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Renny

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Elis Ratna Wulan, Dindin Jamaluddin, Wildan Noor Ramadhan

General assignment problems include n tasks that must be assigned to m workers where each worker has different competencies in completing each task. This research discusses the problem of solving minimization case assignments using a new method, namely the One-to-One Fixed Method. Completion of the One-to-One...

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Nadya Devana, Sarini Abdullah

Problems considering group assignment is often found in health area, where the groups represent whether a patient will be recovered or not, at high risk of relapse or not, and many other. While the occurrence of these events could be modelled using classification methods, more insights on the time of...

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O.M Wijanarko, D Ertiningsih

In a minimization problem, there are some operational costs, such as transportation costs which are not negligible. In this research we discuss a transportation problem and propose a comparison of the generalized unified tabu search and the branch and bound algorithms. One of our concerns is the geographical...

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Heni Widayani, Putri Lestari, Usman Palagay

The dynamics model of smoking is a system of nonlinear differential equations of first order. The dynamics model of smoking consists of five subpopulations, namely potential smokers, light smokers, heavy smokers, smokers who temporarily quit smoking, and smokers who permanently quit smoking. The mathematical...

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The Relationship Between a Fractal F^{α} –absolutely Continuous Function and a Fractal Bounded p – variation Function

Supriyadi Wibowo, Christiana Rini Indrati, Soeparmi, Cari

Wibowo et al. proposed the concept of the fractal Fα –absolutely continuous function and the fractal bounded p –variation function of order α where $0 < \alpha < 1$ and $1 < p < \infty$ on a fractal set F. In this paper, we study the relationship between those two functions. In particular, we represent...

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Noor Saif Muhammad Mussafi, Zuhaimy Ismail

The COVID-19 outbreak affects all aspects of life including stocks trading. This paper aims to highlight the performance of Malaysian Shariah stocks during the COVID-19 outbreak by employing modified Reward to Variability (mRVAL) and EMA (Exponential Moving Average). The analysis of individual stocks...

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Biodiversity of Symbiotic Microorganisms of *Caulerpa racemosa* from Lemukutan Island, Indonesia and Its Antibacterial Activity

Warsidah, Rizky, Mega Sari Juane Sofiana, Ikha Safitri, Sukal Minsas, Melia Trianasta, Susi Sumanti

Symbiotic microorganisms usually have the same secondary metabolite activity as their host. The aims of this study were determine the biodiversity of symbiotic microorganisms from Caulerpa racemosa grown in Lemukutan Island, Indonesia and evaluate their antibacterial activity. Thirty eight bacterial...

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Chemometrics Analysis for the Groundwater Quality Assessment in UIN Walisongo Semarang

Kustomo, Rasidah, Daru Oktaviano

The purpose of this study was to analyze the quality of groundwater in terms of physical, chemical, and microbiological parameters at three campus locations of the Universitas Islam Negeri (UIN) Walisongo Semarang, Indonesia then the results were compared to the Regulation of the Ministry of Health of...

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Molecular Docking Study of Active Compunds in Ginger as Inhibitor Against Covid-19

Priyagung Dhemi Widiakongko, Darmawan Alisaputra, Tawatchai Kangkamano

Molecular docking of the active compounds of ginger (Zingiber officinale) has been successfully carried out. This study aims to examine the potential inhibitor of ginger's main active compounds in spike proteins on the COVID-19 virus. A total of 4 main active compounds in ginger, namely alpha-Curcumene,...

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Synthesis and Characterization of Polyacrilonitrile-Fe2o3 Membrane Nano Composites for Oil Refinery Liquid Waste Separation

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Synthesis of nano-composite membranes using a phase inversion technique with polymer polyacrilonitrile-fe2o3 membrane for the separation of oil refinery effluent by coating using crosslinked PVA obtained results about the effect of the concentration of nano-composite polyacrilonitrile-Fe2O3 membrane...

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Synthesis of ZnO/ECB (*Eichhornia crassipes* Biochar) as a Sustainable Efficient Photocatalyst for Photodegradation of Reactive Black-5

M. Mulyatun, Wirda Udaibah, Siti Hafidzotur, Hamdan Hadi Kusuma

ZnO/ECB photocatalyst (Eichhornia crassipes Biochar) has been synthesized to be applied as a photocatalyst in the degradation of Reactive Black-5 dye. ZnO/ECB photocatalyst was synthesized by the coprecipitation method with the ratio Zn(NO3)2.6H2O:ECB (M:w) 0.25:1 (0.25MZnO/ECB); 0.45:1 (0.45MZnO/ECB);...

