

SKRIPSI

**Aplikasi Mobile Untuk Mengidentifikasi Simbol Informasi
Publik Berbasis Algoritma Learning Vector Quantization (LVQ)**



AFIF MUHAMMAD

15650045

**PROGRAM STUDI TEKNIK INFORMATIKA
FAKULTAS SAINS DAN TEKNOLOGI
UNIVERSITAS ISLAM NEGERI SUNAN KALIJAGA
YOGYAKARTA**

2019

**APLIKASI MOBILE UNTUK MENGIDENTIFIKASI SIMBOL
INFORMASI PUBLIK BERBASIS ALGORITMA LEARNING
VECTOR QUANTIZATION (LVQ)**

SKRIPSI

Untuk memenuhi sebagian persyaratan
mencapai derajat Sarjana S-1
Program Studi Teknik Informatika



Disusun Oleh

AFIF MUHAMMAD

15650045

Kepada

PROGRAM STUDI TEKNIK INFORMATIKA

FAKULTAS SAINS DAN TEKNOLOGI

UNIVERSITAS ISLAM NEGERI SUNAN KALIJAGA

YOGYAKARTA

2019



KEMENTERIAN AGAMA
UNIVERSITAS ISLAM NEGERI SUNAN KALIJAGA
FAKULTAS SAINS DAN TEKNOLOGI
Jl. Mursda Adisucipto Telp. (0274) 540971 Fax. (0274) 519739 Yogyakarta 55281

PENGESAHAN TUGAS AKHIR

Nomor : B-1678/Uin.02/DST/PP.00.9/05/2019

Tugas Akhir dengan judul : Aplikasi Mobile Untuk Mengidentifikasi Simbol Informasi Publik Berbasis Algoritma Learning Vector Quantization (LVQ)

yang dipersiapkan dan disusun oleh:

Nama : AFIF MUHAMMAD
Nomor Induk Mahasiswa : 15650045
Telah diujikan pada : Jumat, 03 Mei 2019
Nilai ujian Tugas Akhir : A-

dinyatakan telah diterima oleh Fakultas Sains dan Teknologi UIN Sunan Kalijaga Yogyakarta

TIM UJIAN TUGAS AKHIR

Ketua Sidang

Nurochman, S.Kom., M.Kom
NIP. 19801223 200901 1 007

Pengaji I

Muhammad Taufiq Nuruzzaman, S.T. M.Eng.
NIP. 19791118 200501 1 003

Pengaji II

Sumarsono, S.T., M.Kom.
NIP. 19710209 200501 1 003

Yogyakarta, 03 Mei 2019

UIN Sunan Kalijaga

Fakultas Sains dan Teknologi





SURAT PERSETUJUAN SKRIPSI/TUGAS AKHIR

Hal : Persetujuan Skripsi

Lamp :-

Kepada

Yth. Dekan Fakultas Sains dan Teknologi
UIN Sunan Kalijaga Yogyakarta
di Yogyakarta

Assalamu'alaikum wr. wb.

Setelah membaca, meneliti, memberikan petunjuk dan mengoreksi serta mengadakan perbaikan seperlunya, maka kami selaku pembimbing berpendapat bahwa skripsi Saudara:

Nama : Afif Muhammad

NIM : 15650045

Judul Skripsi : "Aplikasi Mobile Untuk Mengidentifikasi Simbol Informasi Publik Berbasis Algoritma Learning Vector Quantization (LVQ)"

sudah dapat diajukan kembali kepada Program Studi Teknik Informatika Fakultas Sains dan Teknologi UIN Sunan Kalijaga Yogyakarta sebagai salah satu syarat untuk memperoleh gelar Sarjana Strata Satu dalam Program Studi Teknik Informatika.

Dengan ini kami mengharap agar skripsi/tugas akhir Saudara tersebut di atas dapat segera dimunaqsyahkan. Atas perhatiannya kami ucapan terima kasih.

Wassalamu'alaikum wr. wb.

Yogyakarta, 16 April 2019

Pembimbing

Nurochman, S.Kom., M.Kom.

NIP. 198001223 200901 1 007

PERNYATAAN KEASLIAN SKRIPSI

Saya yang bertanda tangan dibawah ini:

Nama : Afif Muhammad

NIM : 15650045

Jurusan : Teknik Informatika

Fakultas : Sains dan Teknologi

Menyatakan bahwa skripsi yang berjudul "**Aplikasi Mobile Untuk Mengidentifikasi Simbol Informasi Publik Berbasis Algoritma Learning Vector Quantization (LVQ)**" tidak terdapat pada karya yang pernah di ajukan untuk memperoleh gelar sarjana di suatu Perguruan Tinggi, dan sepengetahuan penulis tidak terdapat karya atau pendapat yang pernah ditulis oleh orang lain, kecuali yang secara tertulis diacu dalam naskah ini dan di sebutkan dalam daftar pustaka.

Yogyakarta, 18 April 2019

Yang menyatakan



Afif Muhammad
NIM.15650045

KATA PENGANTAR

Alhamdulillah, puji syukur kehadirat Allah SWT yang senantiasa melimpahkan segala rahmat dan karunia-Nya, sehingga penulis dapat menyelesaikan skripsi yang menjadi salah satu syarat untuk menyelesaikan jenjang Strata-1 program studi Teknik Informatika Universitas Islam Negeri Sunan Kalijaga Yogyakarta. Shalawat serta salam semoga tetap tercurahkan kepada junjungan kita Nabi Muhammada SAW, keluarga, sahabat dan para pengikutnya hingga hari kiamat.

Penulisan skripsi yang berjudul Aplikasi Mobile Untuk Mengidentifikasi Simbol Informasi Publik Berbasis Algoritma Learning Vector Quantization (LVQ) dapat diselesaikan dengan lancar tanpa suatu halangan apapun. Penulis menyadari bahwa dalam menyelesaikan skripsi ini tidak akan berjalan lancar tanpa dukungan dari berbagai pihak. Oleh karena itu dalam kesempatan ini penulis ingin mengucapkan terima kasih kepada :

1. Prof. Drs. Yudian Wahyudi, MA, Ph.D, selaku Rektor Universitas Islam Negeri Sunan Kalijaga Yogyakarta.
2. Dr. Murtono, M.Si selaku Dekan Fakultas Sains dan Teknologi Universitas Islam Negeri Sunan Kalijaga Yogyakarta.
3. Bapak Sumarsono, S.T., M.Kom. selaku Ketua Program Studi Teknik Informatika Universitas Islam Negeri Sunan Kalijaga Yogyakarta.
4. Dr. Bambang Sugiantoro, MT selaku Dosen Pembimbing akademik Program Studi Teknik Informatika Universitas Islam Negeri Sunan Kalijaga Yogyakarta.

5. Bapak Nurochman, S.Kom, M.Kom. selaku pembimbing tugas akhir, yang telah memberikan banyak bantuan, saran, nasehat, masukan, dan bimbingan yang sangat bermanfaat pada saya.
6. Seluruh Dosen Teknik Informatika Universitas Islam Negeri Sunan Kalijaga Yogyakarta yang telah banyak memberikan pelajaran kepada penulis selama ini.
7. Bapak, Ibu, kakak dan adik yang telah mendoakan, memotivasi dan mendorong dalam penyelesaian skripsi ini.
8. Sahabat dan Teman-teman seperjuangan “After Sunday“ Teknik Informatika UIN Sunan Kalijaga angkatan 2015 yang telah banyak memberi dukungan.

Yogyakarta, 14 April 2019

Penulis

HALAMAN PERSEMBAHAN

Dengan mengucapkan syukur Alhamdulillah, penulis mempersembahkan tugas akhir ini kepada :

1. Bapak dan ibu saya, pak Djunaidi dan ibu Mustoinatun yang selalu memberikan dukungan dan doa yang terbaik untuk saya.
2. Saudara kandung saya, Avi Nurul Makrifah, Ifadah Unia Rufaida, dan Ahmad Haris Muafa yang menjadi penyemangat serta motivasi dalam setiap hari-hari saya.
3. Keluarga besar saya yang menjadi motivasi bagi saya untuk menjadi lebih baik.
4. Teman-teman Insect yang memberi kesempatan pada saya untuk ikut serta berorganisasi di kampus.
5. Sahabat-sahabat saya, “Kukluxklan“ yang selalu menjadi teman setia saya selama 4 tahun ini.
6. Serta almamater saya, MAN 4 Sleman yang menjadi tempat saya tumbuh dewasa.

HALAMAN MOTTO

إِنَّ مَعَ الْعُسْرِ يُسْرًا

”Sesungguhnya sesudah kesulitan itu ada kemudahan”

(QS. Al-Insyirah:6)

DAFTAR ISI

HALAMAN JUDUL	i
LEMBAR PENGESAHAN SKRIPSI/TUGAS AKHIR	ii
LEMBAR PERSETUJUAN SKRIPSI/TUGAS AKHIR	iii
HALAMAN PERNYATAAN KEASLIAN SKRIPSI	iv
KATA PENGANTAR	v
HALAMAN PERSEMBAHAN	vii
HALAMAN MOTTO	viii
DAFTAR ISI	ix
DAFTAR TABEL	xii
DAFTAR GAMBAR	xiii
INTISARI	xiv
ABSTRACT	xv
I PENDAHULUAN	1
1.1. Latar Belakang	1
1.2. Rumusan Masalah	2
1.3. Batasan Masalah	2
1.4. Tujuan Penelitian	3
1.5. Manfaat Penelitian	3
1.6. Kontribusi Penelitian	4
II TINJAUAN PUSTAKA DAN LANDASAN TEORI	5
2.1. Tinjauan Pustaka	5
2.2. Landasan Teori	9

2.2.1.	Rumus Slovin	9
2.2.2.	Jaringan Syaraf Tiruan	10
2.2.3.	Karakteristik Jaringan Syaraf Tiruan	10
2.2.4.	Jaringan Learning Vector Quantization (LVQ)	11
2.2.5.	Citra	14
2.2.6.	Pengolahan Citra	14
2.2.7.	OpenCV Library	15
2.2.8.	Pemotongan Citra	16
2.2.9.	Resizing Citra	16
2.2.10.	Grayscale Citra	16
2.2.11.	Gaussian Blur	17
2.2.12.	Deteksi Tepi Canny	17
2.2.13.	Ekstraksi Fitur Zoning	20
2.2.14.	Simbol Informasi Publik	20
III	METODE PENELITIAN	23
3.1.	Obyek Penelitian	23
3.2.	Metode Pengumpulan Data	23
3.2.1.	Jenis Data	23
3.2.2.	Sumber Data	23
3.3.	Tahapan Penelitian	24
3.3.1.	Pengumpulan Data	24
3.3.2.	Prapemrosesan Data	24
3.3.3.	Ekstraksi Fitur	25

3.3.4. Klasifikasi	25
IV HASIL DAN PEMBAHASAN	29
4.1. Pengumpulan Data	29
4.2. Prapemrosesan Data	36
4.2.1. Resizing	36
4.2.2. Gaussian Filter	36
4.2.3. Canny Edge Detection	37
4.3. Ekstraksi Fitur	38
4.4. Klasifikasi	41
4.4.1. Arsitektur Jaringan	41
4.4.2. Pelatihan	43
4.4.3. Pengujian	50
4.4.4. Pelatihan dan Pengujian Lanjutan	52
4.4.5. Analisa Kesalahan	55
V PENUTUP	57
5.1. Kesimpulan	57
5.2. Saran	58
DAFTAR PUSTAKA	59
LAMPIRAN	61
CURICULUM VITAE	131

DAFTAR TABEL

2.1 Rangkuman Penelitian	7
2.2 Simbol Informasi Publik	21
4.1 Daftar Citra Latih	31
4.2 Jumlah piksel aktif	39
4.3 Nilai fitur	40
4.4 Tingkat Akurasi dan <i>Epoch</i> Eksperimen	48
4.5 Pengujian	50
4.6 Pengujian Lanjutan	53
4.7 Analisa Kesalahan	55

DAFTAR GAMBAR

2.1	Arsitektur jaringan LVQ	12
2.2	Operasi Gaussian	17
2.3	Operator Sobel	18
2.4	Non-maximal Suppression	19
2.5	Double Threshold	20
4.1	Sampel Citra Simbol Informasi Publik	29
4.2	<i>Input</i> Jaringan LVQ	30
4.3	Hasil proses <i>Canny Edge Detection</i>	38
4.4	Pembagian zona citra	39
4.5	Arsitektur LVQ Simbol Informasi Publik	42
4.6	Kode Program Euclidean Distance	44
4.7	Kode Program <i>update</i> bobot	47
4.8	Kode Program perubahan alpha	47

INTISARI

Aplikasi Mobile Untuk Mengidentifikasi Simbol Informasi Publik Berbasis Algoritma Learning Vector Quantization (LVQ)

Oleh

AFIF MUHAMMAD

15650045

Simbol informasi publik merupakan salah satu jenis dari informasi berupa citra. Simbol informasi publik dapat dikenali oleh komputer dengan menggunakan jaringan syaraf tiruan. Salah satu metode jaringan syaraf tiruan yang dapat mengklasifikasi banyak pola dengan baik adalah Learning Vector Quantization.

