage of technological advances, especially iOS, education can be done using educational applications. This English-language object recognition educational application is designed by utilizing Augmented Reality (AR) technology by utilizing ARKit, and CoreML for object recognition models, and AVKit for text-to-speech. To find out the name of an object in English, the user is required to point his cellphone at the object he wants to know the name, then click on the cellphone screen to bring up the text of the object name in English above the object and a sound will sound the pronunciation of the text. This educational application is done using XCode software and the Swift programming language. Its development uses the waterfall method. This object recognition educational application in English can run well according to the design, starting from identifying objects and displaying text on objects with test results using the Black Box method, which is valid as a whole.

Keywords: Education Game, Augmented Reality, English, iOS, MobileNetV2, ARKit, CoreML

Paper ID #181

Cahya Damarjati, Fadia Rani, Slamet Riyadi, Gan Kok Beng

Sentiment Classification of Visitors in Yogyakarta Palace using Support Vector Machine

Abstract -

Yogyakarta is one of Indonesia's most popular tourist destinations with its Yogyakarta Palace "Keraton". Trip Advisor, one of the most extensive traveller guides, provides visitor reviews about the Keraton. Since the review is very important for Keraton management and was not analyzed yet, this research aims to classify the visitor sentiment on Keraton using the Support Vector Machine (SVM) method. The research method involved collecting comments from the website, pre-processing, including data cleaning, tokenizing, transforming, and stopwords filtering, as well as classifying the sentiment as positive and negative. This study showed that the SVM could classify the sentiment with 75.79% accuracy.

Keywords: sentiment analysis, Yogyakarta, Palace, Keraton, SVM

The Comparison of Sentiment Analysis Algorithm for Fake Review Detection of The Leading Online Stores in Indonesia

Abstract -

Online store users continue to grow and develop throughout the year so that the number of reviews from customers is also increasing. Customers can write reviews about the products and services and then post them on social media, whether it's a good or bad review. The reviews written are also very diverse such as product specification review, product advantages, product disadvantages and so on. Sometimes it is difficult for readers to determine which reviews are real and correct because there are so many written reviews. Reviews really play a very important role for potential customers to decide whether to buy the product or service or not. This study used several algorithms of sentiment analysis to detect fake reviews of online stores on Twitter. The algorithms were used to calculate the accuracy value of the review. The algorithms used were support vector machine, Naive Bayes, and logistic regression. The accuracy values of the three algorithms were compared and the highest is selected. The review text that was processed to produce fake review detection comes from the 3 leading online stores in Indonesia namely Tokopedia, Shopee, and Bukalapak. The results of calculating the accuracy value for real data using support vector machine is 79.59%, using naïve bayes is 77.92%, and using logistic regression is 70.49%. Comparison of these three results determine that the most appropriate algorithm for detecting fake reviews of online stores is the naïve bayes algorithm

Keywords: logistic regression, naïve bayes, online store, sentiment analysis, support vector machine, fake review detection

Hate Speech Detection in Code-Mixed Indonesian Social Media: Exploiting Multilingual Languages Resources

Abstract -

Hate speech in social media is becoming a relevant issue recently. Several studies have been proposed to deal with the hate speech phenomena in online communication. However, detecting hate speech messages from social media data is not a trivial task. Previous works have mentioned the problem of code-mixed languages in hate speech detection. As a matter of fact, Indonesia consists of several regions, each with its own local languages. Naturally, Indonesians tend to mix their own local language with Bahasa Indonesia when communicating in everyday conversation, including in social media communication, which contributes to the difficulty of processing Indonesian social media data. In this study, we plan to investigate hate speech detection in code-mixed Indonesian social media by exploiting several available multilingual language resources. Our experiment shows that the current available multilingual language model could not improve the model performance compared to the models which utilized the monolingual Indonesian language model. We also found that the most recent neural-based models are able to obtain better performance than the traditional model. For future work, we plan to implement a transfer learning approach to detect hate speech in Indonesian social media, specifically to deal with the code-mixed issue.

