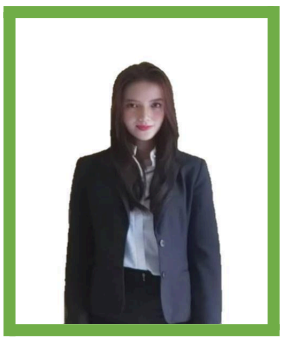
Curricullum Vitae



Personal Information:

- **Name** : Alma
- **Gender** : Female
- **Age** : 25
- **Place / Date of Birth** : Jakarta / 20 June 1998
- **Phone** : +62 878 6042 6579
- **Email** : alma.axeexeea@gmail.com
- **Researchgate** : https://www.researchgate.net/profile/Alma-Alma-3
- **Certificate** : https://drive.google.com/drive/folders/1lUx26lZISP_wDRxIN0QnSHI-6-0BudQf?usp=drive_link
- **Behance** : https://www.behance.net/almaalma22

Awards & Experience:

- **Best Graduate** of Physics Study Program at Jakarta State University with a GPA of 3.54
- **Publication:** AIP Conference Proceedings - "Least significant bit steganography me[1]thod for the digital data protection in the barcode" DOI: 10.1063/1.5132672
- **Publication:** IOP Science - "Feature Extraction of Tea Leaf Images using Dual-Tree Complex Wavelet Transform and Gray Level Co-occurrence Matrix"

Work Experience:

Universitas Negeri Jakarta
Jan 2018 – Jun 2018
Assistant Lab Physics Practicum Viscosity

- Supervised and instructed students during laboratory practicums, explaining procedures and ensuring safety protocols were followed.
- Conducted experiments involving the measurement of ball depth in various fluids, and guided students in analyzing differences between fluids and ball weights.
- Reviewed and evaluated students' reports to ensure accuracy and comprehension.

Badan Meteorologi Klimatologi dan Geofisika
Jun 2018 – Dec 2018
Image Processing Intern

- Analyzed satellite data from the HImawari 9 satellite to identify extreme weather patterns, specifically cumulonimbus clouds, in Indonesia.
- Developed a computer program in Python utilizing split window, threshold, and RGB methods to identify extreme weather patterns, with a focus on cumulonimbus clouds.
- Monitored and presented findings on extreme weather patterns during morning briefings.

Co – Learn
Oct 2020 – Dec 2020
Coverage Analyst (Part-Time)

- Reviewed and corrected inaccurate data entries in the company's database.

1

PT. Bank Mandiri (Pesero) Tbk
Jan 2021 – Jan 2024
Teller and Java Developer (Contarct)

- Utilized IntelliJ IDEA, PostgreSQL, Java Spring Boot, Postman, HTML, CSS, and JavaScript in the development of Java applications.
- Designed, implemented, and maintained Java applications, ensuring adherence to specifications and standards.
- Contributed to all phases of development, including analysis, programming, testing, and debugging.
- Managed Java and Java EE application development, ensuring efficient and sustainable solutions.

This Curriculum Vitae highlights Alma's academic achievements, research publications, and professional experience in physics, image processing, and software development.

Freelance Design NFT generative with Python

PORTFOLIO

Design NFT Pokemon

alma.axeexeea@gmail.com

NFT Design Result

I Generated 100 NFT With Python Programming

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File Size: 167KB

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Ukuran: 1000x1000
File Size: 107KB

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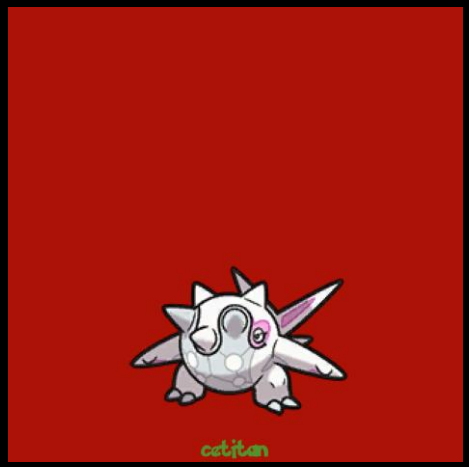

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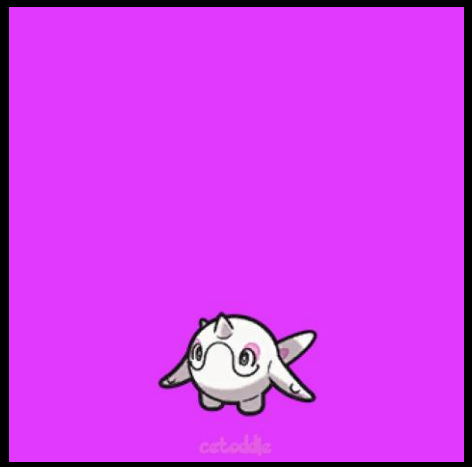

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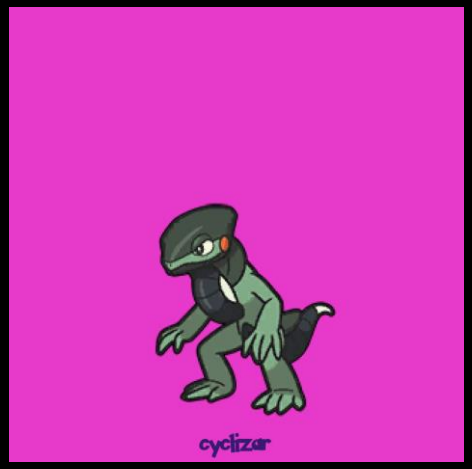

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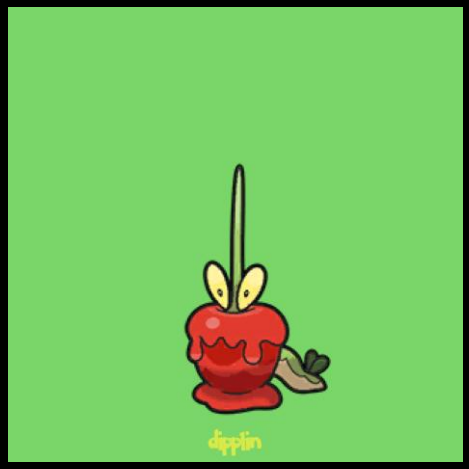

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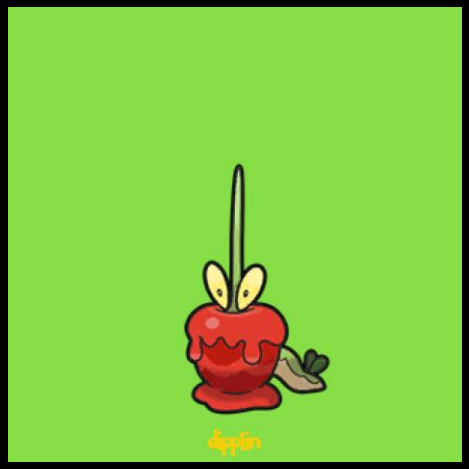

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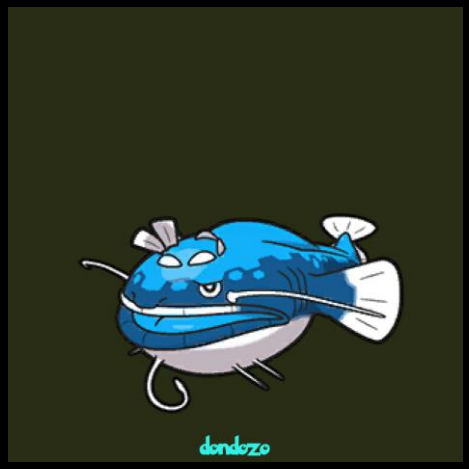

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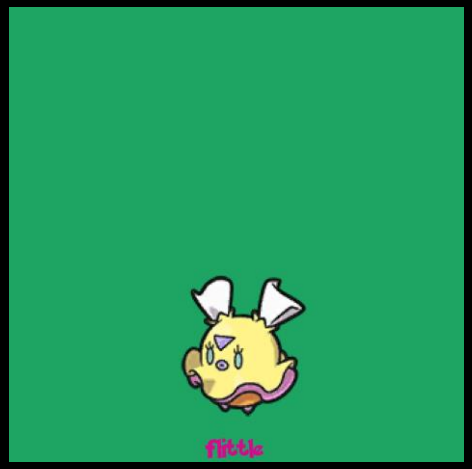

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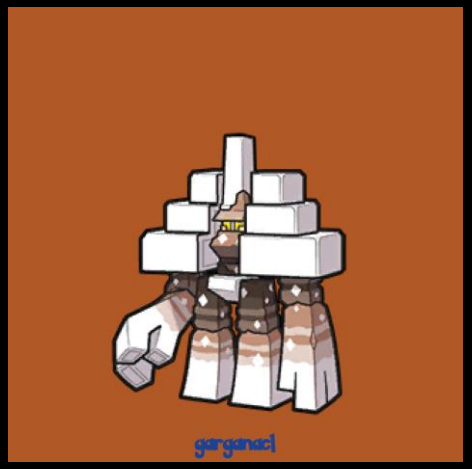

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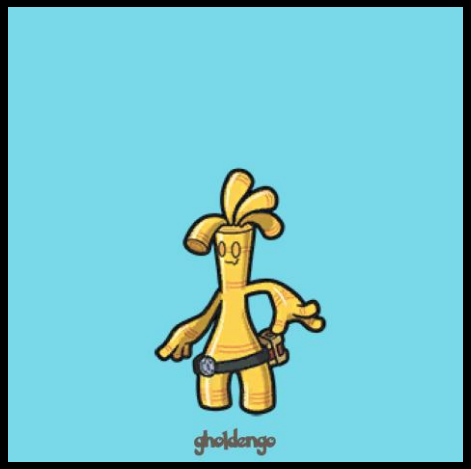

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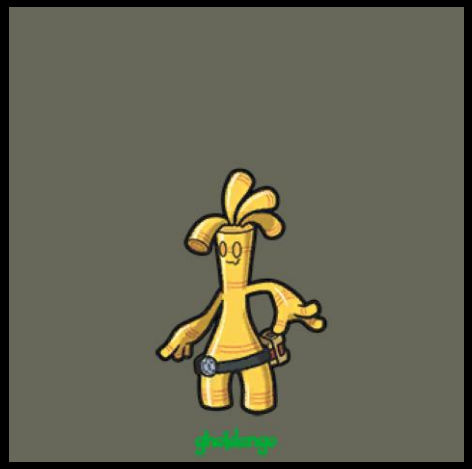

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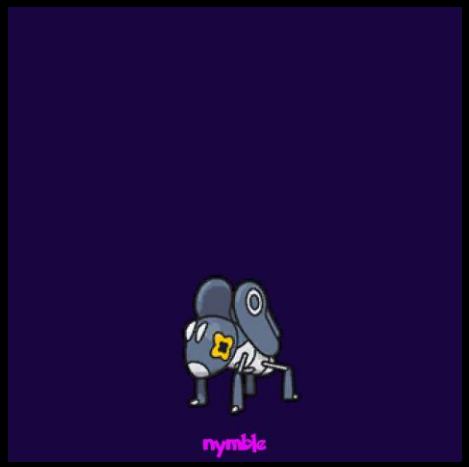

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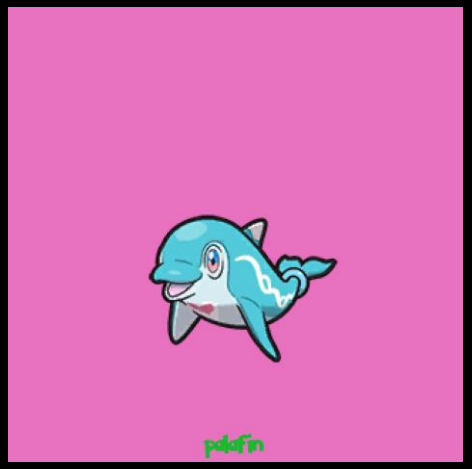