Berdasarkan hal tersebut, peneliti akan mengembangkan suatu aplikasi untuk mengidentifikasi simbol informasi publik dengan memanfaatkan algoritma Learning Vector Quantization(LVQ). Penelitian ini menggunakan 72 citra latih dan 108 citra uji. Citra pelatihan didapatkan dari standar *ISO Public Information Symbol* dan citra uji didapatkan dari hasil *capture* aplikasi yang dibuat peneliti. Data yang akan digunakan dalam jaringan syaraf tiruan LVQ merupakan hasil dari prapemrosesan dan ekstraksi fitur seluruh citra. Prapemrosesan citra dilakukan dengan menerapkan resizing, noise reduction, dan edge detection.

Penelitian ini menghasilkan nilai parameter laju pembelajaran optimal sebesar 0,4 dan perubahan laju pembelajaran sebesar 0,4 dengan tingkat pengenalan 94,4%. Aplikasi dapat mengenali data uji dengan tingkat akurasi sebesar 70,27%.

Kata kunci: Simbol Informasi Publik, Jaringan Syaraf Tiruan, Learning Vector Quantization, Ekstraksi Fitur.

ABSTRACT

Mobile Application To Identify Public Information Symbol Based on Learning Vector Quantization (LVQ) Algorithm

By

AFIF MUHAMMAD

15650045

The public information symbol is a kind of information in the form of image. Public information symbol can be recognized by computer using artificial neural network. One of artificial neural networks method that can classify many patterns well is Learning Vector Quantization.

Based on this, the researcher will develop an application to identify public information symbol using the Learning Vector Quantization (LVQ) algorithm. This study uses 72 training images and 108 test images. The training image is obtained from the ISO Public Information Symbol standard and the test image is obtained from the capture results of application made by researcher. Data that used in LVQ artificial neural network is the result of pre-processing and feature extraction from all images. Pre-processing is done by resizing image, noise reduction, and edge detection.

The result of this study is an optimal learning rate parameter value of 0.4 and a change in the learning rate of 0.4 with 94.4% recognition rate. The application can recognize test data with 70.27% accuracy rate.

Keywords : Public Information Symbol, Artificial Neural Networks, Learning Vector Quantization, Feature Extraction.

BAB I

PENDAHULUAN

1.1. Latar Belakang

Informasi merupakan hal yang sangat diperlukan pada saat ini. Oleh karena itu, manusia dituntut untuk mengerti setiap informasi yang ada di sekitarnya. Salah satunya adalah dengan mengenali setiap simbol informasi publik yang ada. Simbol informasi publik merupakan sesuatu yang terlihat secara visual dan digunakan untuk mengirimkan informasi mengenai suatu fasilitas umum, petunjuk keselamatan, larangan, dll yang dapat dimengerti oleh semua orang dari daerah atau bangsa manapun. Salah satu standar internasional yang digunakan pada simbol informasi publik terdapat pada *ISO Graphical Symbol*. Standar internasional ini umumnya berlaku untuk simbol informasi publik di semua lokasi dan semua sektor di mana publik memiliki akses pada lokasi tersebut. Namun, tidak berlaku untuk tanda-tanda keselamatan atau untuk rambu-rambu yang mempunyai aturan tersendiri di daerah tertentu yang mungkin berbeda dengan poin tertentu dari Standar Internasional ini (misalnya, rambu lalu lintas di jalan raya umum). (International Organization for Standardization, 2007)

Seiring dengan berkembangnya teknologi, simbol informasi publik dapat diidentifikasi dengan menggunakan komputer, yaitu dengan menggunakan jaringan syaraf tiruan. Salah satu algoritma jaringan syaraf tiruan yang dapat mengklasifikasikan pola dengan baik adalah *Learnig Vector Quantization* (LVQ). LVQ adalah suatu metode untuk melakukan pembelajaran pada lapisan kompetitif yang terawa-

si. Suatu lapisan kompetitif akan secara otomatis belajar untuk mengklasifikasikan vektor-vektor input. Jika dua vektor input mendekati sama, maka lapisan kompetitif akan meletakkan kedua vektor input tersebut ke dalam kelas yang sama. (Kusumadewi, 2003)

Penulis akan membahas mengenai pengenalan pola simbol informasi publik, dimana tidak semua orang mengetahui dan mengerti maksud dari setiap simbol informasi tersebut sehingga informasi yang disampaikan tidak dapat dimanfaatkan dengan baik dan tidak dapat berfungsi secara maksimal.

Berdasarkan uraian di atas, penulis tertarik untuk membuat aplikasi mobile dengan menerapkan algoritma *Learnig Vector Quantization* (LVQ) dan menemukan nilai parameter optimal pada algoritma LVQ. untuk mengenali setiap pola simbol informasi publik sehingga dapat memberikan informasi kepada pengguna aplikasi mengenai setiap simbol informasi publik yang mereka temui.

1.2. Rumusan Masalah

Berdasarkan latar belakang masalah tersebut, maka dapat dirumuskan permasalahan yang akan diselesaikan dalam penelitian ini adalah bagaimana membuat Aplikasi Mobile untuk mengenali simbol informasi publik menggunakan algoritma *Learnig Vector Quantization* dan menemukan nilai parameter yang optimal untuk jaringan tersebut.

1.3. Batasan Masalah

Adapun batasan masalah dalam penelitian ini adalah :

1. Simbol informasi publik yang dapat dikenali adalah beberapa informasi yang dapat ditemui di Yogyakarta, yaitu fasilitas publik, fasilitas transportasi, pariwisata, dan fasilitas komersial.
2. Citra uji berupa data real yang diambil dari smartphone.

1.4. Tujuan Penelitian

Sesuai dengan latar belakang dan batasan masalah di atas, maka tujuan dari penelitian ini adalah :

1. Mampu membuat aplikasi mobile untuk mengidentifikasi beberapa simbol informasi publik berupa fasilitas publik, transportasi, pariwisata, komersial, dll dengan algoritma *Learnig Vector Quantization*.
2. Mampu menemukan nilai *learning rate* dan perubahan *learning rate* terbaik dari algoritma *Learnig Vector Quantization* untuk mengidentifikasi simbol informasi publik.
3. Mengetahui tingkat akurasi jaringan syaraf tiruan LVQ untuk mengenali simbol informasi publik.

1.5. Manfaat Penelitian

Mengetahui bagaimana proses penerapan pengolahan citra digital dan metode jaringan syaraf tiruan LVQ pada aplikasi untuk mengidentifikasi simbol informasi publik. Diharapkan juga dapat membantu pengguna aplikasi untuk dapat mengenali setiap simbol informasi publik yang mereka temui berdasarkan citra simbol tersebut.

1.6. Kontribusi Penelitian

Kontribusi yang akan disumbangkan dari penelitian ini untuk ilmu pengetahuan adalah meneliti mengenai pemanfaatan teknologi untuk mengenali simbol informasi publik menggunakan metode Learning Vector Quantization serta memberi masukan bagi siapa saja yang membutuhkan informasi yang berhubungan dengan judul penelitian ini.

Pada bidang teknologi, mengembangkan aplikasi android untuk pengenalan pola yang dapat mengadopsi kemampuan otak manusia.

BAB V

PENUTUP

5.1. Kesimpulan

Dari penelitian yang dilakukan, ada beberapa kesimpulan yang didapatkan, yaitu :

1. Aplikasi moblie Jaringan Syaraf Tiruan dengan metode Learning Vector Quantization untuk mengenali simbol informasi publik berhasil dibuat.
2. Ekstraksi fitur yang digunakan dalam penelitian ini dapat mewakili ciri citra dengan baik
3. Hasil eksperimen menunjukkan bahwa learning rate dan perubahan learning rate optimal pada aplikasi yang dibuat oleh peneliti adalah 0,4 dan 0,4 dengan akurasi sebesar 94,4% dan *epoch* sebanyak 77 kali.
4. Tingkat akurasi hasil pengujian sebesar 77,77% . Hal yang mempengaruhi tingkat akurasi adalah a.) Citra pengujian tidak sesuai/jauh berbeda dengan data latih b.) Terdapat noise pada citra uji c.) Data uji yang digunakan lebih mendekati kelas lain.
5. Setelah dilakukan pengujian lanjutan dengan data uji yang lebih banyak dan bervariasi, tingkat akurasi jaringan menjadi 70,27%.

5.2. Saran

Dari penelitian ini, penulis memberikan beberapa saran untuk penelitian selanjutnya yang berkaitan dengan penelitian ini, yaitu :

1. Diperlukan adanya deteksi simbol agar aplikasi dapat mendeteksi simbol secara otomatis sehingga aplikasi dapat mengidentifikasi simbol secara *realtime*.
2. Perlu diterapkan *image alignment* sehingga dapat mengatasi citra uji yang miring karena diambil dari sudut yang tidak tepat.

DAFTAR PUSTAKA

- Ahmad, Usman. 2005. Pengolahan Citra Digital dan Teknik Pemrogramannya. Edisi Pertama. Yogyakarta : Graha Ilmu.
- Anwar Hidayat. 2017. Cara Hitung Rumus Slovin Besar Sampel di <https://www.statistikian.com> (di akses 19 Maret)
- Basuki, Achmad. 2005. Metode Numerik dan Algoritma Komputasi. Yogyakarta: ANDI.
- Dharmakusuma, Karen. 2018. Aplikasi Pengenalan Ekspresi Pose Jari Tangan Menggunakan Metode Learning Vector Quantization (Lvq) Berbasis Android. Yogyakarta: UIN Sunan Kalijaga Yogyakarta.
- Fiori, Srgio. 2017. Public Information Symbols in Tourism: importance, challenges, dimensions and empirical research about pictograms.Brazilian Journal of Cartography. 66(7): 1567-1586
- Hermawan, Arief. 2006. Jaringan Saraf Tiruan Teori dan Aplikasi. Yogyakarta Andi Offset.
- ISO 7001:2007(E), Graphical symbols Public information symbols
- Kusumadewi, Sri. 2003. Artificial Intellegence: Teknik dan Aplikasinya. Yogyakarta : Graha Ilmu.
- Pulungan, AF. 2016. Klasifikasi Karet Rss (Ribbed Smoke Sheet) Menggunakan Metode Lvq (Learning Vector Quantization). Medan: Universitas Sumatra Utara.

- Putri, Restiana. 2014. Penerapan Jaringan Syaraf Tiruan Untuk Memprediksi Jumlah Peserta Kb Baru Di Kabupaten Semarang Dengan Metode Backpropagation. Semarang: UNIVERSITAS DIAN NUSWANTORO
- Saputra, SS. 2015. Metode Learning Vector Quantization pada Jaringan Syaraf Tiruan untuk Mengidentifikasi Tulisan Tangan Huruf Lontara. Makassar: UIN ALAUDDIN MAKASSAR.
- Sihaan, Antoni. 2011. Pengenalan Karakter Dan Manajemen Database Pada Formulir Isian Menggunakan Jaringan Syaraf Tiruan Dengan Metode Learning Vector Quantization (LVQ). Medan: Universitas Sumatra Utara.
- Surrisyad, Hari. 2017. Aplikasi Jaringan Syaraf Tiruan Menggunakan Metode Learning Vector Quantization Dalam Pengenalan Pola Huruf Pegon Jawa. Yogyakarta: UIN Sunan Kalijaga Yogyakarta.
- Sutoyo, T,dkk. 2009, Teori Pengolahan Citra Digital, Yogyakarta : Andi.
- Winarno, Edy. 2011. Aplikasi Deteksi Tepi pada Realtime Video menggunakan Algoritma Canny Detection . Jurnal Teknologi Informasi DINAMIK. 16(1): 44-49.