Keywords: abusive language detection, code-mixed, hate speech detection, social media

Paper ID #184

Herlawati Herlawati, Rahmadya Trias Handayanto, Prima Dina Atika, Sugiyatno Sugiyatno, Rasim Rasim, Mugiarto Mugiarto, Andy Achmad Hendharsetiawan, Jaja Jaja, Santi Purwanti

Semantic Segmentation of Landsat Satellite Imagery

Abstract -

Currently, practitioners of remote-sensing and geographic information system use mathematical and statistical-based methods in making land cover segmentation. However, this method requires a lengthy process and staff expertise. Urban planners need applications that are not only fast in performing spatial analysis but also do not require special skills. This study proposes a land cover classification application with one of the deep learning methods for semantic segmentation, namely DeepLabV3+. This method will be compared with Iterative Self-Organizing Clustering (ISOCLUST) and Object Based Image Analysis (OBIA) in Karawang, Indonesia, as the case study. The results showed that the DeepLabV3+ accuracy was 95% which is higher than OBIA (80%). Although ISOCLUST more accurate that is usually used as ground truth dataset, this method takes a lot of time as it is semi-automatic compared to DeepLabV3+ which only takes about one minute.

Keywords: Segmentation, OBIA, ISOCLUST, DeepLab, Remote Sensing, Landsat Satellite



Paper ID #186

Hamzah, Erizal, Mohammad Digi

DeepRec: Efficient Product Recommendation Model for E-Commerce using CNN

Abstract -

E-commerce, which provides access to millions of things online, has exploded in popularity in recent years. The availability of several options may cause shoppers' heads to spin and make it harder for them to settle on a single purchase. In recent years, many papers proposed the recommendation system as the potential solution to these issues. Hence, this study constructs a novel recommendation model using a learning technique to build an efficient recommender for e-commerce products. To set up our model, we compile a sizable e-commerce dataset. According to our experiments, our technique improves accuracy by 91.47 percent on the training set and 91.17 percent on the testing set. For this reason, the approach we present has the potential to be an effective means of resolving recommendation-related challenges in the actual implementation of e-commerce.

Keywords: Deep Learning, Convolutional Neural Network, Recommender Model, E-Commerce

Paper ID #187

Muh Ikhsan and Sri Susilawati Islam

Analyze and Improve Production Process Using VSM Method: A Case Study of Microplate HT96 Production at PT. Promanufacture Indonesia

Abstract -

Assembly process is an essential process in a manufacture that is become one of the keys to maintain the quality of product for operations. Among the process, the company should maintain the value which the customer is willing to pay for. By eliminating the waste within the processes, it can reduce the cost and meet the regular demand efficiently. To overcome the waste, this study examines the value stream map (VSM) in the assembly process of HT96. According to the process cycle efficiency benchmark, the assembly process has the score of 24.99% and need around 10% to reach the world class score PCE in the assembly batches category. Furthermore, several points in the VSM were analyzed and the PCE score is increased the PCE by 19% to the score of 30.17%. By approaching the improvement, it will improve the process production and the time consume to produce microplate HT96 will be efficient.

Keywords: value stream map, process cycle efficiency, takt time, waste

Comparison of Convolutional Neural Network Models to Detect Covid-19 on CT-Scan Images

Abstract -

Coronavirus Disease-2019 (COVID-19) is a new type of coronavirus that attacks the respiratory tract and can be contagious. More severe cases of this infection can cause pneumonia, acute respiratory syndrome, kidney failure and even death. Detection of Covid-19 is a crucial step to identifying suspected Covid-19 patients early. CT Scan is a significant modality to detect Covid-19 disease. Automatic detection of Covid-19 on CT-Scan implemented various convolutional neural network models such as Mobile-Net, ResNet50, and DenseNet. These three architectures were implemented for Covid-19 detection but were not compared on the same database. In this study, the authors propose a performance comparison of these three models to detect Covid-19 using an open-source dataset of 2038 CT-Scan images. The methods involved data preparation, preprocessing, training, testing, and performance evaluation. The result showed that the best accuracy is obtained by the DenseNet121 model with 95.98% and MobileNet with 95.09%, while ResNet50 has 92.00% accuracy. Although the accuracy of ResNet50 is lower than the other two models, the travel time of the ResNet50 model is faster than the DenseNet121 model, with an average travel time of 16 seconds per epoch.