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Design and Implementation of Non-Invasive Telemedicine System for Detecting Cholesterol Levels in Blood as a Solution during the Covid-19 Pandemic

Tria Nurmar'atin, Heni Sumarti, Muhammad Ardhi Khalif

Excess total blood cholesterol can cause heart vessel disorders, stroke and the most fatal can cause death. Checking cholesterol levels should be done regularly, especially for someone who has reached adulthood. The implementation of a telemedicine system by utilizing digital technology provides convenience...

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Frida Agung Rakhmadi, Widayanti, Rochan Rifai

Research on design of the second generation of UIN Sunan Kalijaga's UV fluorescence spectro-imaging system was done. The purpose of this research was to make a design of the second generation of UIN Sunan Kalijaga's UV fluorescence spectro-imaging system as a development of the first generation. This...

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Alternative Industrial Fuels in Indonesia from Urban Waste Treatment Using the RDF Method Through Bio-drying

Albert Yansen

This study examines the potential for RDF production from a mixture of municipal solid waste (MSW) using bio-drying technology to be used as an alternative fuel industry in Indonesia. The most suitable waste for the production of the RDF method is waste that has a high carbon content after being separated...

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Comparisons of Different Regiments in the Treatment of Covid-19 in Kpk (Khyber Pakhtoon Khwa)

Madeeha Shah, Iram Maqsood, Rabea ejaz, Saira Saleem, Amber Shaheen, Noor Jahan

The COVID-19 pandemic broke out in December 2019 because of SARS – cov. As of November 24, 2020, more than 59 million cases were accounted in all over the world, causing more than one million passing. Covid 19 is portrayed by incendiary disorder such as fever, coughing, breathing problems, agony, and...

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Photocatalytic Bacterial Inactivation Using Bi-doped TiO2/Kaolinite Under Visible Light Irradiation

Anthoni B.Aritonang, Ajuk Sapar, Annisa Furqonita

Bismuth-doped TiO2 immobilized on kaolinite (Bi-TiO2-K) were prepared via sol-gel method, then calcined at 450oC using kaolinite as the matrix and Bi (NO3)3 as the Bi3+ cationic source. The obtained Bi-TiO2-K photocatalyst were characterized using X-ray diffraction (XRD), infrared absorption spectroscopy,...

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The Evaluation of a Website for Participatory Water Quality Monitoring of Rivers in Indonesia

Eka Sulistiyowati, Shofwatul Uyun

The research on developing a water monitoring website had been conducted in the Integrated Laboratory UIN Sunan Kaliljaga, Yogyakarta. The output of this research a website titled

(www.statusmutuair.com). In this paper, we evaluate the website by involving the community as the users. The community then...

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An Implementation of Profile Matching Method to Determine Agricultural Crops that Suit the Land

Aziz Fuady Negarawan, Maria Ulfah Siregar, Agung Fatwanto, M. Didik R. Wahyudi

The suitability of land conditions and crops is one of the factors that affect agricultural productivity. To get maximum results, agricultural crops must be planted on land that has the right conditions for crops to grow optimally. Lack of knowledge about land characteristics often makes farmers grow...

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The development of information technology, especially computer networks, both in terms of Local Area Network (LAN) and the Internet network within the Sunan Kalijaga State Islamic University, Yogyakarta is needed to support the exchange of data or information between units, faculties, and universities....

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Aprilia Dewi Ardiyanti, Tanzilal Mustaqim

Computational research has been developed recently. One of the research is in the study of material physics. The computational study uses to make a model of the crystal structure which is difficult to do experimentally. In this study, the pymatgen module was used to compute the crystal structure of magnetic...

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Digital Forensics Investigation on Xiaomi Smart Router Using SNI ISO/IEC 27037:2014 and NIST SP 800-86 Framework

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The factual conditions reinforced by research data show the increasing number of connected smart devices in a house. The interconnection of these smart devices is able to form a smart home ecosystem with capabilities in the form of file sharing services, multimedia services, access to the internet network,...

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Muhammad Galih Wonoseto, Felix Ngobigha

This paper proposed a system to survey candidate popularity for governor of Jakarta in 2017 from Twitter, Facebook, Instagram, YouTube, and Google Trends. While traditional surveys take days or weeks to complete, the system demonstrated results instantly and continuously. This paper aims to measure the...

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Genetic Diversity of Rhizophora Apiculata Blume in Banggai Kepulauan Inferred from Sequence-related Amplified Polymorphism (SRAP) Marker

Seni Kurnia Senjaya

Mangroves are among the most productive and biologically important ecosystems in the world, providing many services that bridge processes in the ocean and land. One of the species of mangrove forest in the Banggai Kepulauan is Rhizophora apiculata Blume. Regional development and climate change pose a...

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Social Behavior of Macaca Fascicularis Raffles (1821) at Various Age Levels in the Banjarnegara Ex-Situ Conservation Area During Pandemic Times

Dian Muthi Fitria, Najda Rifqiyati

Macaca fascicularisis one of the nonhuman primates that live in groups with many males and females (multi male multi female group) so that interactions between individuals often occur. Despite having a wide distribution, M. fascicularis continues to decline in population. One of the efforts to protect...