LAMPIRAN

Lampiran A: DATA

A.1 Bobot Awal Jaringan

No.	Nama Simbol	Bobot Awal
1	Hotel	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.011, 0.027, 0.0108, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0119, 0.0259, 0.0097, 0.0313, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0216, 0.027, 0.0443, 0.0562, 0.0443, 0.0076, 0.0, 0.0, 0.0, 0.0, 0.0216, 0.0356, 0.054, 0.0011, 0.0032, 0.041, 0.04, 0.0022, 0.0, 0.0, 0.0054, 0.0097, 0.0259, 0.0389, 0.0194, 0.0, 0.0086, 0.054, 0.0216, 0.0227, 0.0, 0.0, 0.0, 0.0097, 0.0292, 0.0335, 0.0292, 0.0119, 0.0, 0.0216, 0.0, 0.0, 0.0, 0.0, 0.0162, 0.0367, 0.0205, 0.0281, 0.013, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.013, 0.014, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0

14	Kemah	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0466, 0.0146, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0102, 0.0277, 0.0364, 0.0, 0.0, 0.0, 0.0, 0.032, 0.0495, 0.0, 0.0408, 0.0175, 0.0524, 0.0, 0.0, 0.0, 0.0, 0.0291, 0.0291, 0.0, 0.0, 0.0451, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0291, 0.0102, 0.0189, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0262, 0.0029, 0.0102, 0.0291, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0291, 0.0262, 0.0335, 0.0116, 0.0175, 0.0, 0.0, 0.0, 0.0, 0.0611, 0.032, 0.0553, 0.067, 0.0291, 0.0539, 0.0262, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
15	Kafe	0.0, 0.0188, 0.0269, 0.0269, 0.0269, 0.0269, 0.0269, 0.0067, 0.0, 0.0, 0.0, 0.0269, 0.0, 0.0, 0.0, 0.0, 0.0511, 0.0457, 0.0, 0.0, 0.0, 0.0269, 0.0, 0.0, 0.0, 0.0, 0.0618, 0.0309, 0.0, 0.0, 0.0, 0.0269, 0.0, 0.0, 0.0, 0.0, 0.0269, 0.0, 0.0, 0.0, 0.0363, 0.0363, 0.0551, 0.0538, 0.0538, 0.0591, 0.0269, 0.0296, 0.0, 0.0, 0.0175, 0.0269, 0.0269, 0.0269, 0.0269, 0.0269, 0.0269, 0.0134, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0

20	Penukaran Uang	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0059, 0.0138, 0.0059, 0.0, 0.0, 0.0, 0.0, 0.004, 0.0124, 0.0237, 0.0237, 0.0217, 0.0183, 0.0, 0.0015, 0.0104, 0.0203, 0.0257, 0.0173, 0.0252, 0.004, 0.0, 0.0296, 0.0, 0.0133, 0.0138, 0.0025, 0.0074, 0.0, 0.0257, 0.0158, 0.0, 0.0203, 0.0094, 0.0064, 0.0133, 0.0, 0.0099, 0.0, 0.0114, 0.0212, 0.0183, 0.0272, 0.0133, 0.0, 0.0198, 0.0, 0.0217, 0.0124, 0.0257, 0.0242, 0.0242, 0.0148, 0.0, 0.0, 0.0133, 0.0208, 0.0237, 0.0188, 0.0099, 0.0109, 0.0232, 0.0099, 0.0084, 0.0, 0.003, 0.0054, 0.0163, 0.0262, 0.0178, 0.0168, 0.0237, 0.0158, 0.0049, 0.0, 0.0, 0.0, 0.0, 0.0104, 0.0346, 0.0099, 0.0069, 0.0049, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0064, 0.0143, 0.0084, 0.0, 0.0, 0.0
----	----------------	--

23	Petunjuk Arah	0.0, 0.03, 0.042, 0.03, 0.0435, 0.0045, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0435, 0.0135, 0.0, 0.0495, 0.0105, 0.0, 0.0375, 0.03, 0.03, 0.03, 0.03, 0.006, 0.0, 0.0, 0.045, 0.015, 0.03, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0345, 0.021, 0.0105, 0.03, 0.03, 0.03, 0.0706, 0.018, 0.0, 0.0405, 0.0195, 0.0, 0.0, 0.0, 0.0, 0.039, 0.0465, 0.03, 0.045, 0.0135, 0.0
24	ATM	0.0058, 0.0097, 0.0155, 0.0155, 0.0155, 0.0155, 0.0155, 0.0155, 0.012, 0.0058, 0.0104, 0.0259, 0.0309, 0.0, 0.019, 0.0174, 0.0058, 0.0, 0.0101, 0.0097, 0.0155, 0.0309, 0.0085, 0.0077, 0.0294, 0.0294, 0.0155, 0.0031, 0.0162, 0.0, 0.0155, 0.0309, 0.0, 0.0015, 0.0209, 0.0182, 0.0174, 0.0294, 0.0321, 0.0, 0.0155, 0.0383, 0.0387, 0.0387, 0.0387, 0.0387, 0.0062, 0.0259, 0.0159, 0.0, 0.0027, 0.0077, 0.0077, 0.0077, 0.0124, 0.0182, 0.0066, 0.0116, 0.0077, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0062, 0.0151, 0.0012, 0.0, 0.0077, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0077, 0.0, 0.0, 0.0077, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0077, 0.0, 0.0054, 0.0023, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0046, 0.0077, 0.0101, 0.0, 0.0

36	Helikopter	0.0, 0.02, 0.0016, 0.02, 0.0319, 0.0295, 0.0168, 0.0152, 0.0295, 0.0319, 0.02, 0.0168, 0.0231, 0.016, 0.016, 0.0184, 0.0383, 0.0391, 0.0184, 0.0032, 0.0, 0.0, 0.02, 0.016, 0.0072, 0.0247, 0.016, 0.0271, 0.0263, 0.0375, 0.0048, 0.0, 0.0, 0.0, 0.0192, 0.012, 0.016, 0.0208, 0.02, 0.02, 0.016, 0.0, 0.0, 0.0, 8.0E- 4, 0.0208, 0.0176, 0.0176, 0.016, 0.0192, 0.0064, 0.0, 0.0, 0.0, 0.0, 0.0279, 0.0359, 0.0375, 0.0375, 0.0335, 0.0208, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
----	------------	--

A.2 Bobot Akhir Jaringan

2	Bandara	0.0019402911176079512, 4.227213763851744E-5, 0.0, 0.0, 9.299870280473844E-4, 8.496699665342008E-4, 0.0, 0.0, 8.031706151318319E-5, 0.0020628803167596515, 0.0, 0.0, 0.0, 0.0, 0.03057610813228055, 0.03057610813228055, 0.0, 0.0, 0.0, 8.031706151318319E-5, 0.0, 0.0, 0.0, 0.0, 0.029542067079931535, 0.02947032738969679, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -4.279643589865498E-4, 0.030109775380626667, 0.03035962740523732, -6.407096472688814E-4, 0.0, 0.0, 0.0, 0.0, 0.0, 6.258735245515387E-4, 0.019651167121350996, 0.03423207803063496, 0.034430757077536, 0.019863912409633328, 2.1538737691452763E-4, 0.0, 0.0, 2.8322332217806676E-4, 0.0013357995493771507, 0.041040305921234595, 0.031242408833255395, -3.1301434356694087E-4, -4.6259731289297594E-4, 0.031242408833255395, 0.04278523843203657, 0.0011871547675974686, 1.6063412302636638E-4, 0.00109062115107375, 0.03662733640710616, 0.0392748199310343, 0.03046973548813938, 0.038667481581332784, 0.03903992280509515, 0.03025451641743514, 0.03794460078163322, 0.03795661736896087, 0.00109062115107375, -4.5137785298233574E-4, -6.790780399361976E-4, -7.124493375036207E-4, 0.009595314296107006, 0.04103904426489562, 0.04103904426489562, 0.00801276933967342, -7.124493375036207E-4, -5.304332581565158E-4, -6.751742949649975E-4, 0.0, 0.0, 0.0, 0.04983243558925557, 0.030495791070767362, 0.030618380269919074, 0.051187772133738235, 0.0, 0.0, 4.227213763851744E-5, 0.0015387058100420359, 0.0, 0.0, 9.299870280473844E-4, 8.073978288956831E-4, 8.073978288956831E-4, 8.919421041727183E-4, 0.0, 0.0, 0.001902246193733286
---	---------	---

3	Disabilitas	0.0, 0.0, 0.0, 0.0020774002259235725, 0.0013146832347632283, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0019805621971106875, 0.021033108613281698, 0.02684098630911096, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.004411252166291985, 0.03521099869883189, 0.040360144030364115, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0038492501728054126, 0.028827899872668317, 0.01895016082960164, 0.002258043723829971, 0.0, 0.0, 0.0, 0.0, 0.0, 0.001224361485810028, 0.013259461080405962, 0.05972678449658439, 0.021658306625697517, 0.05479506622526981, 0.02289297155219425, 0.0, 0.0, 0.0, 0.0, 0.0021677219748767735, 0.03409136226759644, 0.0539608310164116, 0.024235946953059386, 0.04111315707067296, 0.03783318957446199, 8.530387401135453E-4, 0.0, 0.0, 0.0, 0.0018867209781334862, 0.04579301459705983, 0.003623004201373885, 0.003750876484677472, 0.0034414817893981798, 0.024225636659554056, 0.01951897834935677, 0.0, 0.0, 0.0, 0.002258043723829971, 0.03419171976643334, 0.05274924736887407, -0.0036146186216263485, 0.01672971876996423, 0.06553587474705572, 0.026312958124540212, 0.00348240520964, 0.0, 0.0, 9.433604890667431E-4, 0.003673084457430086, 0.03476326079735839, 0.05083144173365796, 0.04359623605283295, 0.01688240802636929, 0.009202269913438532, 7.526812412766571E-4, 0.0, 9.032174895319886E-5, 0.0, 9.032174895319886E-5, 0.0018867209781334862, 0.0018867209781334862, 8.530387401135453E-4, 0.0, 0.0, 0.0, 0.0
---	-------------	---

4	Stadion	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0035671149517503484, -0.010155357872840286, 1.0665925379265732E-4, 0.010911108531550221, 0.0188891233718235, 0.008858537805405454, -0.006107941677386629, -0.00942737522962592, -0.006267930558075612, -0.002997912003841867, -0.002483575121206989, 0.025272240179769794, 0.025199072222359, 0.024161072548006174, 0.020556149429485318, 0.017838318472953262, 0.021496790956463462, -3.176011934232683E-4, 0.006370384388218386, 0.0181135962925792, 0.024865483945625926, 0.03231946610232569, 0.03936145304493641, 0.04561273493479339, 0.02454258358310965, 0.020777034736168116, 0.029519087704356343, 0.017636439740057137, 0.01579832749583936, 0.04199708253092809, 0.04016002309237882, 0.020758529510591206, 0.024247649823843788, -0.0038855048806487043, 0.015127808153061806, 0.04694579067623982, 0.014017590749041579, 0.013775102516698471, 0.002181442055451388, 0.023410814024922618, 0.030328183764431957, 0.01764274682884592, -0.010796019461297409, 0.02345299328569956, 0.024610016986521786, 0.0238205797441819, 0.010576642789626698, 0.017189959488950808, 0.009534924336994582, 0.013011371412824603, 0.011235710613505973, 0.030741252732522612, 0.02862744668452326, 0.032225184073689746, 0.026504015696364035, 0.03370382498452846, 0.026612526768257466, 0.008133216180319841, -0.005996106259130637, 0.014523823150243628, 0.010716757375308309, 0.00942893210962325, 0.01432143210952161, 0.025642917796300388, 0.027373410972103877, 0.017939021556871666, 0.010736438860111268, -0.003242537775139377, -0.021621084503466403, -0.012513681309135076, -0.0025633425658096276, 2.5242737781623647E-4, -0.003032637556413938, -0.013021746273771426, 0.0, 0.0, 0.0, 0.0, -0.010038880649925967, -0.012535861116151225, -0.012535861116151225, -0.012535861116151225, -0.012535861116151225, -0.011924355695851175, 0.0, 0.0, 0.0, 0.0
---	---------	--

7	Pom Bensin	-0.003815859159618743, -0.0024737293862356, -0.0024737293862356, 0.012270695996537542, 0.0030239063407998933, 0.0032296790366036013, 0.0059924662476233655, -0.0024737293862356, -0.0024737293862356, -0.0037105940793534017, -0.0024737293862356, -0.0037105940793534017, 0.021127175228944996, 0.044590476610346916, 0.04303739553048754, 0.04193969680961338, 0.015622331065093698, 0.0022846433422836713, -0.0034474313786900398, -0.0024737293862356, -0.0024737293862356, -0.0024737293862356, 0.02863060559874368, 0.01607323942062931, 0.004252451643826348, 0.03840800620993257, 0.039953951740532616, 0.01062909232864045, -0.0024737293862356, -0.0024737293862356, -0.0024737293862356, -0.0024737293862356, 0.027563159739261954, 0.030898755659496166, -0.001569254605932715, 0.02624293680272562, 0.049671358982976, 0.01804196696530613, -0.0024737293862356, -0.0024737293862356, -0.0024737293862356, -0.00234214803590392, 0.009269414715589903, 0.006105585608055152, 0.008155362942404857, 0.018560799087629972, 0.05164640177616776, 0.04126898999400565, -0.002105301605306895, -0.0024737293862356, -0.0024737293862356, -0.005789579414593957, 0.006920430910731378, 0.002030579806346654, -0.0024737293862356, 0.011367880551942183, 0.02855588379978345, 0.044037413793008295, -0.003079003597761332, -0.00234214803590392, 0.0, -0.005552732983996935, 0.005446719787016554, 0.003030598068867431, 0.0, 0.01284159167565702, 0.03189805009820815, 0.049221718996076524, 0.0, 0.0, 0.0, -0.004079021860282105, 0.00865730473510957, 0.0040043000613218666, -7.368555618574129E-4, 0.008525723384777887, 0.045508205905317956, 0.05226457952296818, 0.0, 0.0, 0.0, 0.0, 0.022223894221186286, 0.01492279854718225, 0.013815293668111454, 0.014620272285455317, 0.028879241433776924, 0.02522036571249077, 0.0, 0.0, -6.430396743865871E-4, 0.0, 0.010261795552341043, 0.005922041912130641, 0.00634644809722579, 0.005372746104771341, 0.00891265298185252, 0.0, 0.0, -0.0014918520445768805
---	------------	---