Keywords: covid-19, CT-scan, CNN, mobilenet, resnet, densenet

Data Pipeline Framework for AIS Data Processing

Abstract -

Automatic Identification System (AIS) data contains static and dynamic information for identification, tracking, and collision avoidance of vessels, as well as management of maritime activities. In the utilization of AIS data, a data pipeline framework is needed which includes the process of capturing messages, translating messages, detecting data corruption, cleaning damaged data, reconstructing trajectories, visualizing data, and storing data for analysis needs. Usually, the analysis and storage of AIS data are done offline which makes it not conducive to understanding vessel dynamics. In addition, large AIS data contains incomplete and noisy information that affects the quality of the trajectory. In this context, this article has proposed an AIS data pipeline framework in the form of pre-processing and real-time trajectory reconstruction. Pre-processing is intended to eliminate data anomalies caused by transmission errors. While the trajectory reconstruction process to overcome missing values due to noise is based on the Cubic Spline interpolation technique. All processes in the data pipeline framework are streamed using Apache Kafka. The simulation results show that the proposed AIS data pipelines framework has succeeded in visualizing the data flow in the form of a map application and trajectory reconstruction in real-time.

Keywords: Automatic Identification System (AIS), Data Pipelines, Cubic Spline, Trajectory Reconstruction

User Experience Evaluation of IT Support Mobile Application Using System Usability Scale (SUS) and Retrospective Think Aloud (RTA)

Abstract -

Abstract— The development of today's digital world has been running more rapidly at the time of the presence of covid-19 pandemics, in which all aspects of life are very dependent on digitalization that time, and companies keep doing the work of enhancing innovation in their businesses, which is the developing of IT such as mobile application. PT XYZ is one of the companies engaged in printing and digital services. PT XYZ uses the mobile application IT Support to assist technicians in completing reports of printer damage experienced by consumers. During the order services process, users oftenly feel that menu on mobile application IT Support not effective and efficient yet on helping them to process order service, the elements in the mobile application are inconsistent so it complicated the user. To improve and finding the usability problem specifically needed the process user experience evaluation mobile application with system usability scale (SUS) and retrospective think aloud (RTA). Total sample used in the research was 52 respondents from active user IT Support using purposive sampling technique. The SUS score result is 50.77 in grade D. The less satisfied, because the SUS score is still smaller than 68. Retrospective Think Aloud (RTA) results with 11 respondents showed problems with usability and needed recommendations for interface improvements. The result of user experience evaluation is user interface recommendation to enhance the technician's performance to be more optimal. (Abstract)

Keywords: User Experience, IT Support, System Usability Scale (SUS), Retrospective Think Aloud (RTA), Mobile Application Evaluation.

Development of Signer Portal for Digital Products by Using Iterative Model at PT RST

Abstract -

The COVID-19 pandemic has affected the way people work, forcing people to reduce physical contact with other people. So, legalizing documents by adding a signature and stamp in PT RST now requires a new method. Electronic documents with the legalization using digital products become legal for use. Digital products for legalization include electronic stamps, signatures and seal stamps. Adding a digital product to a document is done on a web application that provides document legalization services. Currently adding digital products to web applications is only for one or two products, for example electronic stamps, so to be able to add 3 products we have to use 3 different web applications. This method makes the process of adding digital products done in many stages. Therefore, it is necessary to create a web application portal that combines all services such as e-stamp, e-sign and e-seal stamp in one application. The web-based portal is developed using agile software development methods. The development process is done iteratively in 3 iterations. The result of this research is a web-based portal that can provide services for adding e-stamp, e-sign and e-seal stamp for oneself, other people and collaborate with several people. Furthermore, user satisfaction was measured with the SUS questionnaire and the usability measurement result was 80.3. This score is in the "Acceptable" acceptability range, acceptable with efficient use, easy to understand, and has a simple user interface. The signer portal development process for PT RST can be a reference for other industries to implement similar products in their organization, both in terms of technology and business processes.