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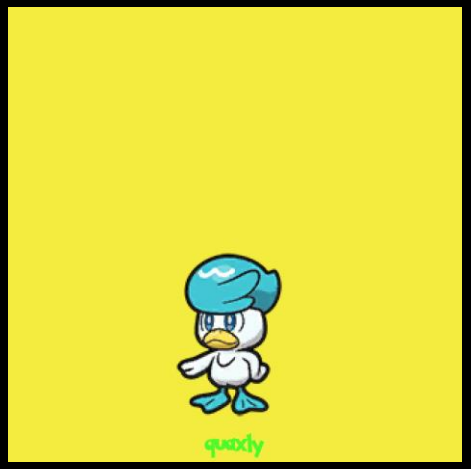

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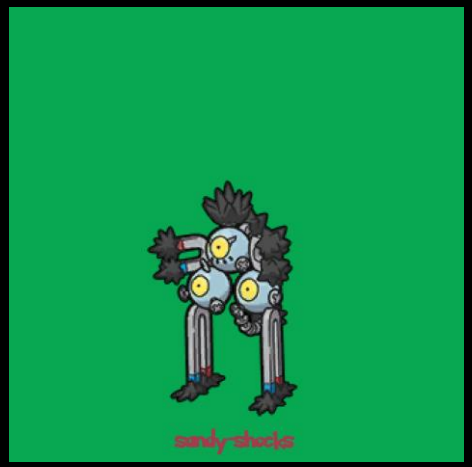

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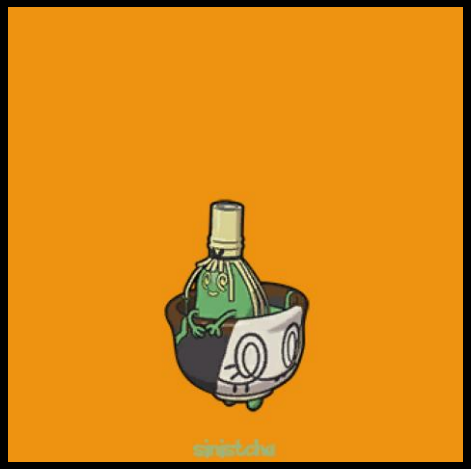

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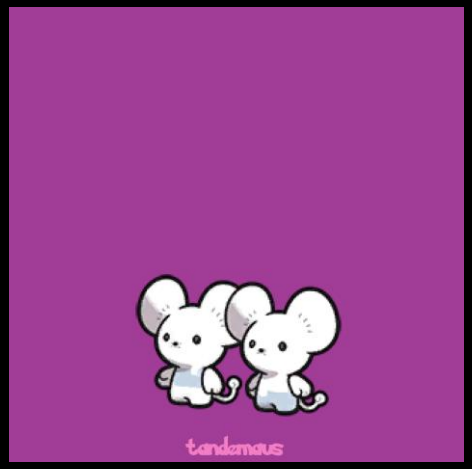

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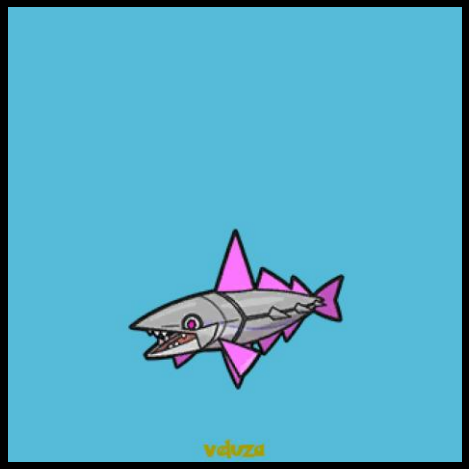

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Ukuran: 1000x1000
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SCRIPT CODE

```
import os
import cv2
import numpy as np
from glob import glob
from PIL import Image, ImageDraw, ImageFont

def create_random_color():
    return tuple(np.random.randint(0, 256, size=3).tolist())

def overlay_image(background, overlay, position):
    bg_h, bg_w = background.shape[:2]
    ol_h, ol_w = overlay.shape[:2]
    x, y = position
    x1, y1 = max(0, x), max(0, y)
    x2, y2 = min(bg_w, x + ol_w), min(bg_h, y + ol_h)
    overlay = overlay[max(0, -y):min(ol_h, bg_h - y), max(0, -x):min(ol_w, bg_w - x)]
    alpha = overlay[..., 3:4] / 255
    background[y1:y2, x1:x2] = (1.0 - alpha) * background[y1:y2, x1:x2] + alpha * overlay[..., :3]
    return background

def create_pokemon_image(pokemon_path, output_dir, index, font_path):
    # Create a 1000x1000 pixel background with a random color
    background_color = create_random_color()
    background = np.full((1000, 1000, 3), background_color, dtype=np.uint8)

    # Load the pokemon image
    pokemon = cv2.imread(pokemon_path, cv2.IMREAD_UNCHANGED)
    if pokemon is None:
        raise ValueError(f"Pokemon image at path '{pokemon_path}' not found")
```

```
# Resize the pokemon image to fill 80% of the background
bg_size = 1000
max_pokemon_size = int(bg_size * 0.8)
pokemon = cv2.resize(pokemon, (max_pokemon_size, max_pokemon_size), interpolation=cv2.INTER_AREA)

# Get dimensions for centering the pokemon
pk_h, pk_w = pokemon.shape[:2]
center_position = ((bg_size - pk_w) // 2, (bg_size - pk_h) // 2)

# Overlay the pokemon image onto the background
result = overlay_image(background.copy(), pokemon, center_position)

# Convert result to PIL Image to add text
result_pil = Image.fromarray(result)
draw = ImageDraw.Draw(result_pil)
font_size = int(bg_size * 0.04)
font = ImageFont.truetype(font_path, font_size)

# Add Pokemon name
pokemon_name = os.path.basename(pokemon_path).split('.')[0]
text_color = create_random_color()

# Calculate text position
text_bbox = draw.textbbox((0, 0), pokemon_name, font=font)
text_width = text_bbox[2] - text_bbox[0]
text_height = text_bbox[3] - text_bbox[1]
text_position = ((bg_size - text_width) // 2, bg_size - text_height - 10)  # Adjust position as needed

draw.text(text_position, pokemon_name, font=font, fill=text_color)

# Convert back to OpenCV image
result = np.array(result_pil)
```

```
    # Save the result image
    output_path = os.path.join(output_dir, f'{pokemon_name}_{index}.png')
    cv2.imwrite(output_path, result)
```

========== Contact Me ==========
========== For More Information ==========
========== 0878 6042 6579 ==========

Program Matlab untuk Ekstraksi Ciri Citra Daun Teh dengan Beberapa Metode

Jenis Karya:
PROGRAM KOMPUTER

Author:
Alma & Dr. Bambang Heru Iswanto, M.Si

PROGRAM STUDI FISIKA

FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM

UNIVERSITAS NEGERI JAKARTA

JULI 2020

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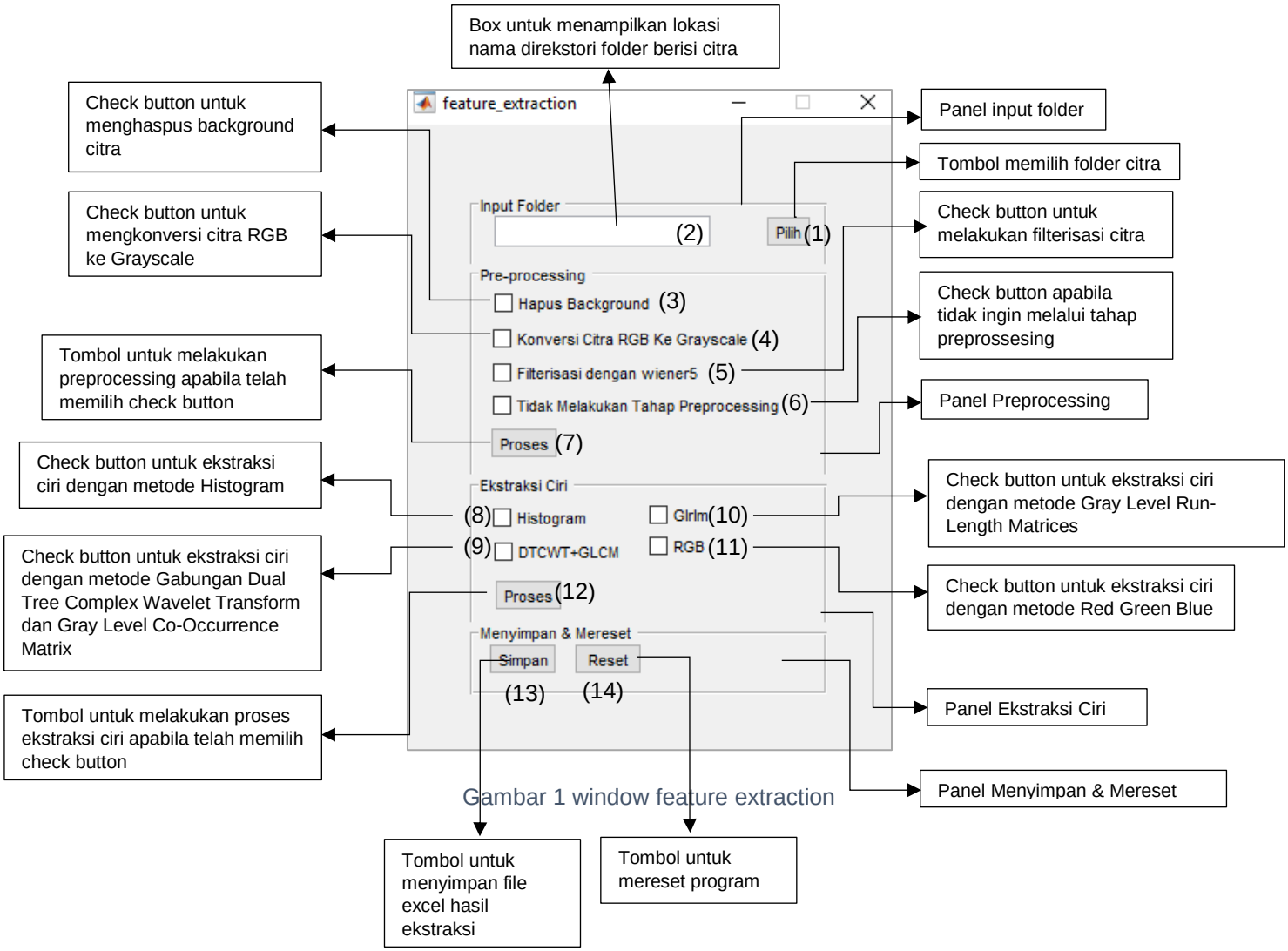
I. GRAPHIC USER INTERFACE (TAB I/feature_extraction)

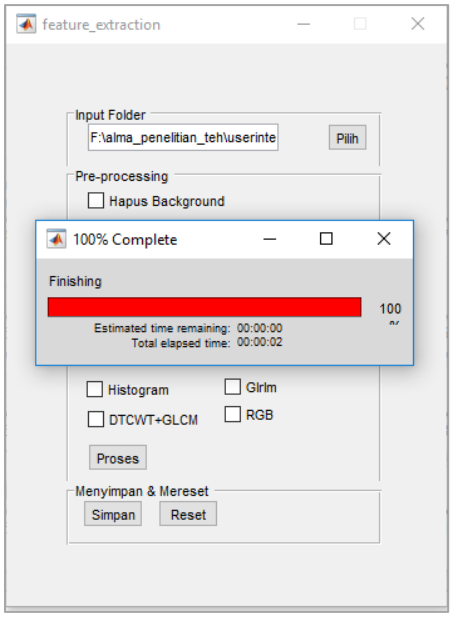
A. Deskripsi Program

Program menampilkan graphical user interface (GUI) untuk melakukan ekstraksi ciri citra daun teh sebagai mana ditampilkan pada gambar dibawah ini:



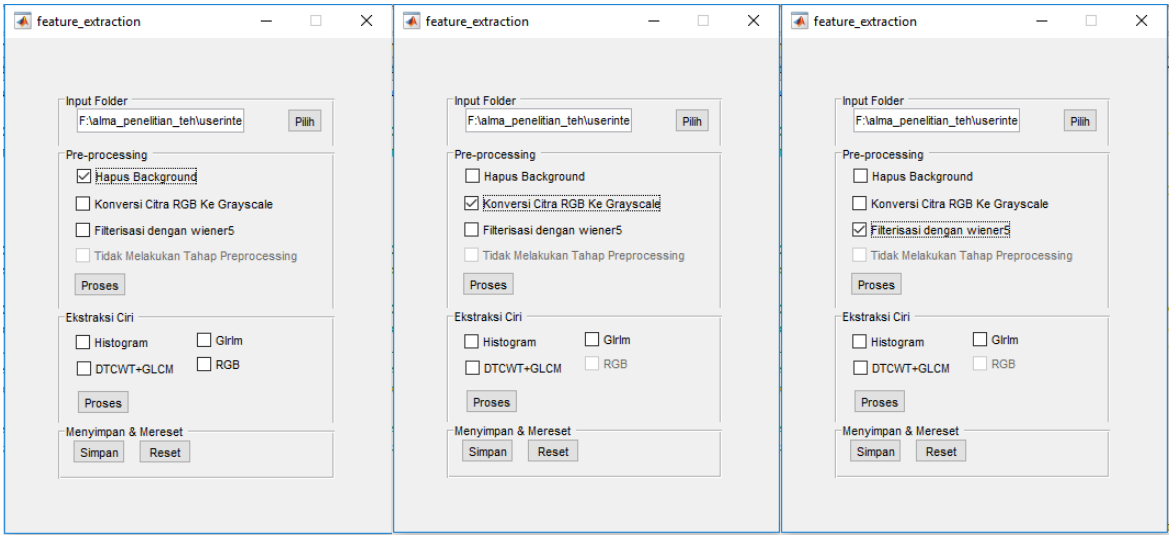
Gambar 1 window feature extraction

Program ini dijalankan dengan cara menginput folder yang berisi citra berformat **.jpg* dengan menekan tombol pilih (dengan label 1), kemudian direktori folder akan ditampilkan pada text box (dengan label 2) proses akan selesai apabila tampil popup bar untuk menunggu hingga proses selesai sebagai mana ditampilkan pada gambar dibawah ini:

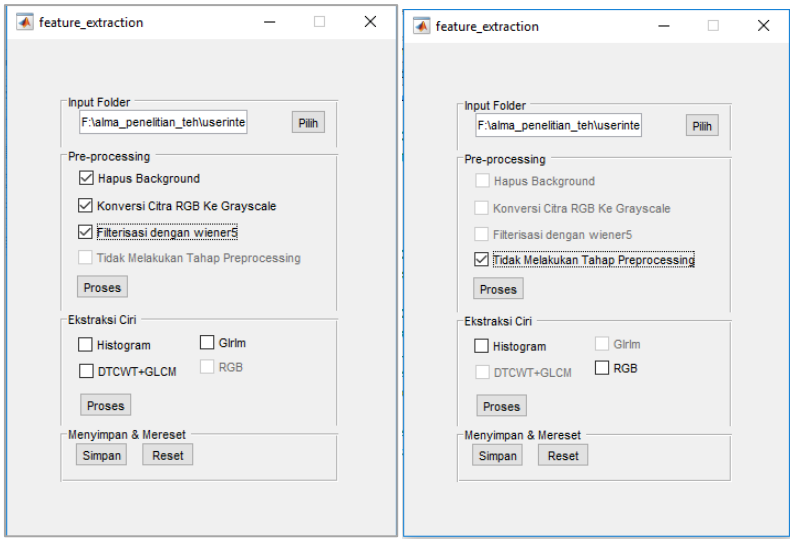


Gambar 2 window feature extraction untuk menginput folder

Setelah menunggu hingga pesan popup bar selesai (‘*finishing*’), dilanjutkan tahap *PreProcessing* dengan memilih bebrapa check button (berlabel (3), (4), (5), dan (6)), namun perlu diketahui apabila menekan check button (berlabel (6)) maka check button (berlabel (3), (4), dan (5)) akan ter-*disable* (tidak dapat dipilih), begitu juga sebaliknya apabila menekan check button (berlabel (3), (4), dan (5)) maka check button (berlabel (6)) yang akan akan ter-*disable* (tidak dapat dipilih) sebagaimana ditampilkan pada gambar dibawah ini



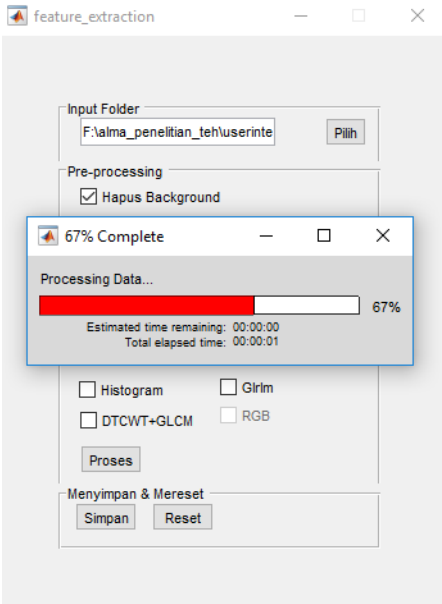
(a) (b) (c)



(d) (e)

Gambar 3 window feature extraction (a) saat memilih hanya menghapus background, (b) saat memilih hanya mengkonversi citra RGB ke citra Grayscale, (c) saat memilih hanya melakukan filterisasi , (d) saat memilih tiga checkbox secara bersamaan, dan (e) saat tidak ingin melalui tahap *preprocessing*.

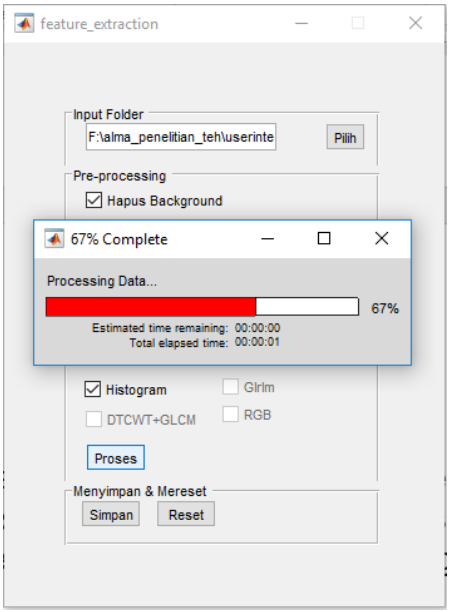
Pada bagian *preprocessing* dapat memilih hapus background, konversi citra RGB ke Grayscale, filterisasi, atau memilih ketiganya secara bersamaan, namun apabila tidak ingin melalui tahap *preprocessing* sebagaimana pada gambar diatas. Selanjutnya menekan button '*Proses*' hingga tampil popup bar menunggu hingga proses selesai, sebagaimana ditampilkan pada gambar dibawah ini



Gambar 4 window memproses tahap *preprocessing*

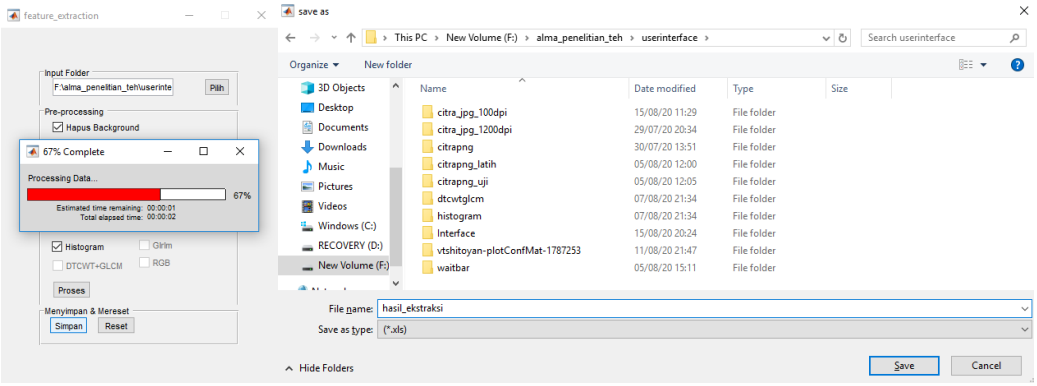
Setelah tahap *preprocessing* selesai barulah ke tahap ekstraksi ciri dengan menekan check button '*Histogram*' apabila ingin menggunakan metode histogram, menekan check button '*DTCWT+GLCM*' apabila ingin menggunakan metode gabungan dual tree complex wavelet transform dan gray level co-occurrence matriks, menekan check button '*Glrlm*' apabila inggin menggunakan metode gray level run length matrices, dan menekan check button '*RGB*' apabila ingin menggunakan metode red green blue. Pada tahap ekstraksi ciri hanya dapat memilih satu check button, dan perlu diketahui untuk metode histogram citra dapat langsung diekstraksi ciri ataupun melalui proses konversi citra RGB ke Grayscale namun untuk metode gabungan dual tree complex wavelet transform dan gray level co-occurrence matriks serta metode gray level run length matrices perlu mengkonversi citra RGB ke citra Grayscale,

dan untuk penggunaan metode red green blue tidak boleh mengkonversi citra RGB ke citra Grayscale, kemudian barulah menekan button '*Proses*' untuk memulai proses ekstraksi ciri hingga tampil popup bar menunggu hingga proses selesai sebagaimana ditampilkan pada gambar dibawah ini:



Gambar 5 window saat memproses ekstraksi ciri

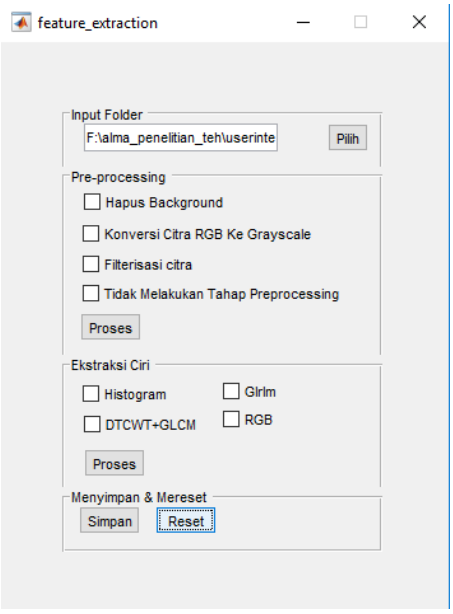
Setelah proses selesai maka hasil ekstraksi dapat disimpan kedalam format **.xls* dengan nama file sesuai keinginan pengguna dengan menekan button '*simpan*' sebagaimana pada gambar dibawah ini:



(a) (b)

Gambar 6 window (a) saat menekan button '*simpan*' (b) saat menamai file **.xls*

Setelah hasil disimpan pengguna dapat mereset program dengan menekan button '*reset*' sehingga sebagaimana ditampilkan pada gambar dibawah ini:



Gambar 7 window setelah mereset program

B. Code Program

Code program dibuat dengan bahasa script Matlab yang terdiri dari beberapa file program sebagai berikut.