8	Restoran	0.0, 0.0, 0.013552952966783166, 0.010022310482549177, 0.008722933868006714, -0.005152195295332227, 0.01310789924890772, 0.009634079121408136, 0.0, 0.0, 0.0, 0.0, 0.033514639046108234, 0.044203560908594765, 0.0663034911247981, -0.006523902858850208, 0.03086048178643398, 0.027294593560892682, 0.0, 0.0, 0.0, 0.0, 0.03171095530516937, 0.06424619722099056, 0.07306118178000187, -0.003300797753522269, 0.026718064226335936, 0.028625794408169994, 0.0, 0.0, 0.0, -0.0011154311067819388, 0.019410087499902667, 0.015992041391967502, 0.02054791864308685, -0.004110102542818096, 0.03074090702116406, 0.029604427360346592, -8.418347975712749E-4, 0.0, 0.0, -0.001883605359565728, 0.003616846095362742, 0.032494050229395485, 0.012597725933143988, -0.0013995503509622452, 0.028107091642328524, 0.029330831051135924, -0.001883605359565728, 0.0, 0.0, -0.0018099448147782422, 0.011583106000904767, 0.018943981317785824, 0.009574320778381003, -0.004819038822776779, 0.034895325402146085, 0.029751748449921563, -0.001883605359565728, 0.0, 0.0, -0.002367660368169212, 0.011025390447513808, 0.023735002472988334, 0.010050621127143828, -0.011543279040604844, 0.009802467028728725, 0.02142326842865578, -0.002367660368169212, 0.0, 0.0, -0.0017468072049603974, 0.01332991320586516, 0.029506641993290752, 0.007669119383329721, -0.008657459280453634, 0.0069244019284181715, 0.018113212829043678, -0.0017468072049603974, 0.0, 0.0, -0.001883605359565728, 0.008699830631948366, 0.03095566664927821, 0.012254205640235508, -0.004285370111113463, 0.01553650382001552, 0.02558411884610067, -0.001957265904353216, 0.0, -3.085662569683253E-4, 0.0, -4.1347878433755584E-4, 0.012359122524264292, -0.002055051271409048, -0.002055051271409048, 0.004269141216570031, 0.007341111620621396, 0.0, -7.15873716166515E-4
---	----------	--

11	Salon	0.0, 0.0, 0.0, 0.0, -0.004661973984543733, -0.005025609019992337, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.012171128345751762, 0.0011043838730649248, 0.027993939990193322, 0.05106412123220864, 0.017582891955833447, -0.001021704501271697, -3.405681670905656E-4, 0.0, 0.0, 0.0, 0.011815317105186122, 0.015496689643107017, 0.04724521689843869, 0.061641874480948544, 0.01661821584852597, -0.0015560442117068948, -0.0011685011250176308, 0.0, 0.0, 0.0, 0.010173270563521372, 0.014991466199939341, 0.04179009006717174, 0.05316195704226201, 0.016524266009328572, -0.0014092475879609616, -0.0012154760446163298, 0.0, 0.0, 0.0, 0.010091837354814105, 0.01274728857936187, 0.037706555708429845, 0.04619338426741122, 0.01623067276183669, -8.279329579270646E-4, 0.0, -1.9377154334463228E-4, -9.747295816729985E-4, -0.0014092475879609616, 0.03196108204195005, 0.020415381350339344, 0.02894974231377923, 0.041316643418547495, 0.017592945430198945, 0.0, 0.0, -0.001702840835452828, 0.0036087408138042675, 0.02906064971180889, 0.05158895685389719, 0.021725690189454343, 0.023281445719254334, 0.015993611186506683, 0.017592945430198945, 0.0, 0.0, -0.001949459163345997, 0.004814585947938632, 0.03296810435608417, 0.03663682468845889, 0.032422502450461285, 0.029206465342505726, 0.017874729595756304, 0.017592945430198945, 0.0, 0.0, -5.871864949837338E-4, -9.747295816729985E-4, -9.747295816729985E-4, -5.871864949837338E-4, 0.003840258581846551, 0.017349668745166677, 0.0043743096103748495, 0.01879695356152349, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -0.007227028533072549, -0.00550354878270054, -0.0015641664961359419, 0.0, 0.0, -1.4679662374593344E-4
----	-------	--

12	Pasar	0.0, 0.0, 0.0, -0.00398401495307645, -0.003226395731436912, 0.0013888780203067323, 0.01467178246654589, 0.0, 7.464596578434721E-4, 2.940598652110647E-4, -0.0019331887690519774, -0.002286205848617991, 0.010607178743195061, -8.485606574091927E-4, 0.011637616192668194, 0.019864687457691085, 0.013811242821389501, -0.009235952579811439, -0.003090459405974826, -0.0015789344486737712, 0.002014792869577943, 0.002735431849601729, 0.0034298141300841377, 0.013030106524348706, 0.018710011860403646, 0.025424012101199378, 0.032041506143312866, 0.03137096660047799, 0.006200521142546401, -0.0044520496834410915, 0.00443351796779759, 0.01823231083556379, 0.03269973258687184, 0.04426185599516416, 0.041515888108409595, 0.040357502718099444, 0.039156171331714736, 0.009649844924107443, -0.004942400493160558, -0.00403649814978053, 0.0030310786106371285, 0.012385154879151752, 0.029932496704026118, 0.02672090209221222, 0.012641704037817116, 0.02839518884570952, 0.022908015690136962, -0.0013706476475949729, -0.00503570458832357, 0.0, 0.0015053993099664585, 0.01675059162160096, 0.05629653853232919, 0.057377523087503005, 0.05350662522520546, 0.049342980146513005, 0.038120151723347165, 0.002397708142335998, -0.002286205848617991, 0.0, -0.005428797511588882, -0.005494847881313215, -0.00696982720522336, -0.0015422081468264978, -0.0053156975634307815, -0.004208904967305722, 0.028672799874873738, -0.002364252074912719, -1.0110409158770629E-4, 0.0, -0.006473997032498239, 0.008044125504481126, 0.027257436577369454, 0.029371492354612363, 0.03212815994476413, 0.029994303626313328, 0.03323364061731472, 0.009843089783333767, -0.0036300559360824343, 0.0, -0.0019499991061741684, 0.015282645785619256, 0.018054215866108395, -0.004956101160289843, -0.0021018494365701627, 0.008288031930612182, 0.02397948645639811, -0.001701511661453273, -5.428797511588881E-4, 0.0, -2.2185827754535046E-4, 0.005044254521781157, 0.01294127744472924, -0.003944379224035286, -0.009142310306906622, -0.009681873559458388, 0.0055900467628603925, -0.008760075818154254, -0.00356495080349915, -6.054744583018396E-4
----	-------	---

13	Museum	0.0, -0.005616398188565786, -0.006427407709297887, -0.01781256708331052, -0.007975332893400279, -0.003962055015590076, -0.013088690631786552, -0.006314388975022682, -0.005616398188565786, 0.0, 0.0, -0.0022465592754263163, -0.005364267354465412, -0.0016041485239488148, 0.008641090932700992, 0.01221497009738089, 0.002764930806724957, -0.007667779315365638, -0.0014866936381497658, 0.0, 0.005213865878233875, 0.008160833548539985, 0.008161459841697872, 0.013927842095046073, 0.017628420366798344, 0.01831412179090523, 0.024410438368066074, 0.004820814904684846, 0.008160833548539985, 0.005591682246221842, 0.006347314982197756, 0.04437325365183008, 0.018617130806281457, 0.012661410350832536, 0.029458259976270208, 0.027675817500878847, 0.020170243779513226, 0.01909840182973224, 0.043645071745753744, 0.007783017180552014, 0.0, 0.019480174929468543, 0.022376648792012725, 0.012521436635134775, 0.00935300780169693, 0.009529624494124658, 0.02131738457828529, 0.031056723002390405, 0.01987907468455986, 0.0011334491039638858, 0.0, 0.01066886479868742, 0.009211647583082174, 0.001971971389658665, 0.007678823710235464, 0.009600286401847097, 3.1871575370324273E-4, 0.014304326308509648, 0.016550194813432083, 0.0, 0.0, 0.010590196733095712, 0.006590403019890335, 0.011500025728378506, 0.014220298752457915, 0.0169405717765373, -6.025114609829469E-5, 0.007123205624330591, 0.015807500273909304, 0.0, 0.0, 0.012729271095640426, 0.0015601346631080137, 0.018354989362562687, 0.018630586724420774, 0.01538164876076141, 0.004595955452026849, 0.0028644605483114072, 0.00934357411702738, 0.0, 0.003702600406282027, 0.04135822887504846, 0.03661689273021478, 0.03771953742388555, 0.044480578138960794, 0.040068071420932265, 0.038603221996640305, 0.04053607889651662, 0.039495308838865775, 0.006725131350185725, 0.005341917715012681, 0.001788802623998269, 0.0013738499107724667, -0.005278608555401691, -0.005278608555401691, -0.002420192253785738, -6.130501458810695E-5, 0.0016236144419816264, 0.001788802623998269, 0.005591682246221842
----	--------	---

16	Eskalator	0.0, 0.0, 0.0, 0.0, 7.252172604013709E-5, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -1.6723780891002423E-4, 3.0029326410062487E-4, 0.0019452061915601383, 0.00297403994152707, 6.740254537848042E-4, 7.081533248625155E-4, 7.422811959402268E-4, 2.4742706531340886E-4, 0.0, 0.0, -4.761158029173139E-4, 0.015852393036488693, 0.03247507185750462, 0.029801630064559742, 9.401908468077168E-4, 2.3203752194520167E-4, 9.871390360977478E-4, 8.489307930580756E-4, 0.0, 0.0, -4.761158029173139E-4, 0.03828450896675278, 0.04149640932461341, 0.03805883517146252, 0.03396012711387774, 0.040628544283480644, 0.042001997499545154, 8.830586641357869E-4, 0.0, 0.0, -7.655048675756575E-4, 0.03580208185316317, 0.04902004372043528, 0.03539025611121114, 0.011100898506203096, 4.114619518985996E-4, 0.02842578620804689, 0.015651803025521317, -1.9199164137030439E-4, 0.01735130299755954, 0.022151598334440442, 0.04175636399036731, 0.015518922107421777, 0.0057891530479426325, 0.031268702510944546, 0.03949197758630569, 0.02671230556704113, 0.0, 0.012756313954475587, 0.0344295255925432, 0.020273144184222533, 6.876347505442155E-5, 0.02412007677371614, 0.04005737392205556, 0.01574044277427573, 0.0, -7.80998700473655E-4, 0.0, 0.0051159253822125085, 0.0471289574285905, 0.03959626031815539, 0.04308530159241945, 0.02240631652166791, -9.758248405050441E-4, -6.353026305371379E-4, -4.8791242025252203E-4, -5.861725604422664E-4, -8.792588406633996E-4, 1.1772039446410521E-4, 4.231664464138009E-4, 7.081533248625155E-4, 4.26598388471395E-4, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.0664959711784875E-4
----	-----------	---

18	Tunggu	0.0, 0.0, 0.0, -1.263746036024601E-4, -0.0010084693367476312, -9.680294635948443E-4, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.02037886276012148, 0.01768332834382416, 0.015497091290601828, 0.01776916415637573, 0.023115851611765697, 0.02141826857812091, 0.0, 0.0, 0.0, 0.0, -0.0023150402309987175, 0.036815686794303186, 0.03257106843883509, 0.03541448120122102, 0.041994882296249425, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0025248220729788017, 0.04771751681006067, 0.0023344275741194577, 0.00815160952507075, 0.046871455930683946, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0020106120339804345, 0.020557494912327723, 0.05163913845673731, 0.0544198864893072, 0.022325043806138384, 0.0, 0.0, 0.0, 0.0, 0.0, 0.018906309324563438, 0.032664486974768765, 0.0353375832774924, 0.019716235935991564, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.03426644921092871, 0.023927799257504434, 0.019511735589555955, 0.03463287982173658, -0.0019708214211417658, 0.0, 0.0, 0.0, 0.0, 0.0, 0.05084630961679942, 0.0330797436056311, 0.033538702018773674, 0.046280517587378764, -0.0032397064457124927, 0.0, 0.0, 0.0, 0.0, 0.02003855511970614, 0.023115851611765697, 0.01781213152160056, 0.017116944513458077, 0.020410052569642807, 0.02054405353411598, 0.0, 0.0, -1.263746036024601E-4, 0.0, -1.693419688272965E-4, -9.250620983700079E-4, -8.416548599923845E-4, -8.416548599923845E-4, -9.680294635948443E-4, 0.0, 0.0, -2.931890803577073E-4
----	--------	--