Keywords: Digital Stamp, Signer Portal, System Usability Scale (SUS), Usability, Web Application

Portable Monitoring Systems for Rivers Waste Based on Internet of Things

Abstract -

River pollution has become a severe problem in Indonesia. Industrial waste causes water pollution because the waste is not filtered before being discharged into the river. Illegal waste dumping cannot be prosecuted due to insufficient data and unknown disposal times. Therefore, a tool is needed to measure river water waste to measure polluted water waste data. Studies on river water monitoring devices have shown that there are no portable monitoring tools based on the internet of things for river water waste that follows regulatory standards from the Minister of Health. This study aims to produce a portable monitoring tool based on the internet of things for water waste. The system was developed using TDS sensors, turbidity, pH, MQ-135 sensors, and the system is equipped with a GPS module to indicate the location's latitude. The monitoring system is developed through the stages of system design, testing water samples, setting water quality standards and required hardware and components, setting river water quality parameters, and conducting system testing. The test results show that the system can send the data obtained to dashboard things via an internet connection, the TDS sensor error rate is 2.17%, the pH sensor error rate is 1.87%, the turbidity sensor error rate is 1.66%, the MQ135 sensor value is at the quality limit. The internet of things-based portable river waste monitoring system produced through this research helps related parties to identify and handle polluted rivers. Water according to the standards of the Ministry of Health, and the GPS module shows location measurements and information according to the location's latitude on google maps.

Keywords: portable monitoring systems, river waste, internet of things.

Monitoring Indoor Air Quality for Thermal Comfort using Internet of Things

Abstract -

Indoor Air Quality (IAQ) is a crucial issue as it influences human comfort and wellbeing. More than 80% of human daily time is spent indoors, therefore maintaining the quality of indoor air is important. Good indoor air conditions may also lead to better productivity. In post-pandemic conditions, maintaining indoor air quality is very crucial as an effort to prevent the spread of the virus as well as to assure that indoor air conditions meet the requirements in the standards. Since August 2022, the library of Universitas Multimedia Nusantara has already been fully open to students and other visitors. Consequently, it is necessary to develop a system that is able to monitor indoor air condition so that indoor air quality is maintained. This research aims to develop a monitoring system of indoor air in the library at Universitas Multimedia Nusantara using Internet of Things. The monitored parameters are temperature, humidity and CO₂ level. The steps in this research consist of three main steps. Firstly, the monitoring system of temperature, relative humidity and CO₂ level is developed and assessed for its accuracy. The monitoring system was installed during the pandemic condition until the present. Afterward, the manual measurements were performed and compared the data with the data collected by the monitoring system. Finally, in order to assure that the indoor air quality is acceptable for the occupant, the survey was conducted to the visitor of the library. The data collected from the monitoring system show that the trend of air temperature and relative humidity do not show significant differences during pandemics and post-pandemics conditions. However, the trend of CO₂ levels increased significantly during post pandemics. The results of manual measurement show the same conditions as the results of the reading of the monitoring system. The results of a survey to visitors and librarians show that most library visitors feel the room temperature is moderately cool and the humidity is neutral.