halamanutama.m

```
Nama File          :  Feature_extraction.m

                      Menciptakan GUI pada software Matlab yang terdiri dari lima
                      botton diantaranya button untuk memilih folder citra yang
                      berisi citra berformat *.jpg,button untuk tahap
                      preprocessing, button untuk mengekstraksi ciri, button
Deskripsi          :  untuk menyimpan file hasil ekstraksi ciri berformat *.xls,
                      dan button untuk mereset program. Satu kolom nama lokasi
                      direktori folder citra, empat check button untuk tahap
                      preprocessing, dan empat check button untuk tahap ekstraksi
                      ciri.

Platform           :  Matlab

Copyright          :  © 2020 Alma, Dr. Bambang Heru Iswanto
```

```
function varargout = feature_extraction(varargin)
% FEATURE_EXTRACTION MATLAB code for feature_extraction.fig
%      FEATURE_EXTRACTION, by itself, creates a new FEATURE_EXTRACTION or raises the
existing
%      singleton*.
%
%      H = FEATURE_EXTRACTION returns the handle to a new FEATURE_EXTRACTION or the
handle to
%      the existing singleton*.
%
%      FEATURE_EXTRACTION('CALLBACK',hObject,eventData,handles,...) calls the local
%      function named CALLBACK in FEATURE_EXTRACTION.M with the given input
arguments.
%
```

```
%      FEATURE_EXTRACTION('Property','Value',...) creates a new FEATURE_EXTRACTION or
raises the
%      existing singleton*.  Starting from the left, property value pairs are
%      applied to the GUI before feature_extraction_OpeningFcn gets called.  An
%      unrecognized property name or invalid value makes property application
%      stop.  All inputs are passed to feature_extraction_OpeningFcn via varargin.
%
%      *See GUI Options on GUIDE's Tools menu.  Choose "GUI allows only one
%      instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help feature_extraction

% Last Modified by GUIDE v2.5 15-Aug-2020 12:38:21

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @feature_extraction_OpeningFcn, ...
                   'gui_OutputFcn',  @feature_extraction_OutputFcn, ...
                   'gui_LayoutFcn',  [] , ...
                   'gui_Callback',   []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT


% --- Executes just before feature_extraction is made visible.
function feature_extraction_OpeningFcn(hObject, eventdata, handles, varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to feature_extraction (see VARARGIN)

% Choose default command line output for feature_extraction
handles.output = hObject;
movegui('center');
% Update handles structure
guidata(hObject, handles);

% UIWAIT makes feature_extraction wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = feature_extraction_OutputFcn(hObject, eventdata, handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;
```

```
% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

folder_data= uigetdir('*.*')
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.edit1,'String',folder_data);
handles.folder_data = folder_data;
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes on button press in pushbutton4.
function pushbutton4_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
data = handles.data;
%% Menginisiasi Save as
[filenames, pathname] = uiputfile('*.xls','save as');
%% Data Ke .xls
xlswrite(filenames, data, 1);
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles)

% --- Executes on button press in pushbutton5.
function pushbutton5_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox1,'enable','on','Value',0);
set(handles.checkbox2,'enable','on','Value',0);
set(handles.checkbox3,'enable','on','Value',0);
set(handles.checkbox4,'enable','on','Value',0);
set(handles.checkbox5,'enable','on','Value',0);
set(handles.checkbox6,'enable','on','Value',0);
set(handles.checkbox7,'enable','on','Value',0);
set(handles.checkbox8,'enable','on','Value',0);
%set(handles.edit1,'String', '');

waitbar(1,waktu,'Finishing');
```

```
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes on button press in checkbox5.
function checkbox5_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox5
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox5,'enable','on');
set(handles.checkbox6,'enable','off');
set(handles.checkbox7,'enable','off');
set(handles.checkbox8,'enable','off');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in checkbox6.
function checkbox6_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox6
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox5,'enable','off');
set(handles.checkbox6,'enable','on');
set(handles.checkbox7,'enable','off');
set(handles.checkbox8,'enable','off');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in checkbox7.
function checkbox7_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox7
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox5,'enable','off');
set(handles.checkbox6,'enable','off');
set(handles.checkbox7,'enable','on');
```

```
set(handles.checkbox8,'enable','off');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in checkbox8.
function checkbox8_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox8 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox8
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox5,'enable','off');
set(handles.checkbox6,'enable','off');
set(handles.checkbox7,'enable','off');
set(handles.checkbox8,'enable','on');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)

new_folder = handles.new_folder
file = dir(fullfile(new_folder, '*.jpg'))
jumlah= numel(file);

val5 = get(handles.checkbox5,'Value');
val6 = get(handles.checkbox6,'Value');
val7 = get(handles.checkbox7,'Value');
val8 = get(handles.checkbox8,'Value');
if val5
    set(handles.checkbox5,'enable','on');
    for k = 1:jumlah
        full= fullfile(new_folder, file(k).name);
        Img = imread(full);
        H = imhist(Img)';
        H = H/sum(H);
        I = [0:255]/255;
        [P G] = imhist(Img);
        nm = sum(P);
        f_energy = sum((P/nm).^2);
        f_mean = I*H';
        f_entrop = -H*log2(H+eps)';
        f_variance = (I-f_mean).^2*H';
        f_skewness = (I-f_mean).^3*H'/f_variance^1.5;
        f_kurtosis = (I-f_mean).^4*H'/f_variance^2-3;
```

```
        data{k,1} = f_energy;
        data{k,2} = f_mean;
        data{k,3} = f_entrop;
        data{k,4} = f_variance;
        data{k,5} = f_skewness;
        data{k,6} = f_kurtosis;
        %folder_xx= strcat(new_folder,'\original\',file(k).name);
        %imwrite(Img,folder_xx);
    end
elseif val6
    set(handles.checkbox6,'enable','on');
    for k = 1:jumlah
        full= fullfile(new_folder, file(k).name);
        Img = imread(full);
        level = 1;
        biort = 'near_sym_b';
        pixel_dist = 1;
        [C,S] = dtwavedec2(Img,level,biort,'qshift_a');
        Img = dtwaverec2(C,S,biort,'qshift_a');
        Img = uint8(Img);
        %% Analisis Tekstur
        glcm_dtcwt = graycomatrix(Img,'Offset',[0 pixel_dist; -pixel_dist pixel_dist;
-pixel_dist 0; -pixel_dist -pixel_dist]);
        stats_dtcwt_glcm =
features_glcm(glcm_dtcwt,0);%{'energ','entro','dissi','contr','corrm', 'homom',
'autoc'})

        autocorrelation = stats_dtcwt_glcm.autoc;
        contrast = stats_dtcwt_glcm.contr;
        correlation = stats_dtcwt_glcm.corrm;
        clusterprominence = stats_dtcwt_glcm.cprom;
        clustershade = stats_dtcwt_glcm.cshad;

        dissimilarity = stats_dtcwt_glcm.dissi;
        energy = stats_dtcwt_glcm.energ;
        entropy = stats_dtcwt_glcm.entro;
        homogeneity = stats_dtcwt_glcm.homop;
        maximumprobability = stats_dtcwt_glcm.maxpr;

        sumofsquares = stats_dtcwt_glcm.sosvh;
        sumaverage = stats_dtcwt_glcm.savgh;
        sumvariance = stats_dtcwt_glcm.svarh;
        sumentropy =  stats_dtcwt_glcm.senth;
        differencevariance = stats_dtcwt_glcm.dvarh;

        differenceentropy = stats_dtcwt_glcm.denth;
        informationmeasureofcorrelation1 = stats_dtcwt_glcm.inf1h;
        informationmeasureofcorrelation2 = stats_dtcwt_glcm.inf2h;
        inversedifference = stats_dtcwt_glcm.homom;
        inversedifferencenormalized = stats_dtcwt_glcm.indnc;

        inversedifferencemomentnormalized = stats_dtcwt_glcm.idmnc;

        % Pembentukan data latih
        data{k,1} = mean(autocorrelation);
        data{k,2} = mean(contrast);
        data{k,3} = mean(correlation);
        data{k,4} = mean(clusterprominence);
        data{k,5} = mean(clustershade);
        data{k,6} = mean(dissimilarity);
        data{k,7} = mean(energy);
        data{k,8} = mean(entropy);
        data{k,9} = mean(homogeneity );
        data{k,10} = mean(maximumprobability);
```

```
        data{k,11} = mean(sumofsquares);
        data{k,12} = mean(sumaverage);
        data{k,13} = mean(sumvariance);
        data{k,14} = mean(sumentropy);
        data{k,15} = mean(differencevariance);
        data{k,16} = mean(differenceentropy);
        data{k,17} = mean(informationmeasureofcorrelation1);
        data{k,18} = mean(informationmeasureofcorrelation2);
        data{k,19} = mean(inversedifference);
        data{k,20} = mean(inversedifferencenormalized);
        data{k,21} = mean(inversedifferencemomentnormalized);
        %folder_xx= strcat(new_folder,'\original\',file(k).name);
        %imwrite(Img,folder_xx);
    end
elseif val7
    set(handles.checkbox7,'enable','on');
    for k = 1:jumlah
        full= fullfile(new_folder, file(k).name);
        Img = imread(full);
        [glrlm,si] = grayrlmatrix(Img,'NumLevels',5,'G',[]);
        stats_glrlm = grayrlprops(glrlm);
        sre = mean(stats_glrlm(:,1));
        lre = mean(stats_glrlm(:,2));
        gln = mean(stats_glrlm(:,3));
        rln = mean(stats_glrlm(:,4));
        rp = mean(stats_glrlm(:,5));
        lgre = mean(stats_glrlm(:,6));
        hgre = mean(stats_glrlm(:,7));
        sglge = mean(stats_glrlm(:,8));
        srhge = mean(stats_glrlm(:,9));
        lrlge = mean(stats_glrlm(:,10));
        lrhge = mean(stats_glrlm(:,11));

        data{k,1} = sre;
        data{k,2} = lre;
        data{k,3} = gln;
        data{k,4} = rln;
        data{k,5} = rp;
        data{k,6} = lgre;
        data{k,7} = hgre;
        data{k,8} = sglge;
        data{k,9} = srhge;
        data{k,10} = lrlge;
        data{k,11} = lrhge;
        %folder_xx= strcat(new_folder,'\original\',file(k).name);
        %imwrite(Img,folder_xx);
    end
elseif val8
    set(handles.checkbox8,'enable','on');
    for k = 1:jumlah
        full= fullfile(new_folder, file(k).name);
        Img = imread(full);
        %Img =
imread('F:\alma_penelitian_teh\userinterface\citra_jpg_100dpi\hapus_background\1_1.jp
g');
        Img_hsv = rgb2hsv(Img);
        H = Img_hsv(:,:,1);
        S = Img_hsv(:,:,2);
        V = Img_hsv(:,:,3);
        bw = im2bw(S,.25);
        bw = bwareaopen(bw,50);
        R = Img(:,:,1);
        G = Img(:,:,2);
        B = Img(:,:,3);
```

```
        R(~bw)=0;
        G(~bw)=0;
        B(~bw)=0;
        RGB = cat(3,R,G,B);
        [a,b]=find(bw==1);
        Red = 0;
        Green = 0;
        Blue = 0;
        for m = 1:numel(a);
            Red = Red + double(R(a(m),b(m)));
            Green = Green + double(G(a(m),b(m)));
            Blue = Blue + double(B(a(m),b(m)));
        end
        Red = Red/numel(a);
        Green = Green/numel(a);
        Blue = Blue/numel(a);
        %folder_xx= strcat(new_folder,'\original\',file(k).name);
        %imwrite(Img,folder_xx);
        data{k,1} = (Red);
        data{k,2} = (Green);
        data{k,3} = (Blue);
    end
end
handles.data = data;
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in checkbox1.
function checkbox1_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox1
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox1,'enable','on');
set(handles.checkbox4,'enable','off');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in checkbox2.
function checkbox2_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox2,'enable','on');
set(handles.checkbox4,'enable','off');
set(handles.checkbox8,'enable','off');
waitbar(1,waktu,'Finishing');
```

```
pause(1)
close(waktu);
guidata(hObject,handles);
% Hint: get(hObject,'Value') returns toggle state of checkbox2


% --- Executes on button press in checkbox4.
function checkbox4_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox4
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox1,'enable','off');
set(handles.checkbox2,'enable','off');
set(handles.checkbox3,'enable','off');
set(handles.checkbox4,'enable','on');
set(handles.checkbox6,'enable','off');
set(handles.checkbox7,'enable','off');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in checkbox3.
function checkbox3_Callback(hObject, eventdata, handles)
% hObject    handle to checkbox3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hint: get(hObject,'Value') returns toggle state of checkbox3
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.checkbox3,'enable','on');
set(handles.checkbox4,'enable','off');
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject,handles);

% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu ,'Loading Data...');
pause(1)
waitbar(.67,waktu ,'Processing Data...');
pause(1)

folder_data = handles.folder_data;
file_data = dir(fullfile(folder_data, '*.jpg'));
```

```
jumlah_data = numel(file_data);

val1 = get(handles.checkbox1,'Value');
val2 = get(handles.checkbox2,'Value');
val3 = get(handles.checkbox3,'Value');
val4 = get(handles.checkbox4,'Value');

if val1 && val2 && val3 % Hapus Background, grayscale
    set(handles.checkbox1,'enable','on');
    set(handles.checkbox2,'enable','on');
    set(handles.checkbox3,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        HSV = rgb2hsv(Img);
        H = HSV(:,:,1);
        S = HSV(:,:,2);
        V = HSV(:,:,3);
        bw = im2bw(S, .4);
        bw = imfill(bw, 'holes');
        bw = bwareaopen(bw,1000);
        str = strel('disk',12);
        bw = imopen(bw,str);
        R = Img(:,:,1);
        G = Img(:,:,2);
        B = Img(:,:,3);
        R(~bw) = 0;
        G(~bw) = 0;
        B(~bw) = 0;
        Img = cat(3,R,G,B);
        Img = rgb2gray(Img);
        Img = wiener2(Img, [5 5]);
        folder=
strcat(folder_data,'\hapus_background_grayscale_filter\',file_data(k).name);
        new_folder= strcat(folder_data,'\hapus_background_grayscale_filter\');
        imwrite(Img,folder);
    end
elseif val1 && val2 % Hapus Background, grayscale
    set(handles.checkbox1,'enable','on');
    set(handles.checkbox2,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        HSV = rgb2hsv(Img);
        H = HSV(:,:,1);
        S = HSV(:,:,2);
        V = HSV(:,:,3);
        bw = im2bw(S, .4);
        bw = imfill(bw, 'holes');
        bw = bwareaopen(bw,1000);
        str = strel('disk',12);
        bw = imopen(bw,str);
        R = Img(:,:,1);
        G = Img(:,:,2);
        B = Img(:,:,3);
        R(~bw) = 0;
        G(~bw) = 0;
        B(~bw) = 0;
        Img = cat(3,R,G,B);
        Img = rgb2gray(Img);
        folder= strcat(folder_data,'\hapus_background_grayscale\',file_data(k).name);
        new_folder= strcat(folder_data,'\hapus_background_grayscale\');
        imwrite(Img,folder);
    end
```