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Cashier Work Posture Analysis Using Rapid Upper Limb Assessment (RULA) and Quick Exposure Checklist (QEC): A Case Study in QRS Pharmacy

Rahma Fariza, Riska Dwi Oktalia

Good posture can be an indicator of increased work productivity. This study was conducted to analyze work posture and to determine the level of risk of the upper body posture when

working as a cashier at a QRS pharmacy. The research method is used in determining the object of research, collecting data,...

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A Critical Review of Potential Development of Photovoltaic (PV) Systems at Electric Vehicle Charging Stations to Support Clean Energy in Indonesia

Ahmad Maghfuri, Cakrawati Sudjoko, Budiawan Sidik Arifianto, Yanif Dwi Kuntjoro

Energy needs are always increasing in various sectors of life. Indonesia, which is below the equator, has extraordinary advantages, one of which is its high potential for solar energy. With high sun exposure throughout the year, Indonesia has the potential to use it to generate electrical energy. One...

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Yunata Amjad, Novie Susanto, Naniek Utami Handayani

In 2020 the development of online public transportation in Indonesia increased significantly. There will be 21.7 million registered users in Indonesia. Online motorcycle taxis are public transportation that is in great demand by the public. But besides that, the high number of motorcycle accidents and...

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Planning Activities and Maintenance Time Intervals of Induction Machines using The Reliability Centered Maintenance (RCM) II and Age Replacement Method

Case Study: CV. Sumber Baja Perkasa

Trio Yonathan Teja Kusuma, Muhammad Khaedzar Assagaf, Fidia Deny Tisna Amijaya

CV. Sumber Baja Perkasa is a company engaged in manufacturing metal smelting and printing which can produce various metal products such as pulleys and brake wheels. In this study, the object studied is an induction machine which often experiences damage during the production process. Damage that occurs...

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Proposal Improvement to Increase Equipment Effectiveness and Reduse Waste Levels in SME Plastic Straw Prodecer with a Total Productive Maintenance Approach and Waste Assessment Model

Shanya Dekrita Jauza, Indro Prakoso, Ayu Anggraeni Sibarani

The existence of waste in a production line causes production equipment and production systems to be ineffective and inefficient. It's the same with an SME that produces plastic straw products in a city in Indonesia. BNL50 machine that produces plactic straw, often experiences problems such as breakdowns...

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Quality Improvement Proposal of Spun Pile Using Six Sigma Method at PT. Adhi Persada Beton

Intan Arizka, Dorina Hetharia, Anik Nur Habyba

PT. Adhi Persada Beton is a subsidiary of PT. Adhi Karya (persero) tbk, which produces precast concrete, including spun pile. There was a problem in spun pile production; the average percentage of spun pile defects was 0.71%, exceeding the company standard, which was 0.5%. Therefore, this research was...

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Smart Trash Can: Innovation of Automatic Trash Can with Arduino Uno-Based as an Effort to Support Global Sustainable Development Goals (SDGs) Action

Rizki Maharani Aqilah, Azzati Sahirah Elfahmi, Rahma Fariza, Riska Dwi Oktalia, Bambang Tri Wahyudi

Garbage is an item that we encounter every day and often causes problems. Based on statistical data from the 2020 National Waste Management Information System, in the City of Yogyakarta the highest percentage of waste by type is organic waste consisting of food waste with a percentage of 50.21%. One...

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The Implementation of the 3R Principle on the Household Solid Waste Management in Sleman, Yogyakarta

Ridayati, A. Yunastiawan

The urbanization process has caused several problems, such as clean water, environmental degradation, and waste management, especially in the peri-urban area. The solid waste management system is a type of basic urban infrastructure that often faces the problem of overcapacity in the peri-urban area....

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GIS Mapping Based on Spatial-Temporal Model Estimation Affecting COVID-19 Outbreak in Kalimantan

Sifriyani, Idris Mandang, Fidia DenyTisnaAmijaya

Innovation of Spatio-temporal analysis specifically for the geographically Weighted Panel Regression model with the development of geographic-weighted functions for spatial and temporal interactions. Map the GIS based on Spatio-temporal model estimation for the factors that may provide influence on the...

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Jakarta Composite Index Model Before and During COVID-19 Using CNN-LSTM

Yogi Anggara, Epha Diana Supandi

Deep Learning is a subset of artificial intelligence and machine learning, which is the development of multiple layered neural networks. There are many sectors that deep learning can be applied to such as computer vision, natural languages processing, and even time series data forecasting. One of the...

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PREFACE

Welcome to International Conference on Science and Engineering 2021 (ICSE2021). The theme of this conference is “Beyond the New Normal: Challenges in Science and Engineering”.