Keywords: indoor air quality monitoring system, air temperature, relative humidity, CO₂ level, Internet of Things

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Paper ID #199

Jemakmun Jemakmun, Rudi Suhirja, Darius Antoni, Hadi Syaputra and Darius Antoni

Adopting Haar Cascade Algorithm on Mask Detection System Based on Distance

Abstract -

COVID-19 which has hit almost the whole world, including Indonesia, which has become an epidemic in early 2020. Many cities and districts have enforced to comply with health protocols by using masks. All cities and regencies in South Sumatra are also required to follow health protocols by wearing masks and maintaining distance. So that the Mask Detection System program is a way to overcome public awareness, especially Bina Darma University that the importance of using masks today. In the case of making this mask detection system program using Python and using the Haar Cascade Algorithm. From experiments using the Haar Cascade method, the results show that this system can detect people who use masks and do not use masks. This test is also done by inputting images or videos. Furthermore, in testing this detection system, the approximate distance and angle also need to be considered because it will be very influential.

Keywords: Covid 19, Haar Cascade, Mask Detection, Algorithm, Information Technology, Machine Learning



Paper ID #200

Paulus Donny Junianto

Impact of Leadership in Transitioning IT Roles from Turnaround to Strategic: Case Study of PT. XYZ

Abstract -

Information Technology's role in enabling an organization's business is crucial. It is important to be analyzed and appraised to determine the position and transition of IT in an organization. The study employs a qualitative approach to identify transformations and analyze how the IT leadership strategy may provide chances for deploying IT based on internal business unit concerns, customer problems, and how it can generate new value propositions. In this study, data collection was carried out by means of exploratory literature studies and interviews that are semi-structured. The findings of this study demonstrate that IT leaders who understand the organization's business needs in depth will have a faster time defining the direction of policies and strategies to create business models and manage IT dynamically in response to business demands. Cooperation among stakeholders participating in business process can help organizations reach their objectives faster. Review and assessment are required to ensure that progress is in line with the objectives.

Keywords: IT Strategy, IT leadership, Transformation of the role of IT

Paper ID #202

Arief Hidayat, Agung Nugroho, Safa'ah Nurfa'izin

Usability Evaluation on Educational Chatbot using the System Usability Scale (SUS)

Abstract -

Chatbot is a medium that can be used in education, especially learning, students seem to communicate through chat with educators about learning materials. To assist the learning in computer hardware, AI-based was used to build the chatbot. This research was to assess the effectiveness of myHardware chatbot. The research started with the determination of research object, data used and the scale evaluation in the utility system. The method consisted of scenario determination, data collection, and calculation. Based on the results, the assessment score obtained was 61.03. With a description of marginal acceptability, a grade D scale, with ok rating of adjective and the application had sufficient usability value. Based on the final System Usability Scale (SUS) score, it is possible to conclude that the myHardware chatbot is acceptable by the students and can function well.

Keywords: usability, educational, chatbot, system usability scale

Real Time Web-based Facemask Detection

Abstract -

The widespread spread of the Covid-19 virus in 2020-2021 is very worrying for all people around the world, coupled with the spread of a new variant of the Covid-19 virus, which is more aggressive and easily transmitted, causing public unrest about when this pandemic will end. The policy of using masks to reduce the spread of the virus has been made to minimize the spread. But even if there is a policy, there are still people who don't want to wear masks. Therefore, a mask detection system is needed to help differentiate whether someone uses a mask or not by displaying alerts in a form of web application. This research was conducted using several data augmentation techniques to increase the variation of the data to be used before training the algorithm model using the Convolutional Neural Network (CNN) algorithm with MobileNetV2 and VGG19 architectures. Both models are then evaluated where the architecture with the best performance will be implemented in the form of a web application. The accuracy of both models was compared, with the result of MobileNetV2 being 99% accurate and VGG19 being 98%. MobileNetV2 as the model that has the best accuracy value will be implemented in the form of a web application using the Haar Feature-Based Cascade to detect masks. The web application will be publicly accessed local at Universitas Multimedia Nusantara.