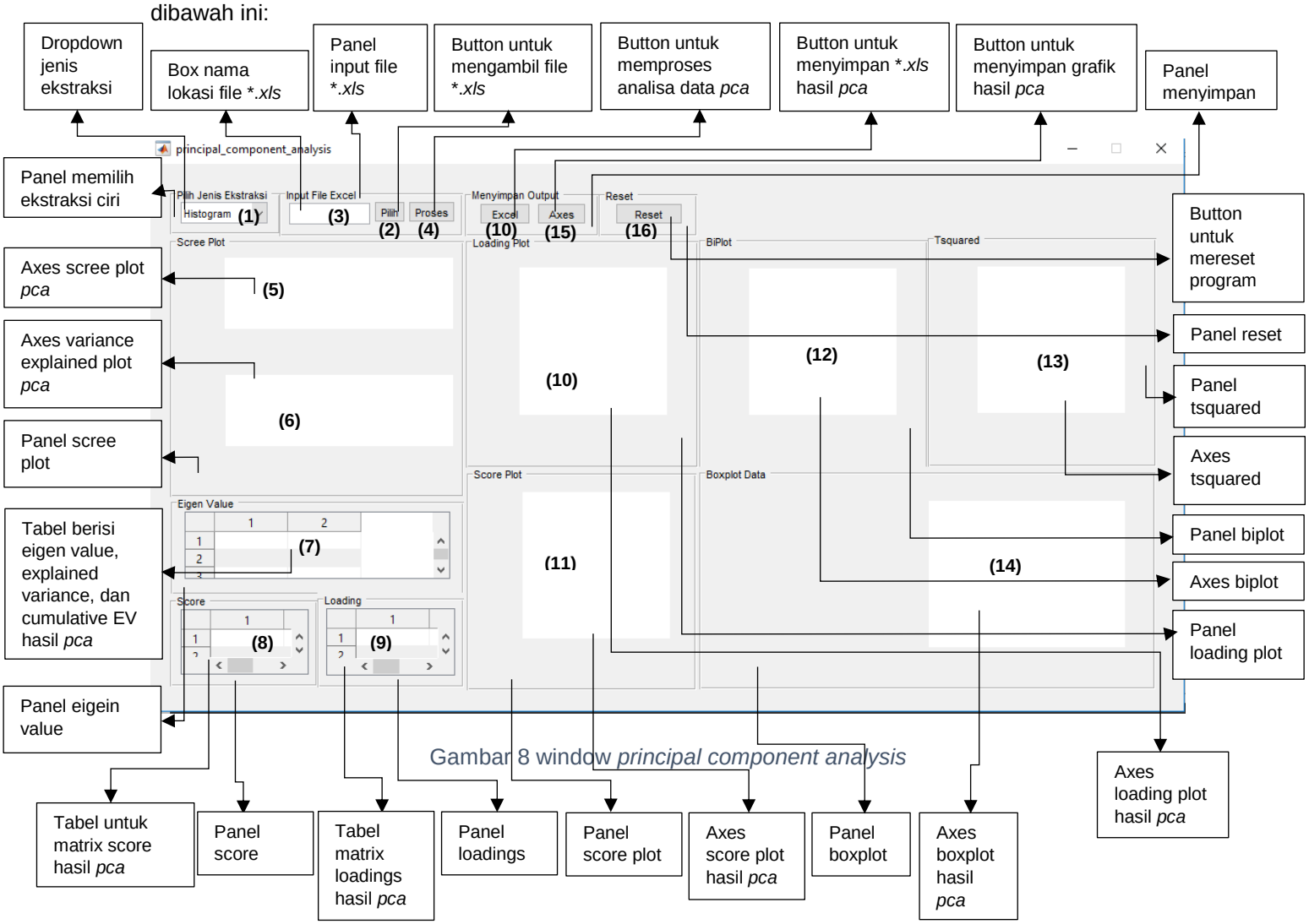
```
elseif val1 && val3 % Hapus background, filter
    set(handles.checkbox1,'enable','on');
    set(handles.checkbox3,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        folder= strcat(folder_data,'\hapus_background_filter\',file_data(k).name);
        new_folder= strcat(folder_data,'\hapus_background_filter\');
        imwrite(Img,folder);
    end
    waitbar(.7,waktu,'IMAGE MUST BE CONVERTED, RESET PROGRAM');
    pause(1)
elseif val1 % Hapus_background
    set(handles.checkbox1,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        HSV = rgb2hsv(Img);
        H = HSV(:,:,1);
        S = HSV(:,:,2);
        V = HSV(:,:,3);
        bw = im2bw(S, .4);
        bw = imfill(bw, 'holes');
        bw = bwareaopen(bw,1000);
        str = strel('disk',12);
        bw = imopen(bw,str);
        R = Img(:,:,1);
        G = Img(:,:,2);
        B = Img(:,:,3);
        R(~bw) = 0;
        G(~bw) = 0;
        B(~bw) = 0;
        Img = cat(3,R,G,B);
        folder= strcat(folder_data,'\hapus_background\',file_data(k).name);
        new_folder= strcat(folder_data,'\hapus_background\');
        imwrite(Img,folder);
    end
elseif val2 && val3 % Grayscale, filter
    set(handles.checkbox2,'enable','on');
    set(handles.checkbox3,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        Img = rgb2gray(Img);
        Img = wiener2(Img, [5 5]);
        folder= strcat(folder_data,'\grayscale_filter\',file_data(k).name);
        new_folder = strcat(folder_data,'\grayscale_filter\');
        imwrite(Img,folder);
    end
elseif val2 % grayscale
    set(handles.checkbox2,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        Img = rgb2gray(Img);
        folder= strcat(folder_data,'\grayscale\',file_data(k).name);
        new_folder= strcat(folder_data,'\grayscale\');
        imwrite(Img,folder);
    end
elseif val3 % Filter
    set(handles.checkbox3,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
```

```
        folder= strcat(folder_data,'\filter\',file_data(k).name);
        new_folder= strcat(folder_data,'\filter\');
    end
    %msgbox({'Image Must Be Converted'; 'Reset Program'},'error','error')
    waitbar(.7,waktu,'IMAGE MUST BE CONVERTED, RESET PROGRAM');
    pause(1)
elseif val4 % Original
    set(handles.checkbox4,'enable','on');
    for k = 1:jumlah_data
        full_data= fullfile(folder_data, file_data(k).name);
        Img = imread(full_data);
        folder= strcat(folder_data,'\original\',file_data(k).name);
        new_folder = strcat(folder_data,'\original\');
        imwrite(Img,folder);
    end
end
new_folder
handles.new_folder = new_folder;
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
%handles.jumlah_data = jumlah_data;
guidata(hObject,handles);


function edit1_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
%        str2double(get(hObject,'String')) returns contents of edit1 as a double


% --- Executes during object creation, after setting all properties.
function edit1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

II. GRAPHIC USER INTERFACE (TAB II/principal_component_analysis)

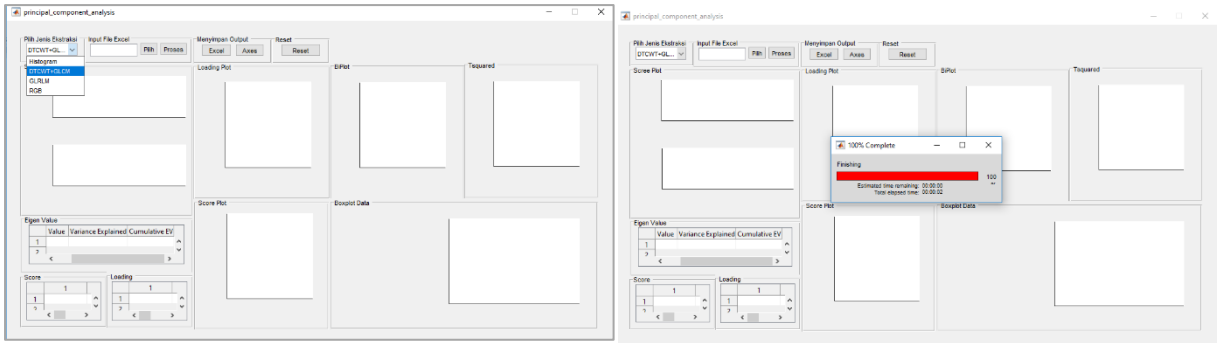
A. Deskripsi Program

Program menampilkan graphical user interface (GUI) untuk melakukan analisa data hasil ekstraksi ciri citra daun teh dengan metode principal component analysis sebagaimana ditampilkan pada gambar dibawah ini:



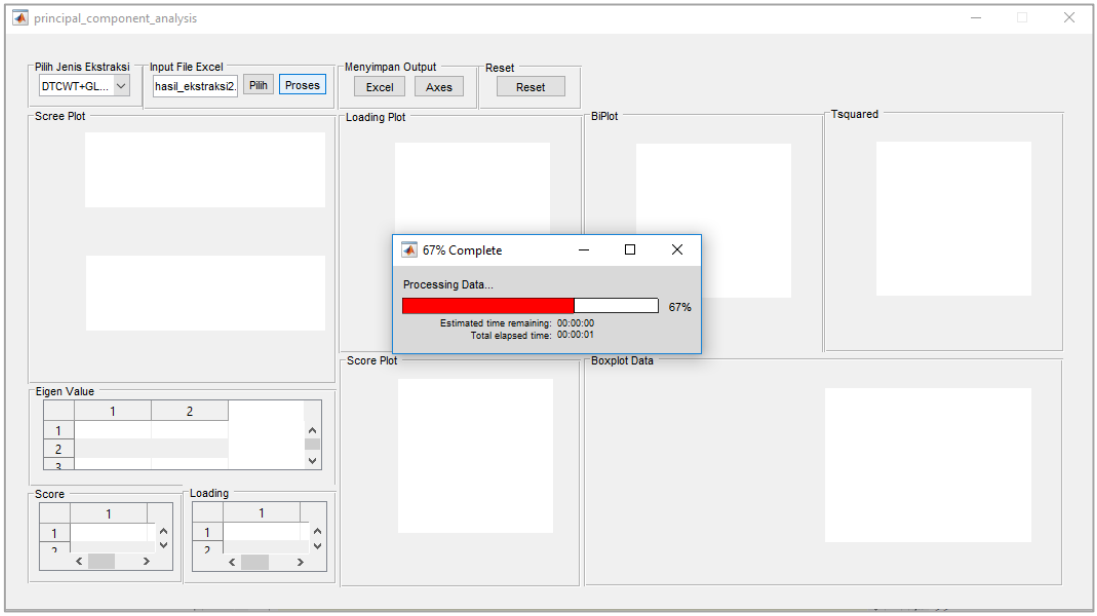
Gambar 8 window *principal component analysis*

Untuk melakukan analisa data hasil ekstraksi ciri dengan program *principal component analysis* pertama dengan memilih jenis ekstraksi ciri (berlabel (1)), hingga tampil popup bar menunggu hingga selesai sebagaimana ditampilkan pada gambar dibawah ini:



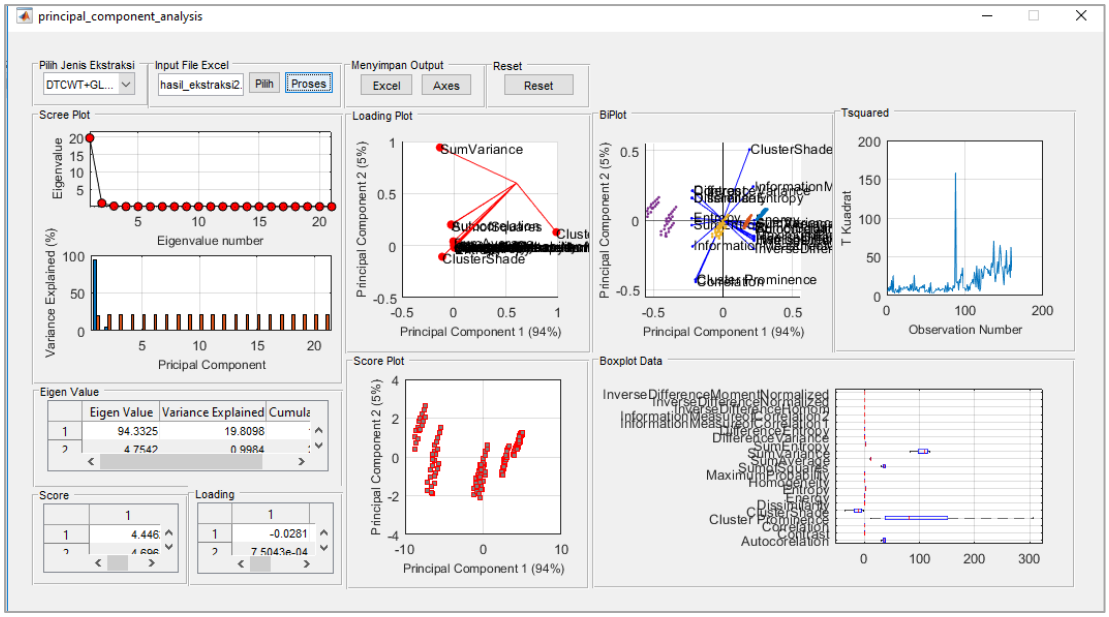
Gambar 9 window saat memilih jenis ekstraksi ciri

Kemudian memilih file berformat *.*xls* hasil ekstraksi ciri sesuai dengan jenis ekstraksi yang telah dipilih dengan menekan button '*pilih*' (berlabel (2)) dan lokasi nama file akan tampil pada box name (berlabel (3)) sebagaimana ditampilkan pada gambar dibawah ini, namun jika tidak sesuai proses analisa data dengan program ini tidak akan berjalan.



Gambar 10 window *principal component analysis*

Kemudian menekan button untuk memulai analisa deta dengan metode *principal component analysis* sebagaimana ditampilkan pada gambar diatas kemudian hasil analisa data tampil secara bersamaan seperti gambar dibawah ini:



Gambar 11 window hasil analisa data dengan metode *principal component analysis*

B. Code Program

Code program dibuat dengan bahasa script Matlab yang terdiri dari beberapa file program sebagai berikut.

`Principal_component_analysis.m`