The ICSE2021 is an annual international conference organized by the Faculty of Science and Technology of UIN Sunan Kalijaga Yogyakarta. This year, the ICSE is again held virtual via Zoom due to covid-19 pandemic. This is the fifth conference.

The topics on this conference are Ecology, Evolution, Behavior and Systematics; Bio Chemistry; Biotechnology; Computational Theory and Mathematics; Biomedical Engineering; Industrial and Manufacturing Engineering; Applied Mathematics; and Statistic and Probability.

All submitted papers were reviewed by technical program committee and reviewers.

I hope this conference would be a great forum for exchanging your research. Apart from that, I hope it also build your network.

I would like to express my gratitude to honourable rector UIN Sunan Kalijaga, Prof. Dr.Phil. Al Makin, S.Ag., M.A., honourable vice rector of academic, Prof. Dr. Iswandi Syahputra, S.Ag., M.Si., honourable vice rector of treasurer, Dr.Phil. Sahiron, M.A., honourable vice rector of students and cooperation, Dr. Abdur Rozaki, S.Ag., M.Si., honourable chairman and secretary of the UIN Sunan Kalijaga senate, Prof. Dr. H. Siswanto Masruri, M.A and Prof. Dr. H. Maragustam, M.A.

I also thank to keynote speakers, Prof. Tsutomu Arie from Tokyo University of Agriculture and Technology Japan, Associate Professor Dr.Haslifah Hasim from Heriot-Watt University Dubai, Assoc. Prof. Dr. Chongdee Buranachai from Prince of Songkla University, Thailand and Assoc. Prof. Dr. Arief Gusnanto from University of Leeds, UK. It is an honor for us to have such great speakers.

Thanks also to the entire ICSE2021 committee, steering committee, organizing committee and of course technical program commitee for their hard-works.

In addition, I would also like to thank all authors and participants of ICSE2021.

Finally, wish you all a great success at ICSE2021.

Best regards,

Sri Utami Zuliana, S.Si., M.Sc., Ph.D.

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An Implementation of Profile Matching Method to Determine Agricultural Crops that Suit the Land

Aziz Fuady Negarawan[1], Maria Ulfah Siregar[1, 2, *], Agung Fatwanto[1, 2]

M. Didik R. Wahyudi[1]

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ABSTRACT
The suitability of land conditions and crops is one of the factors that affect agricultural productivity. To get maximum results, agricultural crops must be planted on land that has the right conditions for crops to grow optimally. Lack of knowledge about land characteristics often makes farmers grow crops that are not suitable for their land so that the productivity is not optimal. To make it easier to determine suitable crops, a decision support system is needed to provide plant recommendations based on land conditions by applying the Profile Matching method. This method is broadly a process of comparing the actual data value of a profile to be assessed with the expected profile value, so that differences in competence can be known. There are two aspects used in this research, namely the physical aspect of the soil and the chemical aspect of the soil. There are 13 criteria used for the plant recommendation, namely temperature, rainfall, humidity, drainage, texture, cation exchange capacity, base saturation, pH H2O, organic C, alkalinity, slope, erosion, and inundation. The result is an alternative decision support system to provide an alternative ranking of what plants are suitable to be planted on certain land. Data from the evaluation of the Profile Matching method show an accuracy rate of 77.94%, a recall rate of 77.94%, and a precision of 100%.

Keywords: *Land Suitability, Agricultural Productivity, Decision Support System, Recommendation, Alternative Ranking*

1. INTRODUCTION

In this era of globalization, human life is required to be more competitive in various fields, one of which is in the field of agriculture. As an agricultural country, many Indonesian are part of the ongoing agriculture, either directly or indirectly. Fortunately, Ministry of Agriculture of our country has also makes use social media to share information about agriculture policies and listen information from community [1].

The productivity of food crops in Bantul Regency from 2013 to 2018 has increased and decreased interchangeably. This shows that the harvest yield is less stable in Bantul Regency. The productivity is influenced by several factors and one of them is the level of suitability of agricultural land in Bantul Regency. To get maximum results, agricultural crops must be planted on land whose conditions are in accordance with what plants need to grow optimally. Lack of knowledge of land characteristics often makes farmers plant crops that are not suitable for their land so that productivity is not optimal. For this reason, a decision support system is needed to assist the Bantul Regency Agriculture Officer in providing crop recommendations to farmers.

The method used in making decisions on the selection of agricultural crops that are suitable with the land is Profile Matching. This method was chosen because there is an ideal predictor level that must be met, not a minimum level that must be passed [2]. In this case the condition of the land is used as a benchmark for obtaining alternative plants with criteria that are as close as possible to the condition of the land.