Keywords: Face Mask Detection, Convolutional Neural Network, MobileNetV2, VGG19, Feature-Based Cascade

Interaction Design of Indonesian Anti Hoax Chatbot

Abstract -

The increasing use of social media has led to an increase in the spread of hoaxes in Indonesia. The number of hoax spreads in Indonesia is very high even though there are already several anti-hoax applications that are provided for Indonesians for free. The applications that are supposed to reduce the spread of hoaxes weren't used because they have several problems such as users don't want to use the application because they think that the applications are troublesome for them and the users feel the applications would be difficult for them and force them to learn a lot. Therefore, this research aims to create an interaction design that can overcome these users problems to increase users interest in using the anti-hoax application. So, in the end, the number of hoaxes in Indonesia can be reduced. User needs and preferences for the anti-hoax application interaction design are determined through research using questionnaire and interview methods. The platform that is chosen as the solution is a chatbot on the Whatsapp application. The method that is used to design the anti-hoax chatbot's interaction design is user-centered design, so the focus is on the user needs and problems. The output of this research is a high-fidelity prototype that meets the usability goals which are effective to use and easy to learn and the user experience goals which is helpful. The achievement of the usability goals and user experience goals was measured quantitatively with metrics completion rate, Single Ease Question (SEQ), System Usability Scale (SUS), Chatbot Usability Questionnaire (CUQ), and Intrinsic Motivation Inventory (IMI) with subscale value/usefulness. The result of the usability testing shows that the interaction design already has a good design and meets the usability goals and user experience goals that has been determined with a completion rate of 100%, SEQ 6.7 out of 7, SUS 87.7 out of 100, CUQ 89 out of 100, and IMI 6.4 out of 7. So, it can be concluded that the Anti Hoax Chatbot's interaction design can solve user problems and meet the user needs.

Keywords: interaction design, chatbot, anti hoax, user-centered design



Paper ID #207

Riri Safitri,, Resnia Trya Muslima, Sandra Herlina

Mobile Augmented Reality for Japanese Vocabulary and Hiragana Letters Learning with Mnemonic Method

Abstract -

Learning a foreign language is a must in the current era of globalization. This also includes learning Japanese for the Indonesian people, considering that Japan is a developed country, both in terms of education, technology, and strong culture. Learning Japanese, can be started at an early age by introducing vocabulary to objects around them. This study develops an educational media using Augmented Reality and a mnemonic approach to teach Japanese vocabulary and hiragana letters. The mnemonic approaches employed in this application includes visual imagery techniques that display 3D objects utilizing Augmented Reality, organizational approaches for classifying Japanese vocabulary, and rhyme and jingle techniques for memorizing words through songs. According to the study's findings, this application can aid children in learning, remembering, and comprehending Japanese vocabulary. The rise in child respondents' average pre- and posttest scores, which ranged from 11 to 80 out of a possible 100 points, indicates significant effect of the use of applications on improving children's learning outcomes. These findings are supported by the opinions of respondents who strongly agree that this application can be an educational media for learning Japanese vocabulary for children.

Keywords: augmented reality, children, education, foreign language, hiragana letters, mnemonic methods, mobile applications

Analysis of Discussion Tendency on Twitter with Text Classification

Abstract -

Discussion on social media sometimes results in the emergence of several groups. The groups that often appear are Pro, Neutral, and Contra. However, there are several others that have emerged, namely Uncorrelated, and Sarcasm. This research focuses to develop a text classification model that can analyze the relationship between tweets and retweets in a discussion to detect groups. Two architectural approaches were used, namely shallow learning and deep learning. The classification algorithms used in the shallow learning architecture are SVM, XGBoost, and CatBoost. BERT and XLMRoBERTa were used as embedding layer algorithms for deep learning architectures. Based on the experiments conducted, the best model was obtained by using XLMRoBERTa as the embedding layer, BiLSTM as the RNN layer, fine-tuning technique by freezing the embedding layer parameters in the first five epochs, where the training data used containing emojis and did not have Uncorrelated and Sarcasm labels. The model with this configuration has an f1 score of 0.597633, and based on qualitative analysis, the model tends to predict the Neutral label and is quite good at detecting Pro and Contra.