19	Loket/ Resepsonis	0.0, 0.0, -0.004257922532964952, -0.004257922532964952, -0.0016981793103660343, -0.0019001932060229597, -0.003630786656016627, -0.0033997365960882955, 0.0, 0.0, 0.0, 0.006754647653499755, 0.027693586615015822, 0.010393087420468329, -0.0018079866322176818, -0.001763016753628646, 0.0226588601837627, 0.01333406461788987, -0.0016989586492801168, -7.259874375170777E-4, 0.0, 0.013468046842241918, 0.03826946106186367, 0.021731888153763184, 0.0014889116106453974, 0.0029150138368837955, 0.03489043898045405, 0.03297192646970883, -0.003463572829016852, -8.08055582627704E-4, 0.0, 0.042055795222833314, -0.003201693687578296, 0.0416104977311158, 0.04025461520736567, 0.023773021620554356, 0.0028418046763777197, 0.01986223324721374, 2.6188019119705345E-4, -8.08055582627704E-4, 0.007835608933277083, 0.06319560632100307, 0.041535130677558395, 0.04689476998681025, 0.016322485457759436, 0.04730520289105218, 0.017339953180335026, 0.03929375211638867, 0.023221859639860797, 0.007527865627053736, 0.011442530470046765, 0.015495826249543718, 0.015055818093306066, 0.013326445513062623, 0.017055154106229143, 0.023627111385416857, 0.01536733537220805, 0.023472569379764868, 0.017306530254312856, 0.011422688428813395, 0.0, 0.0, -0.008515845065929903, -0.008515845065929903, -6.881098320814042E-4, 0.01944172591958131, 0.030628852564306745, 0.022992161539998238, -0.004705577625441547, 0.0, 0.0, 0.0, -0.008515845065929903, -0.008515845065929903, 0.0, 0.022948595837904713, 0.014233131227348827, 0.03756105085835502, -3.21959646203226E-4, 0.0, 0.0, 0.0, -0.008515845065929903, -0.008515845065929903, 0.0, 0.02756095581780948, 0.015181920537886423, 0.04310271360733479, 0.0, 0.0, 0.0, 0.0, -0.003630786656016627, -0.003630786656016627, -1.474621432655237E-4, -4.321007389253621E-4, -0.003419527782033454, -0.0028174570822096048, -1.0048666826404112E-4, 0.0
----	----------------------	--

20	Penukaran Uang	0.0032846341903852863, 0.002129349061353222, 8.22384663326466E-4, 3.9204272739082764E-4, -0.00438447593566297, -0.0037437466313776017, 0.00863081956982796, 0.02114469101201078, 0.010368125903790347, 0.0031940235920298304, 0.002129349061353222, -6.239527185095966E-5, -0.004783052635022935, -0.004001582225775451, 0.010623570474849936, 0.034645530323921744, 0.02516691681336239, 0.0203599527330679, 0.019425501036419598, -0.0013423922860316582, 0.004223953343328762, 0.013134456770166407, 0.026434347123021715, 0.02900076387479413, 0.012914385135959867, 0.025816375867969088, -0.0067030520920327895, -0.006290576483430534, 0.0330613746435964, -0.00611961391785907, 0.020701507028203024, 0.015794271157178807, 0.0017537008026635085, 0.0024880543100121917, 0.0018986949646274984, 0.027122922916537916, 0.018237844217874662, -0.004479063656895053, 0.018802227297835282, 0.006745659469042779, 0.011066327331115532, 0.015072392351075974, -0.001446391213483645, 0.006764547189067259, -0.01617248253133816, 0.004998180429162223, 0.016768017247755222, 0.01767243583808173, 0.03038066704747645, 0.018942766038427757, 0.0010530810932556256, 0.023378853986984666, -0.007143841479968111, 0.015490479090782867, 0.011028316185311134, 0.024086016387686916, 0.02539749442244784, 0.03511395388088183, 0.01999969705875881, 7.794710549731574E-4, -0.009458112446918254, 0.015939693227986784, 0.026143907966118537, 0.029197012160121567, 0.013404960857019362, 0.008360076543202312, 0.011398984275212996, 0.026170587046406818, 0.010328340937300902, 0.011729783979063026, -0.010827908042678837, 2.8819544811166235E-4, 0.0033310653048154518, 0.01101343411786084, 0.03099072043770218, 0.028080812732551235, 0.0229899847734565, 0.02935812983142985, 0.01962511040639972, 0.006842373987786765, -0.0032614180851442266, -0.007151260355301811, -0.007852558324974708, -0.0067519693432888574, 0.01146243877240755, 0.047554070206514504, 0.013106932518122527, 0.006160116189280088, 0.005105067653824377, 0.0, 0.0, -0.001912630826380617, -0.0017373063339623928, -0.0017373063339623928, 0.007199671935799917, 0.018712158258777624, 0.010045948622434474, -0.0026166768288500334, -0.001912630826380617, -8.153545212860567E-4
----	----------------	--

21	Parkir Sepeda	0.011659170990834224, 0.009976014050040217, 0.016672832655203192, 0.01344216304802259, 0.006778181053170642, 0.00688142106145782, 0.0018131491732293074, -0.002220624844905933, 0.0011634469810677846, -0.0028177422189259393, 0.013395060017121832, 0.013501657247621906, 0.002284327925596501, 0.00400014444541129, 0.006396100522321331, -0.0010378337675184574, 0.011747604258828473, 0.002915540001474834, 0.002852847592859198, -0.0014535381712473929, 0.013395060017121832, 0.009930760863290004, 6.110622153649753E-4, 0.01886946817965067, 0.012681787498674314, 0.011602365432848628, 0.002589212855408896, 0.005384378820034318, 0.003243661967482793, -0.001350298162960216, 0.013395060017121832, 0.011889372448530482, 0.009663414494556655, 0.004682497843853884, 0.004493852034854548, 0.0056927151324230926, -5.225021713978196E-4, 0.010117429243195785, 0.0, -0.001350298162960216, 0.013395060017121832, 0.015176242857085314, 0.005163755589724289, 0.011743165097552829, -0.0021063741797674247, 0.004076976186594091, -0.006644170278856243, 0.007386828165894231, 0.0, -0.001350298162960216, 0.013031003145793373, 0.013598087647943607, -0.0037700909332439208, 0.0011757745515690184, 0.009767140043214748, 0.010631971287575417, -9.343266919955334E-4, 0.008290861511324335, 0.0018754295553203796, -0.0015567781795345697, 0.015910392548755845, 0.014305566668049866, 0.0010244540360522826, 0.009321348511824515, 0.0031692071473172325, 0.024483910587884086, 0.029474758212174407, 0.025064566627362696, 0.001415932694816795, -4.1449110329432054E-4, 0.003261443896909976, 0.0038813187473818746, -5.403573437789167E-4, 0.022943392106457877, 0.0171926187706251, 0.04937175420031917, 0.051451121355954955, 0.046495727111900684, 0.022141071950378902, 0.014135075130108879, 0.005497432657281228, 0.009160783545826327, 0.013003980098667565, 0.028246980597077007, 0.026419228751014868, 0.03589058192850415, 0.024451353279694974, 0.05252194991174229, 0.03185950518289523, 0.015591059068949824, 0.0035195714458847965, -0.002157178420765764, 0.0029023015958010144, 0.009392884674088539, 0.0074603032082519605, 0.002263293567058946, 0.005896903513498317, 0.013594655739708953, 0.009498977885523138, -0.0010154914233083967
----	---------------	--

24	ATM	0.00704101142053275, 0.009336099815856345, 0.014521795097510663, 0.016299425648690687, 0.01986737142697674, 0.017948322449578183, 0.018742354003055336, 0.014136971427794756, 0.010105320565021208, 0.00704101142053275, 0.013798749709777854, 0.02989222554517346, 0.03210452761301821, -0.004193621739032253, 0.019311325902985364, 0.019394296316959686, 0.008831270193239723, -0.008425135435243881, 0.004331072867253116, 0.013296457008726012, 0.017808665663878044, 0.035862898832537085, 0.016122225102512006, 0.0040177361808689605, 0.03481574911127962, 0.036267587506836396, 0.013370460279522623, 0.00489896659201984, 0.019804346064860673, -0.003967660424518248, 0.015097921645494132, 0.03127003416606577, 0.006038387966915711, -0.00263268833448073, 0.020531752019527488, 0.018030055604490572, 0.01199136421559921, 0.03856232479936678, 0.04045036918607338, -0.003184158043893174, 0.010992615516575443, 0.03319192663240322, 0.042197057034054956, 0.039339190626817115, 0.042526374576430645, 0.04311850720761534, 0.003040830452702004, 0.0336971806604707, 0.021576296579218897, -0.003927872922320477, -4.4086217912987156E-4, 0.004431098774333411, 0.0044685043266914125, 0.005265617876659711, 0.012161297726656901, 0.023702248283591066, 0.004410488669534962, 0.013526501335586805, 0.008548797897954088, -0.003342812897277912, 0.0, -6.133072713030197E-5, -5.969524107349395E-5, 0.0, 0.007981687336603227, 0.020040170815938983, -0.001368349419632267, -0.0018103661817056075, 0.0027721118161433563, 0.0, 0.0, -4.524844757168945E-5, 0.0, 0.0, 0.0, 0.011269742931081406, -0.003184158043893174, -0.0014748962710653451, 0.0020483353312718017, 0.0, 0.0, -4.879200069477358E-5, -3.625327425924517E-5, -6.514686126285411E-5, -3.625327425924517E-5, 0.010665307543377401, -0.0017571497738020489, 0.004892160186327022, -0.004725472228684013, 0.0, 0.0, 0.0, 0.0, 0.0, -0.0020775342055428477, 0.0019175615448687707, 0.004440802452224147, 0.002981810116300788, -0.00906110478004854, 0.0
----	-----	---

25	Ruang Rapat	-4.6754487773675076E-4, 0.0, -0.0010795986632013749, -0.007692140475309794, -0.007152341143709113, -0.007152341143709113, -0.007341270909769354, -8.906688971411349E-4, -7.481618735985531E-4, -7.622753127907261E-4, -4.6754487773675076E-4, 0.0, -0.001798754266341785, -0.00823193980691049, 2.2541694284650542E-4, -0.0021539201371944513, -0.011486929776462634, -0.0028416465749943145, -0.003695466224138306, -0.0017371529056615694, -0.003278819796713132, -0.003605235064949322, 0.009983896281458238, 2.3430009280816526E-4, 0.01725149775201415, 0.019270562775815996, -0.002995722785661262, 0.018514201277724966, -8.816449908522903E-4, -4.6754487773675076E-4, -0.004911172975473609, 0.013815959152118636, 0.036668964927672125, 0.019596951612351823, 0.02650891304206319, 0.026996124274238645, 0.013530089065382958, 0.02304464634684457, 0.015394844932873077, -4.6754487773675076E-4, 0.005951279962273958, 0.024223877226839587, 0.01673175513352764, 0.03622985763770485, 0.03405262208822554, 0.028284350055752472, 0.04050637753432572, 0.021914166301894633, 0.030993576540572453, 0.012958572419642543, 0.008120096804087623, 0.023766517931829954, 0.030809460227743442, 0.010755943500113822, -0.002706708844011713, -0.0030014392790656892, 0.01259733917452971, 0.0394977079125875, 0.024774222840211784, 0.013392101720751618, 0.026584520501920055, 0.028922376652682314, 0.031897061961505636, -7.481618735985531E-4, -0.0020574648268353447, -0.0021267307346481933, -0.006430389231088276, 0.03791933086592956, 0.0151015329555742, 0.025770404736211342, 0.020159927815039055, 0.03363365332293583, 0.007707205604630879, -0.002010462960819477, -0.002757545252229525, -0.002619013436603821, -0.0030960248442754566, 0.007253774166086301, 0.03214566168817295, 0.020112925949023183, 0.027224890178473418, 0.015027181541618468, 0.01394591522279304, 0.013170763382614456, 0.016031699840098113, 0.016031699840098113, 0.011084978765309395, 0.014172630942065332, 0.017660801794168464, 0.026184058693492433, -4.6754487773675076E-4, -7.481618735985531E-4, -0.0011789217402159015, 0.0, 0.0, 0.0, -8.161765893802391E-4, -7.481618735985531E-4, 0.0, -4.6754487773675076E-4
----	-------------	---