In this decision support system we used two aspects that relate to plants [3], namely physical aspects and chemical aspects. From these two aspects, it is divided

into 13 criteria that are used to determine plant recommendations that are suitable for the land. The criteria used can be seen in Table 1 below.

Table 1. Criteria

Criteria	
A1	Temperature
A2	Rainfall
A3	Humidity
A4	Drainage
A5	Texture
A6	Cation Exchange Capacity
A7	Base Saturation
A8	pH H_2O
A9	Organic C
A10	Alkalinity
A11	Slope
A12	Erosion
A13	Inundation

The criteria for the physical aspect consist of temperature, rainfall, humidity, drainage, texture, slope, erosion, and inundation. The criteria for the chemical aspect consist of clay cation exchange capacity, base saturation, pH H2O, organic C, and alkalinity [4].

The usage of both aspects and 13 criteria are the differences of our research with others [5], [6]. By using these criteria, hopefully the plant recommendation will be suitable as much to the land. In [5] the researchers used Simple Additive Weighting (SAW) to process recommendation of crops and the number of criteria is six. The criteria are temperature, air pressure, wind velocity, humidity, rainfall, and altitude. Promethee was used instead in [6] to raise the recommendation of crops. In their research, there are 12 criteria. Our criteria that are not used in [6] are erosion, inundation, clay cation exchange capacity, base saturation, and organic

2. METHOD

First of all, literature study was conducted to obtain information about the research to be carried out. This study was conducted by reading and studying references in the form of scientific journals, theses, and books. Literature studies are also carried out using internet media to find data and information related to the object of research.

The researcher collected data by interview and literature study. Interviews were conducted in the form of questions and answers with experts from the Department of Agriculture to obtain data and information needed in research. Literature study was carried out to collect secondary data, namely from the Land Evaluation Technical Manual by BBSDLP as well as from the BMKG and BPTP Yogyakarta websites.

From the results of data collection, then the system is developed using the extreme programming method of the System Development Life Cycle (SDLC) model. The stages of this method are Planning, Design, Coding, and Testing.

Next is the evaluation phase. The evaluation phase is carried out using a confusion matrix validation to calculate the accuracy of the series of activities that have been carried out.

2.1. Decision Support System

Decision Support System (DSS) is a system to provide problem solving skills and communication skills for problems with semi-structured and unstructured conditions. This system is used to help make decisions in semi-structured and unstructured situations [7].

DSS is a system to provide data management functions based on a certain model, so that users of the system can choose the best alternative decisions. The thing that needs to be emphasized here is that the decision support system is not a decision-making tool, but to help decision makers about a problem more quickly and accurately [8]

2.2. Profile Matching

Profile Matching is a decision-making mechanism by assuming that there is an ideal level of predictor variables that must be met by the subject under study, not a minimum level that must be met or passed [2].

The Profile Matching method is broadly a process of comparing the actual data value of a profile to be assessed with the expected profile value, so that differences in competence (also called gaps) can be known [9]. Here are some steps and formulation of the calculation method of Profile Matching:

2.2.1. Weighting

This phase will be determined the weight value of each aspect of using weights gap. Gap is the difference between the value of the aspect and the target value. It can be obtained by Equation 1:

Gap = Aspect Value - Target Value (1)

2.2.2. Core and Secondary Factor

This stage determines the weight value gap necessary criteria, each criterion grouped into two groups: core factor and the secondary factor.

2.2.2.1. Core Factor

Core factor is the aspect most needed. The Equation 2 below is to calculate the core factor.

$$NFC = \frac{\sum_{i=1}^{n} NC}{\sum_{i=1}^{n} IC} \quad (2)$$

NCF: Core Factor Value

NC: Total Weight Core Factor

IC: Total Item Core Factor

2.2.2.2. Secondary Factor

Secondary factors are the items other than that of the core aspects of factors. The formula for calculating the secondary factor is shown on Equation 3 as follows:

$$NSF = \frac{\sum_{i=1}^{n} NS}{\sum_{i=1}^{n} IS}$$

$$NCF = \frac{\sum_{i=1}^{n} NC}{\sum_{i=1}^{n} IC} \quad (3)$$

NSF: Secondary Factor Value
NS: Total Weight Secondary Factor
IS: Total Item Secondary Factor

2.2.3. Total Value Calculation

From the calculation of core factors and secondary factors of every aspect, and then calculated the total value of each aspect of the estimated effect on the performance of each profile. To calculate the total value of each aspect, the following Equation 4 is used.

$$N = (x)\ \%\ NCF + (x)\ \%\ NSF \quad (4)$$

N: Total value of each aspect
NCF: Average Core Factor
NSF: Average Secondary Factor
X%: Percentage value is entered

2.2.4. Ranking

The final result of the profile matching process is a ranking which refers to the calculation results shown by this Equation 5:

$$\text{Ranking} = (x)\ \%\ NMA + (x)\ NSA \quad (5)$$

NM: Total value of the Main Aspect criteria
NSA: Total score of the Supporting Aspect criteria
(x) % : Percent value entered

2.3. Land

Land is part of a landscape that includes the notion of the physical environment including climate, topography/relief, soil, hydrology, and even natural vegetation, all of which have the potential to affect land use [3].