```
Nama File          :  Principal_component_analysis.m
                      Menciptakan GUI untuk halaman principal_component_analysis
                      pada Matlab yang terdiri dari lima button untuk mengamfil
                      file hasil ekstraksi ciri berformat .*xls,button untuk
                      memproses analisa data, button simpan excel hasil analisa
Deskripsi          :  data, button untuk menyimpan axes, button untuk mereset
                      program, kemudian program ini juga memiliki tujuh axes
                      yaitu axes untuk scree plot, explained variance, axes
                      biplot, axes loading plot, axes tsquared, axes boxplot,
                      axes score plot, kemudian memiliki tiga tabel yaitu tabel
                      eigen value, tabel matrix loadings, serta matrix score.

Platform           :  Matlab

Copyright          :  © 2020 Alma, Dr. Bambang Heru Iswanto
```

```
function varargout = principal_component_analysis(varargin)
% PRINCIPAL_COMPONENT_ANALYSIS MATLAB code for principal_component_analysis.fig
%      PRINCIPAL_COMPONENT_ANALYSIS, by itself, creates a new
PRINCIPAL_COMPONENT_ANALYSIS or raises the existing
%      singleton*.
%
%      H = PRINCIPAL_COMPONENT_ANALYSIS returns the handle to a new
PRINCIPAL_COMPONENT_ANALYSIS or the handle to
%      the existing singleton*.
%
%      PRINCIPAL_COMPONENT_ANALYSIS('CALLBACK',hObject,eventData,handles,...) calls
the local
%      function named CALLBACK in PRINCIPAL_COMPONENT_ANALYSIS.M with the given input
arguments.
```

```
%
%      PRINCIPAL_COMPONENT_ANALYSIS('Property','Value',...) creates a new
PRINCIPAL_COMPONENT_ANALYSIS or raises the
%      existing singleton*.  Starting from the left, property value pairs are
%      applied to the GUI before principal_component_analysis_OpeningFcn gets called.
An
%      unrecognized property name or invalid value makes property application
%      stop.  All inputs are passed to principal_component_analysis_OpeningFcn via
varargin.
%
%      *See GUI Options on GUIDE's Tools menu.  Choose "GUI allows only one
%      instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help principal_component_analysis

% Last Modified by GUIDE v2.5 11-Aug-2020 14:12:47

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @principal_component_analysis_OpeningFcn, ...
                   'gui_OutputFcn',  @principal_component_analysis_OutputFcn, ...
                   'gui_LayoutFcn',  [] , ...
                   'gui_Callback',   []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT


% --- Executes just before principal_component_analysis is made visible.
function principal_component_analysis_OpeningFcn(hObject, eventdata, handles,
varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to principal_component_analysis (see VARARGIN)

% Choose default command line output for principal_component_analysis
handles.output = hObject;
movegui('center');
% Update handles structure
guidata(hObject, handles);

% UIWAIT makes principal_component_analysis wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = principal_component_analysis_OutputFcn(hObject, eventdata,
handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
```

```
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;


% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
folder_excel= uigetfile('*.xls');
file = xlsread(folder_excel);
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.edit1,'String',folder_excel);
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
%% Import to handles
handles.folder_excel = folder_excel;
handles.file = file;
guidata(hObject, handles);


function edit1_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
%        str2double(get(hObject,'String')) returns contents of edit1 as a double


% --- Executes during object creation, after setting all properties.
function edit1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end


% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
file = handles.file;
```

```
folder_excel = handles.folder_excel;
file_excel = dir(fullfile(folder_excel, '*.xls'));
jumlah_file = numel(file_excel);

%% PCA
metode = get(handles.popupmenu1,'Value')
switch metode
    case 1
        fitur = {'Mean','Entropy','Variansi','Skewness','Kurtosis','Energy'};
    case 2
        fitur = {'Autocorelation','Contrast','Correlation','Cluster Prominence',...
            'ClusterShade','Dissimilarity','Energy','Entropy','Homogeneity',...

'MaximumProbability','SumofSquares','SumAverage','SumVariance','SumEntropy',...

'DifferenceVariance','DifferenceEntropy','InformationMeasureofCorrelation1',...
            'InformationMeasureofCorrelation2','InverseDifferenceHomom',...
            'InverseDifferenceNormalized','InverseDifferenceMomentNormalized'};
    case 3
        fitur = {'ShortRunEmphasis','LongRunEmphasis','GrayLevelNonuniformity',...
            'RunLengthNonuniformity', 'RunPercentage','LowGrayLevelRunEmphasis',...

'HighGrayLevelRunEmphasis','ShortRunLowGrayLevelEmphasis','ShortRunHighGrayLevelEmpha
sis',...
            'LongRunLowGrayLevelEmphasis','LongRunHighGrayLevelEmphasis'};
    case 4
        fitur = {'Red','Green','Blue'};
end

[data_normalZ,muZ,sigmaZ] = zscore(file);
[coeff,score,latent,tsquared,explained] = pca(data_normalZ);
[loadings, scores, ~, tscores]=princomp(file)
jenis_daun = zeros(jumlah_file,1);
jenis_daun(1:40,:) = 1;
jenis_daun(41:80,:) = 2;
jenis_daun(81:120,:) = 3;
jenis_daun(121:160,:) = 4;

%% Informasi EigenValue
eigentabel = [explained, latent, cumsum(latent)];
set(handles.uitable1,'Data',eigentabel,'ForegroundColor',[0 0 0],'ColumnName',{'Eigen
Value','Variance Explained','Cumulative EV'})

%% Information Loadings
set(handles.uitable2,'Data',loadings,'ForegroundColor',[0 0 0])

%% Information Score
set(handles.uitable3,'Data',score,'ForegroundColor',[0 0 0])

%% Plotting Eigenvalue
axes(handles.axes1);
plot(1:length(latent),latent,'ko-','MarkerFaceColor','r');
line([1,length(latent)],[0 0],'LineStyle',':','XLimInclude','off',...
     'Color',[.0 .0 .0])
axis([1,length(latent),min(latent),max(latent)*1.1]);
xlabel('Eigenvalue number','FontSize',9);
ylabel('Eigenvalue','FontSize',9);
grid on

%% Plotting Variance Explained
axes(handles.axes2);
explain = [explained cumsum(latent)]
bar(explain);
xlabel('Pricipal Component','FontSize',9);
```

```
ylabel('Variance Explained (%)','FontSize',9);
grid on

%% Ploting Loading
axes(handles.axes3);
scatter(loadings(:,1), loadings(:,2),'ro','filled')
for y = 1:length(fitur)
    line([0.6,loadings(y,1)],[0.6,loadings(y,2)],'Color','r')
    text(loadings(y,1), loadings(y,2),fitur{y})
end
xlabel('Principal Component 1 ('+string(round(explained(1)))+'%)','FontSize',9)
ylabel('Principal Component 2 ('+string(round(explained(2)))+'%)','FontSize',9)
grid on