Keywords: discussion analysis, FastText, Word2Vec, BERT, XLMRoBERTa, twitter, shallow learning, deep learning, text classification

Usability Improvement Through User Interface Design With Human Centered Design (HCD) Method On Junior High School Websites

Abstract -

Menes Mathla'ul Anwar Central Junior High School is one of the schools that is trying to take advantage of technology in the world of education by having a profile website that is used for school purposes. Based on observations and interviews, the school still feels dissatisfied with the User Interface and User Experience of the existing website due to poor navigation naming and some things that still do not meet the needs of the school. In the initial design evaluation using the System Usability Scale (SUS) method, it shows that the Menes Mathla'ul Anwar Central Junior High School website has an average usability score of 35,42 with an acceptance rate that is in the not acceptable category. This study intends to evaluate usability and provide user interface recommendations in the form of a prototype on the Menes Mathla'ul Anwar Central Junior High School website. Data collection begins with an observation then a literature study, and interviews. For the design, Human Centered Design (HCD) is used, which consists of four stages of the Problem, namely analysis of the context of use, analysis of user needs, making of solution designs, and evaluation of solution designs. The results of the evaluation of the solution design using the Heuristic Evaluation (HE) and System Usability Scale (SUS) methods indicate that the designed solution design is considered good enough and users can interact effectively and easily. The HE method shows that the solution design only has 4 problems, 3 of which fall into the low-priority category, and 1 of them falls into the category that does not affect the user. Meanwhile, in the SUS method, the average score for the website design solution usability is 70,93 with the acceptance rate in the acceptable category

Keywords: User Interface, User Experience, Human Centered Design, Heuristic Evaluation, System Usability Scale

Educational Question Classification with Pre-trained Language Models

Abstract -

This study tries to classify questions into types that come from cognitive science, namely: verification, disjunction, concept, extent, example, comparison, cause, consequence, procedural, and judgmental. These types are more related and useful for an educational environment. The source of the question dataset is real questions asked by users on Reddit and Yahoo Answer forums. As far as we know, this study is the first to compare several pre-training models for classifying questions of this type and provide a detailed analysis of the dataset. Specifically, we tried the standard model, namely feature extraction with BERT followed by classification with Random Forest, also fine-tuning BERT, XLNet, and Roberta. The experimental results show that the model with the fine-tuning pre-trained language model achieved 0.8367 accuracies and 0.8116 F1-score. Moreover, evaluation on top-2 prediction shows significant improvement in accuracy to 0.9496. Detailed error and data analysis show some issues in the dataset, thus opening the possibility of improving the quality of the dataset.

Keywords: question classification, cognitive science, pre-trained language models

Evaluation of Enterprise Resource Planning (ERP) and Open-source ERP Modification for Performance Improvement

Abstract -

ERP system implementation in a company is based on business needs. The ERP usually used by companies is a commercial (paid/subscribed) ERP. The problems at PT XYZ are the decrease in user satisfaction with the performance of the commercial ERP system and the unavailability of access to modify the required modules. The purpose of this study is to evaluate the User Experience (UX) of the commercial ERP system at PT XYZ to determine user impressions and ratings on the performance of its use for business needs. UX evaluation is carried out using the User Experience Questionnaire (UEQ) method by measuring six aspects: attractiveness, dependability, efficiency, sharpness, novelty, and stimulation. The evaluation results that are measured are based on the mean value and also the benchmark of user experience. After the evaluation is successful, the results of the evaluation will be used as recommendations for improving the performance of the ERP system. Because there is no access right to modify the commercial ERP system, the recommendation will be carried out by modifying Odoo: open-source ERP that can be modified. The modifications are to adjust the aspects that still need to be improved from the evaluation results and add a new module that will be implemented to calculate sales commissions. The modified Odoo ERP System has been tested using the User Acceptance Test (UAT) method with a black-box testing model and evaluating user satisfaction using UEQ. The testing results got an Excellent benchmark value in attractiveness, efficiency, and novelty. In addition, there is a significant increase in value in other aspects compared to evaluating a commercial ERP system.