2.4. Land characteristics

Land characteristics are land properties that can be measured or estimated. Land characteristics are: air temperature, rainfall, dry period, humidity, drainage, texture, coarse material, soil depth, peat thickness, peat maturity, clay cation exchange capacity, base saturation, pH H2O, organic C, salinity, alkalinity, depth of sulfidic material, slope, erosion hazard, inundation, rock surface, and rock outcrop [3].

2.5. Land Suitability

Land suitability is the suitability of a plot of land for a particular use. The suitability of the land can be assessed for current conditions or after improvements have been made. Specifically, land suitability is the suitability of the physical and chemical properties of a land for farming or certain commodities. Physical properties are climate, soil, topography, hydrology and/or drainage, while chemical properties are pH, base saturation, and micro nutrients [3].

2.6. Confusion Matrix

Confusion Matrix is a method used to calculate the accuracy of the concept of data mining or decision support systems. Based on the confusion matrix, the level of precision, recall, and accuracy can be measured. Equation for these three measurements are given on Equation 6-8. Precision is the level of accuracy of information requested by data and system users. Recall is the success of the system in finding back information. While accuracy is the closeness of the measurement of the quantity to the actual value. Table 2 shows the confusion matrix formula.

Table 2. Confusion Matrix

		Real Value	
		True	False
Prediction Value	True	TP (True Positive) Correct Result	FP (False Positive) Unexpected Result
	False	FN (False Negative) Missing Result	TN (True Negative) Correct absence of result

$$\text{Precision} = \frac{TP}{TP+fp} * 100\% \quad (6)$$

$$\text{Recall} = \frac{TP}{TP+FN} * 100\% \quad (7)$$

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} * 100\% \quad (8)$$

Measurement of accuracy can be done after matching the data obtained from manual calculations and system calculations. According to [10], the standard accuracy of the measurement results are as follows:

90%-100% accuracy = Excellent Classification

80%-90% accuracy = Best Classification

70%-80% accuracy = Fair Classification

60%-70% accuracy = Poor Classification

50%-60% accuracy = Failure

3. RESULTS AND DISCUSSION

3.1. System Description

This system was created with the aim to help determining plants that are suitable for land in Bantul Regency. In determining plants, this system uses the calculation of the Profile Matching method. The system will sort the suitability of plants to the land based on the final value, from the largest to the smallest. This system runs on a web platform, and is built using the PHP programming language, CodeIgniter framework, and MySQL database.

3.2. Calculation of the Profile Matching Method

The following is an example of calculation results of plant and land suitability using the Profile Matching method.

Table 5 shows the calculation results of gap mapping from Table 3 and Table 4. In this paper we simulate for Bambanglipuro area. Moreover, only five criteria are shown for the sake of limited number of pages.

Table 6 shows the weighting results that based on gap mapping results in Table 5. The weight for gap 0 is 5, the weight for gap 1 is 4.5, and so on until gap -4.

Table 7 shows the calculation results of profile matching based on the total value of core factor and secondary factor from both aspects. Equation 2-4 are used to obtain values shown on Table 7. In this research, we defined x = 55 for core factor, and x = 45 for secondary factor. These values for xs are used in Equation 4.

Table 8 shows the result of crop ranking based on the final value of profile matching. The greater the final value indicates that the alternative is more suitable for the land. Equation 5 is used here with values for xs are 52.5 for core factor, and 47.5 for secondary factor. In other research, 60 is used for core/ main factor, and 40 is used for secondary factor [10].

All of xs' values used here are based on recommendation from the Bantul Regency Agriculture Officer. Values for core factor are bigger than the ones for secondary factor.

Table 3. Crop alternative criteria value

Crop Name	A1	A2	A3	A4	...	A13
Peanut	3	2	4	3	...	1
Corn	2	3	5	3	...	1
Cassava	3	3	4	3	...	1
Paddy	3	4	4	2	...	1
Soya Bean	2	2	4	3	...	1
Sweet Potato	2	3	4	3	...	1
Shallot	2	1	5	3	...	1
Red Chili Pepper	2	2	4	3	...	1

Table 4. Land criteria value

Land	A1	A2	A3	A4	...	A13
Kec. Bambanglipuro	3	5	4	2	...	2

Table 5. Gap mapping results

Crop Name	A1	A2	A3	A4	...	A13
Peanut	0	-3	0	1	...	-1
Corn	-1	-2	1	1	···	-1
Cassava	0	-2	0	1	···	-1
Paddy	0	-1	0	0	···	-1
Soya Bean	-1	-3	0	1	···	-1
Sweet Potato	-1	-2	0	1	···	-1
Shallot	-1	-4	1	1	···	-1
Red Chili Pepper	-1	-3	0	1	···	-1