26	Penitipan Barang	-0.010469999659818202, -0.008154694537974903, -0.008154694537974903, -0.0050834459457505905, -0.004059696415009149, -0.004059696415009149, -0.004059696415009149, -0.004059696415009149, -0.004059696415009149, -0.006798622032331668, -0.006798622032331668, -0.0038330843033448922, 0.0035839624258854745, 0.012806828378138985, 0.01602093835194764, 0.017644816917951285, 0.017644816917951285, 0.017644816917951285, 0.009627527265344193, 2.8946681505047486E-4, 0.014085207707785733, 0.01640925713947025, 0.026157845034900994, 0.012029915206926945, 0.016007258215530947, 0.017644816917951285, 0.017644816917951285, 0.017644816917951285, 0.03345557062462887, 0.025022372580383916, 0.014990070113834516, 0.036023681113967324, 0.0354659784257174, -0.00594777258885051, 0.00839573532104571, 0.02473290576533344, 0.0, 0.0, 0.032701518619588185, -0.001520257997047094, 0.009778021741627826, 0.014105548170157854, 0.024364486117226327, 0.0267517899677969, 0.010473822005897322, 0.007604471359178499, 0.023666300074740673, 0.013956547132259134, 0.032701518619588185, -0.006798622032331668, -0.004059696415009149, 0.012190485743735692, 0.02156453125506982, 0.030804843297701005, -0.0045448164425842185, -0.006448317595447907, 0.028281278413961098, 0.009313613840193382, 0.02394669504635107, -0.006798622032331668, -0.00230498705285106, 0.011301812988310738, 0.03089562779432649, 0.02700186962279612, -0.00403761110031376, 0.0, 0.03115348667348036, 0.01169355209108503, 0.026594323143096166, -0.005477851234645033, -0.006434301450217976, 0.014694081052889168, 0.027212305915715756, 0.0236165026013675, 0.02728295288676706, 0.030659184715962663, 0.029014945924023643, 0.01797554306301163, 0.026651038526401594, -0.0027389256173225166, 0.0, 0.008897813659479708, 0.012773181219940309, 0.013585120502942144, 0.013585120502942144, 0.013585120502942144, 0.013973439290464757, 0.006472693256383836, -0.006798622032331668, -0.004059696415009149, -0.004059696415009149, -0.008966633820976733, -0.004059696415009149, -0.004059696415009149, -0.004059696415009149, -0.006319005724231634, -0.010081680872295594
----	------------------	---

27	Daur Ulang	-0.006443718310766831, -6.70140814199071E-4, -5.481772917620944E-4, -5.822858550465477E-4, -0.003503561120385513, -0.0032609156875042324, -6.904172482156349E-4, -5.481772917620944E-4, -7.799079843923497E-4, -0.006774085832567586, -5.481772917620944E-4, -8.222659376431418E-4, -0.001114497942524584, 0.013591940272994065, 0.04092861310973707, 0.021935510111094857, 0.013987066028831598, -9.783500821098573E-4, -7.892076727505801E-4, -7.799079843923497E-4, -5.481772917620944E-4, -5.481772917620944E-4, 0.008630224056958435, 0.0204826753134895, 0.010723920888047911, 0.045700577194959506, 0.020660286011019668, 0.026302297740697488, -5.840709045719734E-4, -5.481772917620944E-4, -5.481772917620944E-4, 0.008850094617639076, 0.02096708785394498, 0.030243041262739433, 0.023604744281184687, 0.040393622615693445, 0.03171815946148239, 0.017235361155600197, 7.910780101195305E-4, -5.481772917620944E-4, -5.679282744722926E-4, 0.016630876027608026, 0.021940520318363715, 0.02950512761271172, 0.00497677823731457, -0.0015902352283728972, 0.027044872765357737, 0.023223784738409976, 0.012989973191129814, -5.571032166407412E-4, -0.0013653328920898362, 0.024182615070775765, -0.0019233355442668768, 0.039138581999934786, -0.002158123559867251, 0.006355219393657888, 0.03159825512072577, 0.015120911668816673, 0.023108670436366975, -9.933053682710644E-4, -0.003146658878873992, 0.014714676764911259, 0.0525091878249411, 0.03185641229274532, 0.03531103921183736, 0.025233381825238564, 0.022370524419400094, 0.04841435338083559, 0.015248500093748696, -0.003146658878873992, -0.0019880054157227155, -0.002089425507163299, 0.022637732990960537, 0.015834753116987718, 0.0285751876619326, 0.025152370838887977, 0.014446684987918972, 0.02433243152909697, -0.0013093787984773842, -0.0017562747230924598, 0.0, -3.7557724798079626E-4, 0.0023799870681648944, 0.007475659767337797, 0.0046137628593620516, 0.003173676347556076, 0.008245732555637009, 0.001897504017456297, -4.2128134714102976E-4, -1.2196352243697637E-4, -0.004473580779990389, 0.0, -4.570547480116753E-5, -0.0029328721768556755, -0.002556666310020708, -0.002772438222735577, -0.003301235783508556, 0.0, 0.0, -0.00556749037648387
----	------------	---

30	Pos Surat	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -5.591233409537051E-5, -2.202607100726717E-5, 7.552341818307405E-4, 0.007493256144499687, 0.005200239554146539, 0.0025372307080810588, 0.005502629867658942, 0.006422258775605574, 0.003407662034956287, 4.938434005742816E-4, 3.217186946342591E-4, -0.002589499313648119, 0.006370239804902659, 0.017939663815582072, 0.030231356217067233, 0.024186088782322715, 0.0207594363753316, 0.019105924869407, 0.015505833668371717, 0.031452895502688, 0.01237582092990142, 0.004066976261765138, 0.006727510638706631, 0.03916898308994607, 0.03630121926423671, -0.0013901228289171295, -0.004672034818623997, -0.004885910881917843, 0.004116340771435064, 0.03254846013835046, 0.026280176257187836, 0.0066610690417106206, 0.00486622195421872, 0.02072944685503056, 0.006688488710569806, 0.03546614475755484, 0.002276046435871338, 0.005815989419406405, 0.04330605350400456, 0.005643271034826885, 0.016960111653197534, 0.0030940954933077595, 7.121121992146359E-4, 0.011584577728120493, 0.005624365048132398, 0.028465492592286194, 0.029150748957665153, 0.03249793054825757, 0.03187088383890866, -4.836470034322216E-4, 0.01357002418648014, 0.005963726076288246, 0.0026953006462884653, 0.02621314239455826, 0.02887895697983212, -0.00338239848101383, -0.009079300985511624, -0.003450093598273156, 0.008173273631866727, 0.03922714585756544, 0.03166631495746549, 0.007895630082775924, 0.0030323151588494465, 0.015386381905555298, 0.03391246751440963, 0.02221806086218665, 0.02289359624501862, 0.024654377726460022, 0.024535429672655158, 0.038599795281656434, 0.016927285245487807, 0.007895630082775924, -0.0033814346877471505, -0.003914322947287186, 0.003016928476741362, 0.002807009422927286, 0.003233771264283195, 0.0030437233531920216, 0.007629622917534315, 0.007646566049078369, 0.0029336285050315363, 0.0019910719339174096, -0.002656430821996115, -0.003373079756486458, -0.003405271706420158, -0.0033171674223910924, -0.0033171674223910924, -0.0031553543773964036, -6.0995273558585975E-5, -5.591233409537051E-5, 0.0, 0.0
----	-----------	--

31	Parkir Mobil	0.016654553554515596, 0.022362974861167464, 0.01930343055446045, 0.021853210340860785, 6.141829359758549E-4, -0.0028207101160337097, 0.00296069798500847, 0.002010719439216319, 0.0015467191098341427, -0.01004182388773474, 0.020137212800970312, 0.022977010807032957, 0.013705309905231585, 0.017855230799125696, 0.01151991790549317, -0.0058547896880923826, -1.1541200570423203E-4, -0.0018414617612834015, -0.0017526581046768516, -5.068822165483056E-4, 0.019833496996485504, 0.012861328168574585, 8.905053739404322E-4, 0.019794234581147548, 0.010947676239084329, -0.006389329503985669, -0.001258179114551317, -1.5552005144903454E-5, -3.6445896538178536E-5, -9.901135226205178E-4, 0.01937792328975826, 0.00851693596179621, 0.01710594177537112, 0.01589427053921363, 0.004801810602969029, -0.010220129632779454, -0.0020027232015204033, -8.969528548688508E-6, 0.0, -7.592895112120531E-4, 0.018539667669380134, 0.026824415623647513, 0.010406066833950739, -7.00889349944322E-4, 0.02182201697055661, 0.019047376248642257, 0.01101648446646028, 0.016613717135391688, 0.01859240693453392, -9.111474134544633E-4, 0.01759049652614056, 0.009340714065735688, -0.004370521437360732, 0.01470689935575037, 0.03547627978996246, 0.019368085742317763, 0.019165533782882934, 0.014507877121713334, 0.030684401103592628, 0.004647009770353142, 0.013254285860472243, 0.009089384612691351, -0.003162918178817587, 0.018813617781200262, 0.023981711477474778, 0.0069626780103376595, 0.010088730306469836, 0.00750897320897805, 0.02515117081578911, 0.017440676482665077, -0.004348515857756517, -0.0017874267636177087, 1.3977211698401138E-4, 0.03896767751940298, 0.025429176187411265, -0.004346792297338133, -0.0022433901361729198, 0.01148786492199349, 0.028863402305404098, 0.01676155152614883, 0.0, -4.918773720248537E-6, -1.8807075989185574E-5, 0.021696317719375528, 0.019042495919917166, 0.014766758665552646, 0.015018340191131178, 0.019357452510893117, 0.0192584301474008, 0.02512354507276264, -0.006733750474472113, 0.0029647487398369084, 0.002964387065298658, 0.017032893951529533, 0.018527439858804343, -0.0021348021918718603, -0.0030085241208404486, 0.001785969743897551, 0.026290870468988065, 0.007154292472144186
----	--------------	---

32	Pemeriksaan Barang	-0.005432908770541995, -0.004936860578449032, -0.004936860578449032, -0.004936860578449032, -0.003063070657441086, 0.007003478252224004, 0.0026150806183405603, -3.9433955782371155E-4, -0.004677025811162244, -0.0012283098089921026, -0.006661218579534098, 0.0, 0.0, 0.0, 0.0026119495868595593, 0.027659938113795732, 0.039500190067116754, 0.030689816901899685, 0.006841263331899707, 0.0, -0.0032125025773639625, -0.005173074003255208, 0.0, 0.0, -0.0047933267074786335, 0.021778898783942416, 0.007166039275123367, 0.026103448682898607, 0.0, 0.016309241419739964, 0.012524375109782772, -0.004677025811162244, -0.0032125025773639625, -0.0014881445762788947, -0.0020142219071680547, 0.011625399729337503, 0.0345773757815108, 0.03269201439368631, 0.008634582268072583, 0.02047920807167338, 0.01891742595528007, 0.0, -0.006661218579534098, 0.004691952940548198, 0.005171062687904928, 0.007070803121207314, 0.014163730800425748, 0.026983504878059464, 0.02288481723486461, 0.020150889242454957, 0.018657334655109013, -9.694312097285107E-4, 0.0028827673878515448, 0.0022168608388046175, 0.024379175824285445, 0.011577299799010388, 0.015437924230942375, 0.0024037747911320596, 0.01992626493776176, 0.020150889242454957, 0.018432710350415812, -0.00190339542397915, 0.009021751773671023, 0.004610055954515608, 0.016470844334329375, 0.03707992086953528, 0.006399075685990527, -0.001568429355577023, 0.020150889242454957, 0.024239158161017727, 0.02505054884859286, 0.009816554467918542, 0.016914243562645596, 0.023444493103590067, 0.017961544011376084, 0.027639401687303042, 0.014302293975786055, 0.013491041772572829, 0.020150889242454957, 0.007573524948798847, 0.027594877345971117, 0.007425874042410162, 0.007662087467216333, 0.008654183851402267, 0.0347866269782445, 0.007662087467216333, -0.005173074003255208, -0.00394991767244589, 0.020150889242454957, 0.0, 0.007967624942560654, 0.015214028664005938, 0.015214028664005938, 0.015214028664005938, 0.008123405791448287, 0.005729427326257844, 0.014977815239199752, 0.017694269624470765, 0.01335281042744902
----	--------------------	---