Keywords: ERP, Evaluation, Odoo, UEQ

Adaptivo: A Personalized Adaptive E-Learning System based on Learning Styles and Prior Knowledge

Abstract -

The rapid advancement of technology and the internet has resulted in an increase in the number of learners seeking e-learning. Though E-Learning is widely used most e-learning systems provide the same set of learning resources and learning paths to each student, regardless of their personal preferences. In recent years there has been increasing attention towards the characteristics of learners such as the learning styles and the knowledge level of the learner. This research paper proposes a personalized adaptive E-learning system called “Adaptivo” that provides a personalized learning experience to the learners based on their learning style and knowledge level. To make the learning process more efficient and engaging, Adaptivo takes into account the specific differences between learners in terms of time, online interactions and learning duration. It then builds a personalized learning path depending on each learner's learning style and knowledge level. The main aim of this study is to investigate the impact of the proposed adaptive learning approach on learners. The results show that the students appreciate the approach, are highly satisfied, and performed better when content is personalized according to their learning style and prior knowledge.

Keywords: E-Learning, Personalized Learning, Adaptive Learning, Learning Style, Prior Knowledge, Content Recommendation

Paper ID #223

Aida Fitriyani, Wowon Priatna, Tyastuti Sri Lestari, Dwipa Handayani, TB Ai Munandar, Amri.

Data Balance Optimization of Fraud Classification for E-Commerce Transaction

Abstract -

The purpose of this study is to solve the problem of unbalanced data for prediction and classification of fraudulent E-Commerce transactions. Data from Digital Commerce 360 in 2015 showed that fraud occurred as much as 35% of total e-commerce transactions. Quoted from Bisnis.com, based on the 2017 Fraud Management Insight report, this percentage of fraud can reduce consumer confidence. One method for predicting fraud is machine learning. Fraud data does not have a balance between data that is not fraudulent, causing the classification to be biased. So it is necessary to balance the data using the SMOTE algorithm. The results of the data balancing will be classified as fraudulent transactions using the Support vector machine, K-Nearest Neighbor, Naïve Bayes and C45 algorithms.

Keywords: Oversampling, Fraud E-Commerce SMOTE, K-Nearest Neighbor, Support Vector Machine, Naïve Bayes, C45.

YoBagi's User Experience Evaluation using User Experience Questionnaire

Abstract -

The pandemic has brought many negative impacts on human life. One of the negative impacts is economic downturn of Micro, Small, and Medium Enterprise (MSME) actors in Bangka Belitung Province. To solve this problem, a website-based marketplace platform called Yobagi was created. As we know, a new software product must have a good user experience. By having a good user experience means that the product has met the needs of its users. For this reason, an evaluation of the user experience is necessary. This study aims to measure the user experience of using Yobagi. The evaluation uses the User Experience Questionnaire (UEQ) tool, which consists of six scales: Attractiveness, Efficiency, Perspicuity, Dependability, Stimulation, and Novelty. There were 40 respondents who were taken from the top of MSME actors. As the UX evaluation results, it is known that the final score of the six scales is above 0.8 and at the excellent level. This means that Yobagi users have a very good user experience in using Yobagi. In addition, Yobagi has met the criteria for good software by having an excellent user experience value

Keywords: Evaluation, User Experience, User Experience Questionnaire, YoBagi, Social Entrepreneurship

E-Archive Document Clustering Information System Using K-Means Algorithm

Abstract -

Archiving is an important activity in a company, because the archive is a form of decision making as physical evidence owned by the company. Records management system in a company or organization must be managed properly. Currently, the archive management system is still manual which has the risk of documents being easily damaged and lost either due to natural disasters or unwanted accidents. Therefore, it is necessary to manage archives that can use a computerized system to facilitate users and avoid data loss with various factors. The research method uses the K-Means Clustering algorithm to facilitate the process of grouping archives, and the prototype is the method that will be used for software development. The function of this application is to simplify the process of archiving and searching for archived data. Management carried out by the system includes archive storage, archive destruction, and archive file reports.

Keywords: Archives, K-Means Algorithm, Clustering

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