Table 6. Weighting results

Crop Name	A1	A2	A3	A4	...	A13
Peanut	5	2	5	4.5	···	4
Corn	4	3	4.5	4.5	···	4
Cassava	5	3	5	4.5	···	4
Paddy	5	4	5	5	···	4
Soya Bean	4	2	5	4.5	···	4
Sweet Potato	4	3	5	4.5	···	4
Shallot	4	1	4.5	4.5	···	4
Red Chili Pepper	4	2	5	4.5	···	4

Table 7. Calculation results

Crop Name	Physical Aspect			...	Profile Matching Final Score
	Core Factor	Secondary Factor	Total Value	...	
Peanut	4.083	5.000	4.496	...	4.670
Corn	4.000	4.750	4.338	...	4.551
Cassava	4.250	5.000	4.588	...	4.546
Paddy	4.500	5.000	4.725	...	4.719
Soya Bean	3.917	5.000	4.404	...	4.622
Sweet Potato	4.250	5.000	4.588	...	4.683
Shallot	3.667	5.000	4.267	...	4.449
Red Chili Pepper	3.917	5.000	4.404	...	4.622

Table 8. Calculation results

Rank	Crop Name	Profile Matching Final Score	Land Suitability
1	Paddy	4.719	Quite Suitable

2	Sweet Potato	4.683	Quite Suitable
3	Peanut	4.670	Quite Suitable
4	Soya Bean	4.622	Quite Suitable
5	Red Chili Pepper	4.622	Quite Suitable
6	Corn	4.551	Quite Suitable
7	Cassava	4.546	Quite Suitable
8	Shallot	4.449	Quite Suitable

3.3. Evaluation of the Profile Matching Method

This evaluation is done by comparing the results of the system calculations and the results of manual calculations by officers. System calculations and manual calculations use the same data, which will then get results in the form of rankings. The ranking results are then compared and the data sought are suitable and data that do not match. The results of the process are then analyzed to further calculate the level of accuracy, precision, and recall. Table 9 is the results of the comparison of plant rankings based on the system and manual calculations of each land.

Based on Table 9, 106 data match (TP) and 30 data does not match (FN). Total is 136 data.

Furthermore, the calculation of precision, recall, and accuracy on each land were performed using Equation 6, 7, and 8.

$$\text{Precision} = \frac{TP}{TP+fp} * 100\% = \frac{6}{6+0} * 100\% = 100\%$$

$$\text{Recall} = \frac{TP}{TP+FN} * 100\% = \frac{6}{6+2} * 100\% = 75\%$$

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} * 100\% = \frac{6+0}{6+0+0+2} * 100\% = 75\%$$

The results of the calculation can be seen in Table 10.

Based on calculations that have been done, it can be seen at 100% precision level, the recall level of 77.94%, and an accuracy of 77.94% in a decision support system that has been built. The accuracy of this system is higher than [5] with accuracy of 73.33%. Based on [10], this decision support system is measured as fair classification.

These results indicate that DSS has adaptive and flexible properties which can be applied in all situations, including the process of providing crops recommendations. However, the application of the DSS method not only helps recommendations more quickly, but also accurately.

Table 9. Ranking comparison results

Land	Match (TP)	Not Match (FN)	Total Data
Kec. Bambanglipuro	6	2	8
Kec. Bantul	8	0	8
Kec. Banguntapan	6	2	8
Kec. Dlingo	6	2	8
Kec. Imogiri	5	3	8
Kec. Jetis	5	3	8
Kec. Kasihan	6	2	8
Kec. Kretek	8	0	8
Kec. Pajangan	8	0	8
Kec. Pandak	6	2	8
Kec. Piyungan	5	3	8
Kec. Pleret	5	3	8
Kec. Pundong	6	2	8
Kec. Sanden	6	2	8
Kec. Sedayu	8	0	8
Kec. Sewon	6	2	8
Kec. Srandakan	6	2	8
Total	106	30	136

4. CONCLUSION

Based on the results, it can be concluded that a decision support system for determining plants that are suitable for the land has been successfully built. This system uses the Profile Matching method with two aspects, namely the physical aspect of the soil and the chemical aspect of the soil as well as 13 criteria. The physical aspect of the soil has criteria consisting of temperature, rainfall, humidity, drainage, texture, slope, erosion, and inundation. The chemical aspects of the soil consist of clay cation exchange capacity, base saturation, pH H2O, organic C and alkalinity. This system can provide plant recommendations for a land in the form of ranking based on the final value of each alternative plant. The higher the final value of the alternative plant, the more suitable it will be with the land.