33	Area Merokok	0.0, 0.0, -1.503322890064983E-4, -6.143146693621023E-5, -1.2985513336109475E-4, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.013028390548274118, 0.010936112095262827, 0.005392312599714972, -8.328261924314034E-4, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0234782752270154, 0.032765874743097716, 0.03286306621294735, 0.001738934865602389, -9.819645194846108E-4, -0.001541096046216474, -0.001541096046216474, -0.001541096046216474, 0.008224929860988198, 0.004112753463224621, 0.036721206463797396, 0.05129675092852358, 0.02996732350955939, 0.018580476840352633, -1.503322890064983E-4, -9.589302155896232E-5, 0.0031859357813711843, 0.018304649216605337, 0.018717716843135432, 0.0169144226938252, 0.013728486912454011, 0.05305481917274429, 0.031923292139057834, 0.030278217353211644, 0.0, 0.014270722170244537, 0.030365433775355822, 0.02849676304318747, 0.024881031452281547, 0.01401801357002328, 0.008397994811327058, 0.034091102711383076, 0.04623521448727343, 0.016252169267787196, 0.0260834190872877, 0.0238116623144248, 0.01948608011083334, 0.015036599774703854, 0.0056851162030746305, 0.009475104951155777, 0.0017775955356604217, 0.023766166420752407, 0.047002279105683484, 0.028520830090384728, 0.028128935935018758, 0.02764290683491136, 0.012136200424664033, 0.001636549087375372, -1.708094446519016E-4, 0.0, -0.001541096046216474, 0.013197208108135853, 0.0217022036056868, 0.020373430670848375, 0.007148396786620517, 0.0, -7.491642309293925E-5, -1.2985513336109475E-4, -7.491642309293925E-5, 0.0, -9.997791554307595E-4, -9.224481710328006E-4, 9.268176818534352E-4, 0.0018536353637068704, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0033186915818768964, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
----	--------------	---

34	Toilet Unisex	0.0, -2.0830525043016287E-4, -7.212514327545037E-5, -9.604984392703472E-4, -0.005500514039454257, -0.004397506812809761, -0.0012632832288128322, 0.0017520414310340465, -6.809422555769343E-4, -1.1814087439253322E-4, 0.0, -3.353206470339208E-4, 0.024752688006586386, 0.019451427652411715, -7.187307048149186E-4, -0.0021565252882263246, 0.021608167248299674, 0.02452431867450946, -0.002529201366727817, -5.089145358447586E-4, -0.0012538975831171504, 0.012008865556505786, 0.03230470294087099, 0.03329293004303307, -0.005099108620179165, -0.005231941529197611, 0.033711982691168214, 0.03600747952251032, 0.011061902217066428, -4.140701929282504E-4, -0.0020987393669660496, 0.022386514494422926, 0.01184710555136007, 0.028157846441479156, 0.006810426587915629, 0.008467218855322275, 0.01911075317155539, 0.01380861932766562, 0.02126197915023458, -3.175384915093949E-4, -0.0018858607683357245, 0.03944786013716881, 0.0145755468202285, 0.03759821336424116, 0.01214475425575013, 0.017362886272030746, 0.033040764370986145, 0.014488481943140123, 0.043934415331822414, -3.8104618981127337E-4, -0.0011808756505317522, 0.03626431491443604, -0.002302554419492778, 0.013616610017185815, 0.017843563915087502, 0.02108728524730978, 0.007043773547412877, 0.02481128690843996, 0.027753470655654654, -3.175384915093949E-4, -9.087759568656398E-5, 0.02468921136729902, 0.0022376113565532557, 0.016455778047674605, 0.014596051911499392, 0.002529634819449287, 0.03558961678789471, 0.016388949267607134, 0.017965023648511377, 0.0, 0.0, -0.0046402625056547716, 0.017730579325585097, 0.01815667548357098, -5.907043719626658E-4, -5.907043719626658E-4, 0.03825412084851878, 0.017463701728876676, 0.01424016288763493, 0.0, 0.0, -0.005830759009148768, 0.024980924515284247, 0.015169116870430903, -0.009073891517318168, 0.005117011895097194, 0.02663541458561744, 0.021955001336837573, 0.018188276989972225, 0.0, 0.0, -0.004948217789248139, -0.001735846726382965, -0.0012632832288128322, -0.004589363578385017, -0.00488937940609163, -0.0034489332138090516, -0.003933629284457659, -0.005551363552248932, 0.0
----	------------------	---

35	Kafetaria/ Bar	0.006156227971698205, 0.004137720547757385, 0.004094884752348084, 0.003657959639173228, 0.003657959639173228, 0.003657959639173228, 0.003657959639173228, 0.010288593135530573, 0.004137720547757385, 0.005299709297374969, 0.0013918428457752453, 0.006965503999906964, -0.0013536111349338755, -0.0015474511792312382, -0.0010473771895335305, -1.8336046288915917E-4, 0.023536091856093417, 0.0675764385828272, 0.0040977823719550955, -0.0011513536929306, -0.0013171678784745457, 0.03985315979781998, 0.042264000046854974, 0.020815521373457678, 0.02214049777578085, 0.02795519726020636, 0.01102564077562429, 0.04256358359407778, 0.039308397197236424, -0.0018418932934766024, -6.63938280206681E-4, -0.0028176962198382498, 0.03009410437691466, 0.018988918690201844, 0.0020000881047156386, 0.02454990519092424, 0.02562638788478095, 0.029070823779537392, -5.247254150020548E-4, 0.0, 0.0, -0.0020353526424120635, -0.0024013690198293083, 0.024608370447948034, 0.02999808182826153, 0.04679795671180578, 0.024197977218675334, 0.0, 0.0, 0.0, -0.0021096103419470376, -0.005083237410538441, -0.0024961308637274676, -0.00527803761634682, 0.02727075001480627, 0.030328018249319796, -0.0021332226113831335, 0.0, 0.0, 0.0, 0.0, -0.0022381145252128466, -0.004221388898101783, -0.002017549415140557, 0.02901535998946962, 0.02901535998946962, -0.0013536111349338755, -0.0010623277261506377, 0.0, 0.0, 0.0, 0.0, -0.001841939202599894, -0.0016962974982082759, 0.03012909067011143, 0.03012909067011143, -0.0016962974982082759, -0.001841939202599894, 0.0, 0.0, -0.003159061171951149, 1.2887349705953958E-4, 0.0010000025591669068, 0.03014008505783932, 0.03059733233770098, 0.031043631550865005, 0.030296937461515443, 0.003437293657233217, 0.0026925918271654, 0.0, -0.0021096103419470376, -0.0010126388150161867, 0.0014605489953989936, 0.023320974061681075, 0.024795531246726975, 0.024104469724654885, 0.02289407626842868, 0.0025400549645091188, 6.438341950474288E-4, 0.0
----	-------------------	--

36	Helikopter	0.0, -9.425459485827995E-4, -0.0016552026414136973, -9.425459485827995E-4, 0.0, -7.931179323440624E-4, 0.0, -0.0018046306576524325, -0.0017241694181392667, 0.0, 0.0, -0.0024508956149866903, -0.006058797892203422, -0.004569503072057642, -0.0015172690879625545, -0.0014368078484493895, -2.1839479296430713E-4, -0.0034598332990661293, -0.0033104052828273945, 0.0, 0.01630406328327286, -0.005078580959483231, 0.014311272867572618, 0.02056519788272718, 0.010937536103573158, 0.008898820983105361, 0.008033877196833182, 0.022328696418332624, 0.02448625435097621, 0.015005188988274621, 0.01094720664784821, 0.017174465481031694, 0.015675804596556733, 0.026830073589569164, 0.0294707489540895, 0.05078104954248629, 0.049066850303797406, 0.03573904694495037, 0.01847927048352767, -0.002968035812021203, -0.005590557268217519, 0.030277971006913207, 0.021086285355752018, 0.0036400065996243687, 0.02967523009790617, 0.02197246430654688, 0.03743417223139086, 0.029999371985257796, 0.029142078783901605, -2.407742317826417E-4, -0.004004321403529389, 0.014696742763065915, -0.001821574002826963, 0.022677879783100433, 0.002225590013143118, 0.019478112490969316, 0.03774282013010429, 0.03547378868112182, 0.029528556134552627, 0.009498707734592705, -0.0019179016917465098, -0.008264684264545026, -0.0037894025361120544, -8.511024012436564E-4, 0.022894931481409926, 0.018914503391313748, 0.019971074410749485, 0.019426808252301638, 0.019248674972288833, 0.003869983691677031, -0.0061467789202943645, -0.00742946901168768, -0.006407583683159779, -0.00698092748700503, 0.01825748844858079, 0.03965413313910178, 0.031919618834241464, 0.04607615104903497, 0.03457123292700636, 0.010633811502914972, 0.0, 0.0, 0.0, 0.0, 0.00815402564918932, 0.011613309257936312, 0.010176501409486926, 0.010176501409486926, 0.004095229979392373, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, -6.436899161053263E-4, -0.00229925780793451, -0.0029540769364119427, 0.0
----	------------	---

Lampiran B: SKRIP PROGRAM JAVA

B.1. Kelas Node.java

```
1 package com.example.afif.skripsi;
2
3 public class Node {
4     private double[] x = new double[100];
5     private double[] w = new double[100];
6     private double[] deltaW = new double[100];
7     private double error;
8     private int t,c;
9     double alpha = 0.1;
10    double perubahanAlpha=0.5;
11
12    Node(int C) {
13        this.c = C;
14    }
15
16
17    public double getBesar(){
18        double result = 0;
19        for(int i=0; i<x.length; i++){
20            result += Math.pow(x[i] - w[i], 2);
21        }
22        return Math.sqrt(result);
23    }
24
25    private double[] kurang(double[] a, double[] b){
```

```
26     double result[] = new double[a.length];
27
28     for( int i=0; i<a.length ; i++){
29
30         result[i] = a[i] - b[i];
31
32     }
33
34     return result;
35
36 }
37
38
39
40
41 private double[] tambah(double[] a, double[] b){
42
43     double result[] = new double[a.length];
44
45     for( int i=0; i<a.length ; i++){
46
47         result[i] = a[i] + b[i];
48
49     }
50
51     return result;
52 }
```

```
53         w = kurang(w, kali(alpha, kurang(x,w)));
54     }
55     deltaW = kali(alpha, kurang(x,w));
56     error = getMaxDW();
57 }
58
59 public void reduceAlpha(){
60
61     alpha = alpha * perubahanAlpha;
62 }
63
64 private double getMaxDW() {
65     double maxValue = deltaW[0];
66     for (int i = 1; i < deltaW.length; i++) {
67         if (deltaW[i] > maxValue) {
68             maxValue = deltaW[i];
69         }
70     }
71     return maxValue;
72 }
73
74 public void setX(double[] x) {
75     this.x = x;
76 }
77
78 public void setW(double[] w) {
79     this.w = w;
```

```
80    }
81
82    public void setT(int t) {
83        this.t = t;
84    }
85
86    public double getError() {
87        return error;
88    }
89
90    public void setAlpha(double alpha) {
91        this.alpha = alpha;
92    }
93
94    public void setPerubahanAlpha(double perubahanAlpha) {
95        this.perubahanAlpha = perubahanAlpha;
96    }
97
98    public double getAlpha() {
99        return alpha;
100    }
101
102    public double getPerubahanAlpha() {
103        return perubahanAlpha;
104    }
105
106    public double[] getW() {
```

```

107         return w;
108     }
109 }
```

B.2. Kelas LVQ.java

```

1 package com.example.afif.skripsi;
2
3 public class LVQ {
4     private Node[] kelas = new Node[36];
5     private double[] besar = new double[36];
6     int epoch;
7     double alpha;
8     double lastAlpha;
9     double perubahanAlpha;
10    double [][] bobot = new double [36][100];
11    String [] hasilUji = new String [36];
12
13    private double [][] pola = Data.pola;
14
15    public void train(){
16        epoch = 0;
17        for( int i=0; i<kelas.length; i++){
18            kelas [ i ] = new Node(i+1);
19            kelas [ i ].setW(pola [ i ]);
20            kelas [ i ].setAlpha(alpha);
21            kelas [ i ].setPerubahanAlpha(perubahanAlpha);
22        }
23    }
24}
```

```
23     lastAlpha = alpha;
24
25     System.out.println(kelas[1].getAlpha() + "," + kelas[1].
26                         getPerubahanAlpha() + "," + epoch);
27
28     int pemenang;
29
30     for(int a=0; a<36; a++){
31         for(Node kela : kelas) {
32             kela.setX(pola[a + 36]);
33         }
34         for(int i=0; i<kelas.length; i++){
35             besar[i] = kelas[i].getBesar();
36         }
37
38         pemenang = getPemenang();
39         kelas[pemenang].setT(a+1);
40         kelas[pemenang].update();
41     }
42
43     //Mengurangi Learning Rate
44     for(Node kela : kelas) {
45         kela.reduceAlpha();
46     }
47
48     while(lastAlpha >= 4.0E-32){
49         for(int a=0; a<72; a++){
50             for(Node kela : kelas) {
```

```

49         kela.setX(pola[a]);
50     }
51     for(int i=0; i<kelas.length; i++){
52         besar[i] = kelas[i].getBesar();
53     }
54
55     pemenang = getPemenang();
56     kelas[pemenang].setT((a%36)+1);
57     kelas[pemenang].update();
58
59 }
60
61 trainLanjutan();
62
63 //Mengurangi Learning Rate
64 for (Node kela : kelas) {
65     kela.reduceAlpha();
66     lastAlpha = kela.alpha;
67 }
68
69 epoch++;
70 }
71
72 private double[][] dataLanjutan = Data.dataLanjutan;
73 private int[] kelasDataLanjutan = {5,6,14,21,22,24,26,28};
74 private void trainLanjutan(){
75     for (int a=0; a<kelasDataLanjutan.length; a++){

```

```
76     int pemenang;
77
78     for (Node kela : kelas) {
79
80         kela.setX(dataLanjutan[a]);
81
82     }
83
84     pemenang = getPemenang();
85
86     kelas[pemenang].setT((kelasDataLanjutan[a]));
87
88     kelas[pemenang].update();
89
90 }
91
92
93
94     public String getHasil(double[] input){
95
96         int pemenang;
97
98         String hasil = "N/A";
99
100
101        for (Node kela : kelas) {
102
103             kela.setX(input);
104
105         }
106
107         for(int i=0; i<kelas.length;i++){
108
109             besar[i] = kelas[i].getBesar();
110
111         }
112
113         pemenang = getPemenang();
114
115         System.out.println(pemenang);
```

```
103  
104     if (pemenang == 0){  
105         hasil = "Hotel";  
106     } else if (pemenang == 1){  
107         hasil = "Bandara";  
108     } else if (pemenang == 2){  
109         hasil = "Disabilitas";  
110     } else if (pemenang == 3){  
111         hasil = "Stadion";  
112     } else if (pemenang == 4){  
113         hasil = "Keberangkatan_Pesawat";  
114     } else if (pemenang == 5){  
115         hasil = "Pengawasan_Kamera";  
116     } else if (pemenang == 6){  
117         hasil = "Pom_Bensin";  
118     } else if (pemenang == 7){  
119         hasil = "Restoran";  
120     } else if (pemenang == 8){  
121         hasil = "Toliet_Pria";  
122     } else if (pemenang == 9){  
123         hasil = "Toilet_Wanita";  
124     } else if (pemenang == 10){  
125         hasil = "Salon";  
126     } else if (pemenang == 11){  
127         hasil = "Pasar";  
128     } else if (pemenang == 12){  
129         hasil = "Museum";
```

```

130 } else if (pemenang == 13){
131     hasil = "Kemah";
132 } else if (pemenang == 14){
133     hasil = "Kafe";
134 } else if (pemenang == 15){
135     hasil = "Eskalator";
136 } else if (pemenang == 16){
137     hasil = "Bus";
138 } else if (pemenang == 17){
139     hasil = "Tunggu";
140 } else if (pemenang == 18){
141     hasil = "Loket / Resepsionis";
142 } else if (pemenang == 19){
143     hasil = "Penukaran - Uang";
144 } else if (pemenang == 20){
145     hasil = "Parkir - Sepeda";
146 } else if (pemenang == 21){
147     hasil = "Informasi";
148 } else if (pemenang == 22){
149     hasil = "Petunjuk - Arah";
150 } else if (pemenang == 23){
151     hasil = "ATM";
152 } else if (pemenang == 24){
153     hasil = "Ruang - Rapat";
154 } else if (pemenang == 25){
155     hasil = "Penitipan - Barang";
156 } else if (pemenang == 26){

```

```

157         hasil = "Daur_Ulang";
158     } else if (pemenang == 27){
159         hasil = "Telepon";
160     } else if (pemenang == 28){
161         hasil = "Taksi";
162     } else if (pemenang == 29){
163         hasil = "Pos_Surat";
164     } else if (pemenang == 30){
165         hasil = "Parkir_Mobil";
166     } else if (pemenang == 31){
167         hasil = "Pemeriksaan_Barang";
168     } else if (pemenang == 32){
169         hasil = "Area_Merokok";
170     } else if (pemenang == 33){
171         hasil = "Toilet_Unisex";
172     } else if (pemenang == 34){
173         hasil = "Kafetaria / Bar";
174     } else if (pemenang == 35){
175         hasil = "Helikopter";
176     }
177
178
179     return hasil;
180 }
181
182     private int getPemenang() {
183         double minValue = besar[0];

```

```
184     int kelas = 0;
185
186     for (int i = 1; i < besar.length; i++) {
187
188         if (besar[i] < minValue) {
189
190             minValue = besar[i];
191
192             kelas = i;
193
194         }
195
196         return kelas;
197     }
198
199     public void setAlpha(double alpha) {
200
201         this.alpha = alpha;
202     }
203
204     public double getAlpha() {
205
206         return alpha;
207     }
208
209     public void setPerubahanAlpha(double perubahanAlpha) {
210
211         this.perubahanAlpha = perubahanAlpha;
212     }
213
214     public double getPerubahanAlpha() {
215
216         return perubahanAlpha;
217     }
218
219     public double[][][] getBobot() {
```

```
211     for( int i=0; i<kelas.length ; i++) {  
212         bobot[ i ] = kelas[ i ].getW();  
213     }  
214     return bobot;  
215 }  
216 }
```

B.3. Kelas Gambar.java

```
1 package com.example.afif.skripsi;  
2  
3 import android.graphics.Bitmap;  
4 import android.graphics.Color;  
5 import android.util.Log;  
6  
7 import org.opencv.android.Utils;  
8 import org.opencv.core.CvType;  
9 import org.opencv.core.Mat;  
10 import org.opencv.core.Size;  
11 import org.opencv.imgproc.Imgproc;  
12  
13 import java.math.BigDecimal;  
14 import java.math.RoundingMode;  
15  
16 public class Gambar {  
17     private Mat rgba;  
18  
19     Gambar(Mat rgba) {
```

```
20     this .rgba = rgba ;
21 }
22
23 public Bitmap noiseReduction(Bitmap bitmap) {
24     Mat imageMat = new Mat();
25     Utils.bitmapToMat(bitmap, imageMat);
26     Imgproc.cvtColor(imageMat, imageMat, Imgproc .
27         COLOR_BGR2GRAY);
28     Imgproc.GaussianBlur(imageMat, imageMat, new Size(3, 3),
29         0);
30     Imgproc.threshold(imageMat, imageMat, 0, 255, Imgproc .
31         THRESH_OTSU);
32
33     Bitmap resultBitmap = Bitmap.createBitmap(imageMat.cols
34         (), imageMat.rows(), Bitmap.Config.ARGB_8888);
35     Utils.matToBitmap(imageMat, resultBitmap);
36
37     return resultBitmap;
38 }
39
40 public Bitmap detectEdges(Bitmap bitmap) { // deteksi tepi
41     gambar
42     Utils.bitmapToMat(bitmap, rgba);
43
44     Mat edges = new Mat(rgba.size(), CvType.CV_8UC1);
45     Imgproc.cvtColor(rgba, edges, Imgproc.COLOR_RGB2GRAY, 4)
46     ;
```

```

41     Imgproc.Canny(edges, edges, 80, 240);

42

43     Bitmap resultBitmap = Bitmap.createBitmap(edges.cols(),
44         edges.rows(), Bitmap.Config.ARGB_8888);

45     Utils.matToBitmap(edges, resultBitmap);

46

47     return resultBitmap;
48 }

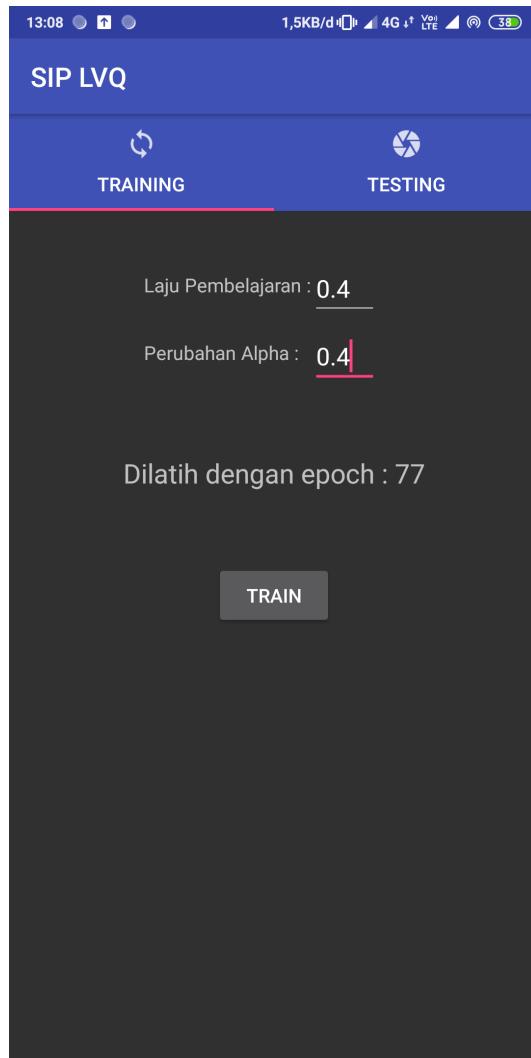
49 // convert from bitmap to byte array
50 public int[][] getBytesFromBitmap(Bitmap bitmap) {
51     int[][] value = new int[200][200];
52     int red, green, blue;
53     for (int h=0; h<bitmap.getHeight(); h++){
54         for (int w=0; w<bitmap.getWidth(); w++){
55             red = Color.red(bitmap.getPixel(h,w));
56             green = Color.green(bitmap.getPixel(h,w));
57             blue = Color.blue(bitmap.getPixel(h,w));
58
59             if ((red+green+blue)/3 == 0){
60                 value[w][h]=0;
61             } else {
62                 value[w][h]=1;
63             }
64         }
65     }
66     return value;

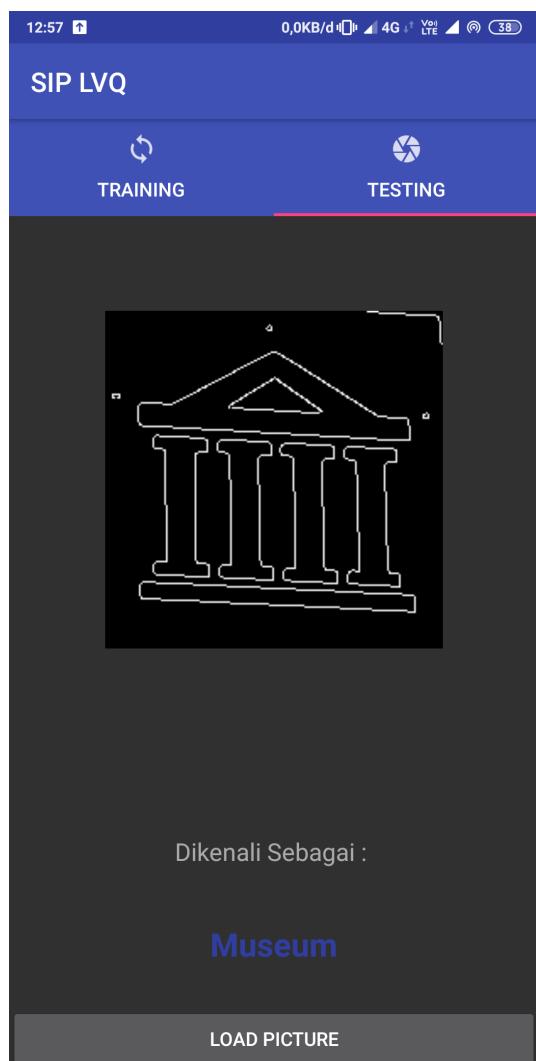
```

```
67    }
68
69  public double[] zoning(int [][] pixels){
70      double zona[] = new double[100];
71      double total = 0;
72      double hasil[] = new double[100];
73      int temp= 0;
74      int index = 0;
75      for (int c=0; c<200; c+=20){
76          for (int d=0; d<200; d+=20){
77              int ii = c+20;
78              for (int i=c; i<ii ; i++){
79                  int jj = d+20;
80                  for (int j=d; j<jj ; j++){
81                      temp += pixels[i][j];
82                  }
83              }
84              total += temp;
85              zona[index] = temp;
86              temp=0;
87              index++;
88          }
89      }
90      for(int i=0; i<hasil.length; i++){
91          hasil[i] = round(zona[i]/total , 4);
92      }
93      return hasil;
```

```
94    }
95
96    private static double round(double value, int places) {
97        if (places < 0) throw new IllegalArgumentException();
98
99        BigDecimal bd = new BigDecimal(value);
100       bd = bd.setScale(places, RoundingMode.HALF_UP);
101
102       return bd.doubleValue();
103    }
104}
```

Lampiran C: TAMPILAN APLIKASI





CURICULUM VITAE

Biodata Diri

Nama : Afif Muhammad
Tempat, Tanggal Lahir : Sleman, 5 September 1997
Kewarganegaraan : Indonesia
Agama : Islam
Jenis Kelamin : Laki-laki
Golongan Darah : B
Email : afifmuhammad5997@gmail.com
Kontak : 085765509202



Riwayat Pendidikan

2003 – 2009 : SD N Karanganyar
2009 – 2012 : SMP N 1 Ngemplak
2012 – 2015 : MAN PAKEM Sleman
2015 – 2019 : S1 Teknik Informatika UIN Sunan Kalijaga Yogyakarta