Table 10. Calculation results of precision, recall, and accuracy

Land	Precision	Recall	Accuracy
Kec. Bambanglipuro	100%	75%	75%
Kec. Bantul	100%	100%	100%
Kec. Banguntapan	100%	75%	75%
Kec. Dlingo	100%	75%	75%
Kec. Imogiri	100%	62.5%	62.5%
Kec. Jetis	100%	62.5%	62.5%
Kec. Kasihan	100%	75%	75%
Kec. Kretek	100%	100%	100%
Kec. Pajangan	100%	100%	100%
Kec. Pandak	100%	75%	75%

Kec. Piyungan	100%	62.5%	62.5%
Kec. Pleret	100%	62.5%	62.5%
Kec. Pundong	100%	75%	75%
Kec. Sanden	100%	75%	75%
Kec. Sedayu	100%	100%	100%
Kec. Sewon	100%	75%	75%
Kec. Srandakan	100%	75%	75%
Average	100%	77.94%	77.94%

The results of the Profile matching method evaluation show an accuracy rate of 77.94%, a recall rate of 77.94%, and a precision of 100%. The results of the evaluation of the Profile Matching method show that the system can be used to recommend plants that are suitable for the land.

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1.	3065	Waste Analysis of Continuous Frying and Seasoning Process Using Waste Relationship Matrix	Universitas Muhammadiyah Surakarta	Mila Faila Sufa, Nabila Zulfa Wijayanti
2.	3094	WASTE MINIMIZATION IN THE PRODUCTION PROCESS OF NATURAL STONE WALL USING THE APPROACH SIX SIGMA	UIN Suka	Imam Sya'roni, Ahmad Taufik Hidayat
3.	3128	SYNTHESIS OF POLYACRILONITRILE-Fe2O3 MEMBRANE NANO COMPOSITES FOR OIL REFINERY LIQUID WASTE SEPARATION	UIN walisongo	Malikhatul Hidayah, Dyah Fitasari, Anwar ma'ruf
4.	3113	IMPLEMENTATION OF K Means CLUSTER ANALYSIS ON COMMUNITY BEHAVIOR GROUPS IN COVID19 CASE	uii	Riska Dwi Oktalia, Rahma Fariza
5.	3115	The Implementation of the 3R Principle on the Household Solid Waste Management in Sleman, Yogyakarta	ITNY	Ridayati,A.Yunastiawan Eka Pramana
6.	3076	Development of Communication Tools for Deaf and Mute People Using Design Thinking Method	UII	Khairunnisa Nurul Istiqomah, Rizky Alditama, Salma Salsabila, Abdullah 'Azzam
7.	3052	Quality Improvement Proposal of Spun Pile using Six Sigma Method at PT. Adhi Persada Beton	Universitas Trisakti	Intan Arizka, Dorina Hetharia, Anik Nur Habyba

Cluster 7 : Statistic and Probability
Moderator : Nia Maharani Raharja, M.Eng.
Host : Dwi Otik Kurniawati, M.Eng.
Time : October 27, 2021, 01.00 PM Jakarta
Zoom ID : 856 7780 7384
Passcode : icse2021

No.	ID	Tittle	Affiliation	All Authors
1.	3050	JAKARTA COMPOSITE INDEX MODEL BEFORE AND DURING COVID-19 USING CNN-LSTM	UIN suka	Yogi Anggara, Epha Diana Supandi
2.	3104	GIS Mapping Based on Spatial-Temporal Model Estimation Affecting COVID-19 Outbreak in Kalimantan	mipa unmul	Sifriyani, Idris Mandang, Fidia Deny Tisna Amijaya
3.	3044	Determining Optimal Solutions In Learning Outcome Using One To One Fixed Method	UIN Bandung / abstrak	Elis Ratna Wulan, Wildan Noor Ramadhan
4.	3085	Forecasting Using Arima With Bayes MCMC Approach	uin suka	Muhammad Rizal, Shofia Nur Fadhila, Siti Wulandari
5.	3084	Selection Of Ridge Regression Model Of Indonesia's Inflation Rate Year 2019 Using Schall's Algorithm And Akaike's Information Criterion (AIC)	uin suka	Royhana Devi, Sri Utami Zuliana
6.	3086	Ridge Regression Models Using Schall Algorithm and Bayesian Information Criterion (BIC) Method	uin suka	Istinganatun, Sri Utami Zuliana
7.	3087	Forecasting With ARCH/GARCH Model	uin suka	Aura Latifa, Nur Halimah
8.	3088	App)lication Of Parameter Estimation Of Ridge Regression Using Schall's Algorithm And Akaike Information Criterion (AIC) Methods	uin suka	Linaksanan, Sri Utami Zuliana