%% Plotting Score
axes(handles.axes4);
plot(score(:,1), score(:,2),
's','LineWidth',1,'MarkerSize',5,'MarkerEdgeColor','r','MarkerFaceColor',[0.5,0.5,0.5
])
xlabel('Principal Component 1 ('+string(round(explained(1)))+'%)','FontSize',9)
ylabel('Principal Component 2 ('+string(round(explained(2)))+'%)', 'FontSize',9)
grid on

%% Plotting Biplot
axes(handles.axes5);
h = biplot(coeff(:,1:2),'Scores',score(:,1:2),'varlabels',fitur);
hID = get(h, 'tag');
hPt = h(strcmp(hID,'obsmarker'));
grp = findgroups(jenis_daun);
grp(isnan(grp)) = max(grp(~isnan(grp)));
grpID = 1:max(grp);
clrMap = lines(length(unique(grp)));
for i = 1:max(grp)
    set(hPt(grp==i),'Color',clrMap(i,:),'DisplayName',sprintf('Cluster
%d',grpID(i)));
end
xlabel('Principal Component 1 ('+string(round(explained(1)))+'%)','FontSize',9)
ylabel('Principal Component 2 ('+string(round(explained(2)))+'%)','FontSize',9)
[~, unqIdx] = unique(grp)
%legend(hPt(unqIdx),'Location', 'SE', )
grid on

axes(handles.axes6)
boxplot(file,'Orientation','horizontal','Labels',fitur);
grid on

axes(handles.axes7)
plot(tsquared);
xlabel('Observation Number','FontSize',9)
ylabel('T Kuadrat','FontSize',9)
grid on

handles.eigentabel = eigentabel;
handles.loadings = loadings;
handles.score = score;

waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes on button press in pushbutton5.
function pushbutton5_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5 (see GCBO)
```

```
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes1)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes2)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes3)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes4)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes5)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes6)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes7)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

set(handles.uitable1,'Data',cell(size(get(handles.uitable1,'Data'))));
set(handles.uitable2,'Data',cell(size(get(handles.uitable2,'Data'))));
set(handles.uitable3,'Data',cell(size(get(handles.uitable2,'Data'))))

set(handles.edit1,'String', '');

waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
eigentabel = handles.eigentabel;
loadings = handles.loadings;
score = handles.score;
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
```

```
pause(1)
%% Menginisiasi Save as
[filenames, pathname] = uiputfile('*.xls','save as');
%% Data Ke .xls
xlswrite(filenames, eigentabel, 1);
xlswrite(filenames, loadings, 2);
xlswrite(filenames, score, 3);
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles)

% --- Executes on button press in pushbutton4.
function pushbutton4_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)

xlabel(handles.axes1,'Eigenvalue number','FontSize',9);
ylabel(handles.axes1,'Eigenvalue','FontSize',9);
frame_data_1=getframe(handles.axes1);

frame_data_2=getframe(handles.axes2);
frame_data_3=getframe(handles.axes3);
frame_data_4=getframe(handles.axes4);
frame_data_5=getframe(handles.axes5);
frame_data_6=getframe(handles.axes6);
frame_data_7=getframe(handles.axes7);

image_frame_1=frame2im(frame_data_1);
image_frame_2=frame2im(frame_data_2);
image_frame_3=frame2im(frame_data_3);
image_frame_4=frame2im(frame_data_4);
image_frame_5=frame2im(frame_data_5);
image_frame_6=frame2im(frame_data_6);
image_frame_7=frame2im(frame_data_7);

metode = get(handles.popupmenu1,'Value')
switch metode
    case 1
        fitur = {'Mean','Entropy','Variansi','Skewness','Kurtosis','Energy'};
    case 2
        fitur = {'Autocorelation','Contrast','Correlation','Cluster Prominence',...
            'ClusterShade','Dissimilarity','Energy','Entropy','Homogeneity',...

'MaximumProbability','SumofSquares','SumAverage','SumVariance','SumEntropy',...

'DifferenceVariance','DifferenceEntropy','InformationMeasureofCorrelation1',...
            'InformationMeasureofCorrelation2','InverseDifferenceHomom',...
            'InverseDifferenceNormalized','InverseDifferenceMomentNormalized'};
end

%[nama_file, nama_path] = uiputfile('*.png');
%imwrite([image_frame_1,image_frame_2,image_frame_3,image_frame_4,image_frame_5,image
_frame_6,image_frame_7],fullfile(nama_path,nama_file));

imwrite([image_frame_1],['axes1_',num2str(metode),'.jpg'])%'axes1','jpg');
imwrite([image_frame_2],['axes2_',num2str(metode),'.jpg']);
```

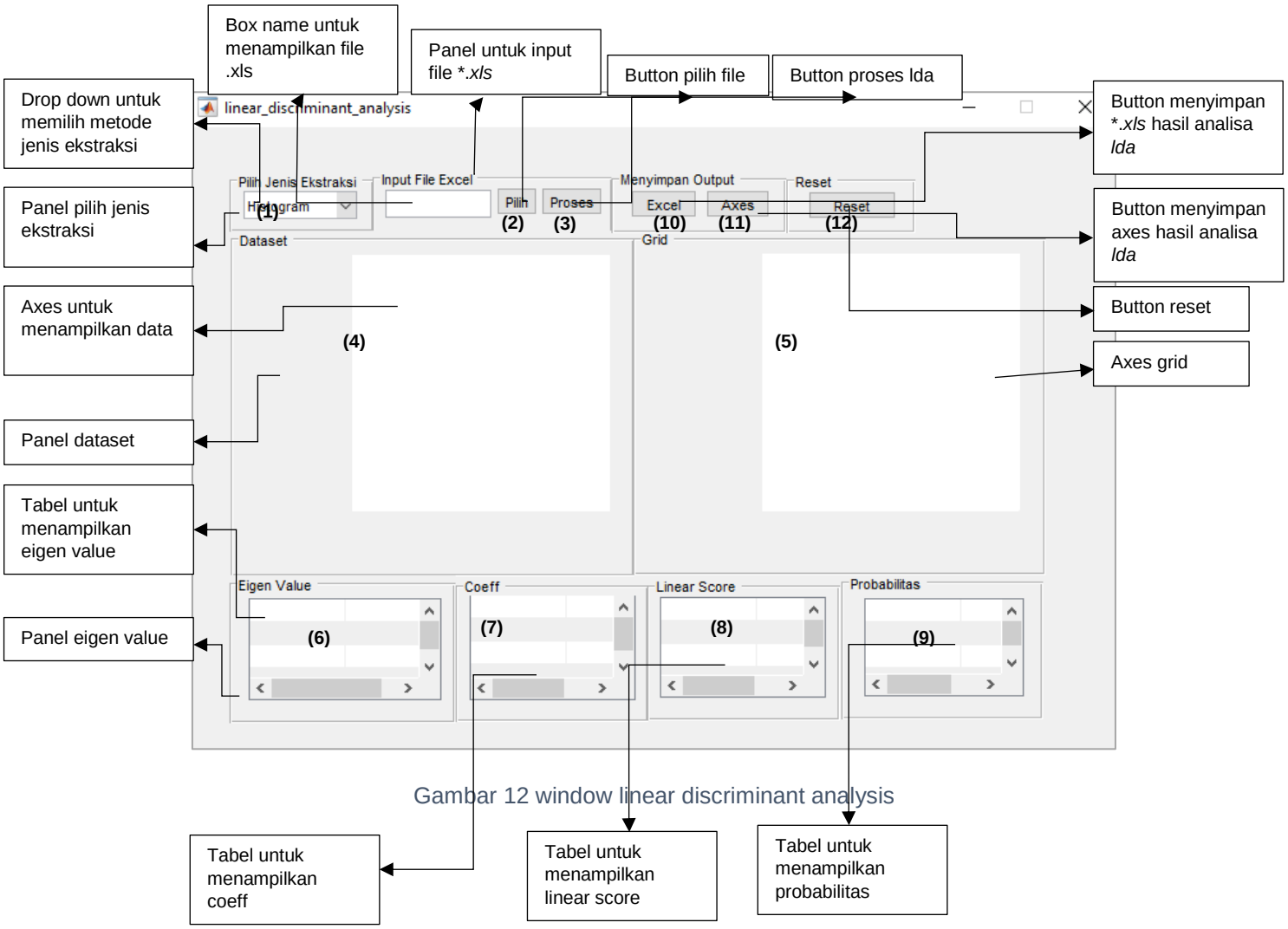
```
imwrite([image_frame_3],['axes3_',num2str(metode),'.jpg']);
imwrite([image_frame_4],['axes4_',num2str(metode),'.jpg']);
imwrite([image_frame_5],['axes5_',num2str(metode),'.jpg']);
imwrite([image_frame_6],['axes6_',num2str(metode),'.jpg']);
imwrite([image_frame_7],['axes7_',num2str(metode),'.jpg']);

%saveas(frame_data_1,'axes1.jpg')
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes on selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns popupmenu1 contents as
cell array
%        contents{get(hObject,'Value')} returns selected item from popupmenu1
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
metode = get(handles.popupmenu1,'Value')
switch metode
    case 1
        fitur = {'Mean','Entropy','Variansi','Skewness','Kurtosis','Energy'};
    case 2
        fitur = {'Autocorelation','Contrast','Correlation','Cluster Prominence',...
            'ClusterShade','Dissimilarity','Energy','Entropy','Homogeneity',...

'MaximumProbability','SumofSquares','SumAverage','SumVariance','SumEntropy',...

'DifferenceVariance','DifferenceEntropy','InformationMeasureofCorrelation1',...
            'InformationMeasureofCorrelation2','InverseDifferenceHomom',...
            'InverseDifferenceNormalized','InverseDifferenceMomentNormalized'};
    case 3
        fitur = {'ShortRunEmphasis','LongRunEmphasis','GrayLevelNonuniformity',...
            'RunLengthNonuniformity', 'RunPercentage','LowGrayLevelRunEmphasis',...

'HighGrayLevelRunEmphasis','ShortRunLowGrayLevelEmphasis','ShortRunHighGrayLevelEmpha
sis',...
            'LongRunLowGrayLevelEmphasis','LongRunHighGrayLevelEmphasis'};
    case 4
        fitur = {'Red','Green','Blue'};
end
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes during object creation, after setting all properties.
function popupmenu1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: popupmenu controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
```

```
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

III. GRAPHIC USER INTERFACE (TAB III/ linear_discriminant_analysis)

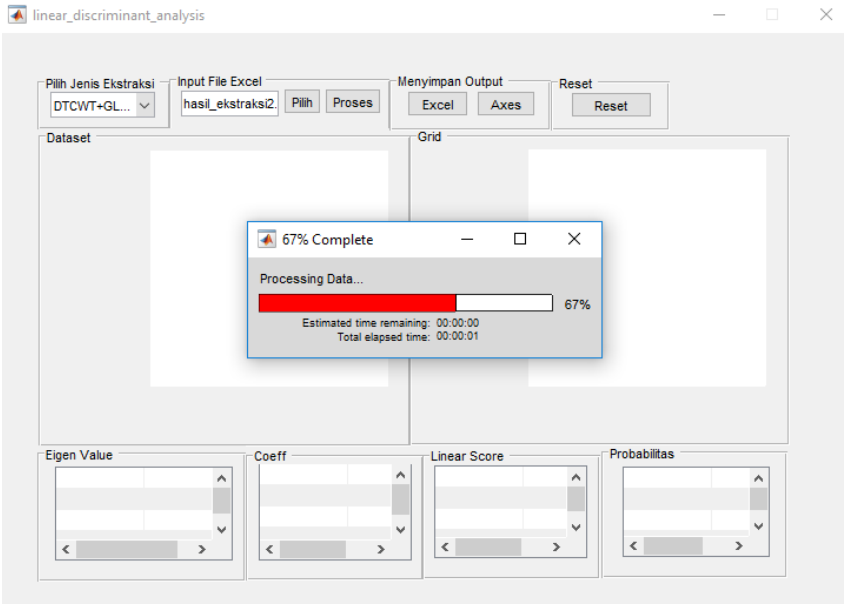
A. Deskripsi Program

Program menampilkan graphical user interface (GUI) untuk melakukan analisa data hasil ekstraksi ciri citra daun teh dengan metode linear disciminant analysis sebagai mana ditampilkan pada gambar dibawah ini:



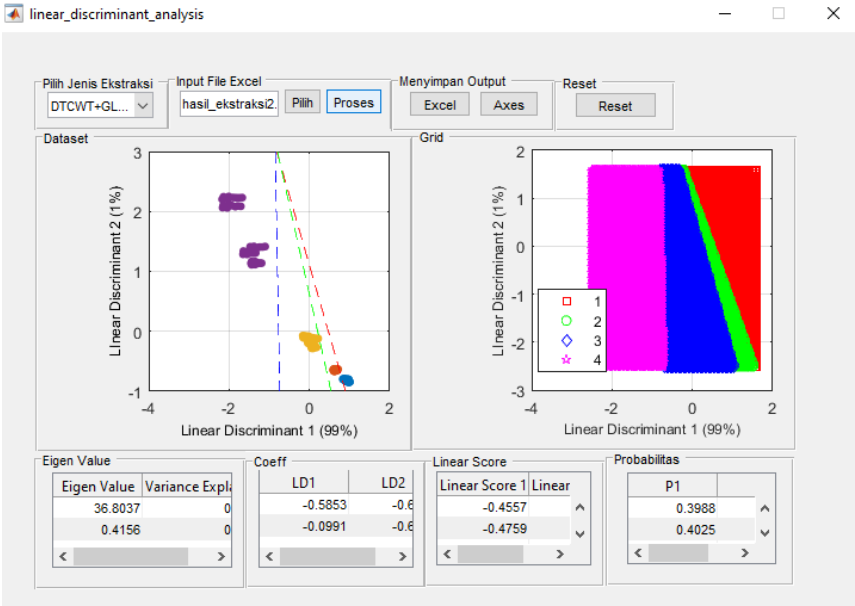
Gambar 12 window linear discriminant analysis

Untuk menganalisa data dengan metode *linear discriminant analysis* pada program ini hal pertama yang dilakukan yaitu memilih jenis ekstraksi untuk mengetahui jumlah fitur yang akan dipakai kemudian mengambil file **.xls* dengan menekan button pilih kemudian menunggu proses selesai sampai popup bar selesai seperti yang ditampilkan pada gambar dibawah ini



Gambar 13 window *linear discriminant analysis* saat mengambil file *.*xls*

Kemudian menekan button '*proses*' untuk memproses analisa data dengan metode *linear discriminant analysis* hingga popup menunggu selesai sebagaimana ditampilkan pada gambar dibawah ini, hasil analisa data akan ditampilkan pada axes, serta tabel hasil analisis data dengan metode *linear discriminant analysis.*



Gambar 14 window hasil analisa data *linear discriminant analysis*

Kemudian apabila pengguna ingin menyimpan file hasil analisa data dengan menggunakan metode *linear discriminant analysis* pengguna dapat menekan button '*excel*' untuk menyimpan file *.*xls* dan button '*axes*' untuk menyimpan axes hasil analisa tersebut.Kemudian apabila ingin mereset program dapat menekan button '*reset*'.

B. Code Program

Code program dibuat dengan bahasa script Matlab yang terdiri dari file program sebagai berikut.

linear_discriminant_analysis.m

```
Nama File           :  inear_discriminant_analysis.m

                       Menciptakan GUI untuk menganalisa data hasil ekstraksi ciri
                       citra dengan metode linear discriminant analysis yang
                       terdiri dari lima button yaitu, button untuk memilih file
                       *.xls, button untuk memproses analisa data, button untuk
Deskripsi           :  menyimpan file *.xls hasil analisa data, button untuk
                       menyimpan axes, button reset, kemudian terdapat dua axes
                       yaitu axes untuk menampilkan batas data, dan axes untuk
                       menampilkan wilayah kelompok daun, serta terdapat empat
                       tabel yaitu tabel untuk menampilkan eigen value, tabel
                       score, tabel coeff, serta tabel probabilita

Platform            :  Matlab

Copyright           :  © 2020 Alma, Dr. Bambang Heru Iswanto
```

```
function varargout = linear_discriminant_analysis(varargin)
% LINEAR_DISCRIMINANT_ANALYSIS MATLAB code for linear_discriminant_analysis.fig
%      LINEAR_DISCRIMINANT_ANALYSIS, by itself, creates a new
LINEAR_DISCRIMINANT_ANALYSIS or raises the existing
%      singleton*.
%
%      H = LINEAR_DISCRIMINANT_ANALYSIS returns the handle to a new
LINEAR_DISCRIMINANT_ANALYSIS or the handle to
%      the existing singleton*.
%
%      LINEAR_DISCRIMINANT_ANALYSIS('CALLBACK',hObject,eventData,handles,...) calls
the local
%      function named CALLBACK in LINEAR_DISCRIMINANT_ANALYSIS.M with the given input
arguments.
%
%      LINEAR_DISCRIMINANT_ANALYSIS('Property','Value',...) creates a new
LINEAR_DISCRIMINANT_ANALYSIS or raises the
%      existing singleton*.  Starting from the left, property value pairs are
%      applied to the GUI before linear_discriminant_analysis_OpeningFcn gets called.
An
%      unrecognized property name or invalid value makes property application
%      stop.  All inputs are passed to linear_discriminant_analysis_OpeningFcn via
varargin.
%
%      *See GUI Options on GUIDE's Tools menu.  Choose "GUI allows only one
%      instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help linear_discriminant_analysis

% Last Modified by GUIDE v2.5 14-Aug-2020 14:40:40

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @linear_discriminant_analysis_OpeningFcn, ...
                   'gui_OutputFcn',  @linear_discriminant_analysis_OutputFcn, ...
                   'gui_LayoutFcn',  [] , ...
```

```
                    'gui_Callback',   []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT


% --- Executes just before linear_discriminant_analysis is made visible.
function linear_discriminant_analysis_OpeningFcn(hObject, eventdata, handles,
varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to linear_discriminant_analysis (see VARARGIN)

% Choose default command line output for linear_discriminant_analysis
handles.output = hObject;
movegui('center');
% Update handles structure
guidata(hObject, handles);

% UIWAIT makes linear_discriminant_analysis wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = linear_discriminant_analysis_OutputFcn(hObject, eventdata,
handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;



function edit1_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
%        str2double(get(hObject,'String')) returns contents of edit1 as a double


% --- Executes during object creation, after setting all properties.
function edit1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
```

```
    set(hObject,'BackgroundColor','white');
end


% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
folder_excel= uigetfile('*.xls');
file = xlsread(folder_excel);
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
set(handles.edit1,'String',folder_excel);
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
%% Import to handles
handles.folder_excel = folder_excel;
handles.file = file;
guidata(hObject, handles);

% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
file = handles.file;
folder_excel = handles.folder_excel;
file_excel = dir(fullfile(folder_excel, '*.xls'));
jumlah_file = numel(file_excel);

%% PCA
metode = get(handles.popupmenu1,'Value')
switch metode
    case 1
        fitur = {'Mean','Entropy','Variansi','Skewness','Kurtosis','Energy'};
    case 2
        fitur = {'Autocorelation','Contrast','Correlation','Cluster Prominence',...
            'ClusterShade','Dissimilarity','Energy','Entropy','Homogeneity',...

'MaximumProbability','SumofSquares','SumAverage','SumVariance','SumEntropy',...

'DifferenceVariance','DifferenceEntropy','InformationMeasureofCorrelation1',...
            'InformationMeasureofCorrelation2','InverseDifferenceHomom',...
            'InverseDifferenceNormalized','InverseDifferenceMomentNormalized'};
    case 3
        fitur = {'ShortRunEmphasis','LongRunEmphasis','GrayLevelNonuniformity',...
            'RunLengthNonuniformity', 'RunPercentage','LowGrayLevelRunEmphasis',...

'HighGrayLevelRunEmphasis','ShortRunLowGrayLevelEmphasis','ShortRunHighGrayLevelEmpha
sis',...
            'LongRunLowGrayLevelEmphasis','LongRunHighGrayLevelEmphasis'};
    case 4
```

```
        fitur = {'Red','Green','Blue'};
end

[data_normalZ,muZ,sigmaZ] = zscore(file);
[coeff,score,latent,tsquared,explained] = pca(data_normalZ);
[loadings, scores, variances, tscores]=princomp(file)
%% Target kelas
jenis_daun = zeros(jumlah_file,1);
jenis_daun(1:40,:) = 1;
jenis_daun(41:80,:) = 2;
jenis_daun(81:120,:) = 3;
jenis_daun(121:160,:) = 4;
%% LDA

M = [data_normalZ(:,1),data_normalZ(:,2)];
[S, W, lambda] = LDA([M], jenis_daun)
[X,Y] = meshgrid(linspace(-2.5,1.6),linspace(-2.5,1.6));
X = X(:);Y = Y(:);
Prob = exp(S)./repmat(sum(exp(S),2),[1,2])
[A,err,P,lopgp,coeff] = classify([X Y], M, jenis_daun,'linear');
K = coeff(1,2).const;
L = coeff(1,2).linear;
f = @(Y,Z) K+[Y,Z]*L;
K1 = coeff(2,3).const;
L1 = coeff(2,3).linear;
f1 = @(Y,Z) K1+[Y,Z]*L1
K2 = coeff(3,4).const;
L2 = coeff(3,4).linear;
f2 = @(Y,Z) K2+[Y,Z]*L2;
%% Informasi Eigen value
explainLda = (lambda./sum(lambda));
eigentabel = [lambda, explainLda];
set(handles.uitable1,'Data',eigentabel,'ForegroundColor',[0 0 0],'ColumnName',{'Eigen
Value','Variance Explained'});
%% Informasi W (LD)
set(handles.uitable2,'Data',W,'ForegroundColor',[0 0 0],'ColumnName',{'LD1','LD2'});
%% Informasi Score
set(handles.uitable3,'Data',S,'ForegroundColor',[0 0 0],'ColumnName',{'Linear Score
1','Linear Score 2'});
%% Informasi Probability
set(handles.uitable4,'Data',Prob,'ForegroundColor',[0 0 0],'ColumnName',{'P1','P2'});
color = lines(7)
%% Plotting
axes(handles.axes1);
h1 = gscatter(data_normalZ(:,1),data_normalZ(:,2),jenis_daun,color([1 2 3
4],:),'....',[],'off')
hold on
h2 = fimplicit(f,[-4 2 -1 3],'--r')
h3 = fimplicit(f1,[-4 2 -1 3],'--g')
h4 = fimplicit(f2,[-4 2 -1 3],'--b')
xlabel('Linear Discriminant 1
('+string(round(explainLda(1).*100))+'%)','FontSize',9,'Color','k')
ylabel('LInear Discriminant 2
('+string(round(explainLda(2).*100))+'%)','FontSize',9,'Color','k')
grid on

axes(handles.axes2);
gscatter(X,Y,A,'rgbm','sodp');
xlabel('Linear Discriminant 1 ('+string(round(explainLda(1).*100))+'%)','FontSize',9)
ylabel('LInear Discriminant 2 ('+string(round(explainLda(2).*100))+'%)','FontSize',9)
grid on

waitbar(1,waktu,'Finishing');
pause(1)
```

```
close(waktu);
handles.eigentabel = eigentabel;
handles.W = W;
handles.S = S;
handles.Prob = Prob;
guidata(hObject, handles);

% --- Executes on selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns popupmenu1 contents as
cell array
%        contents{get(hObject,'Value')} returns selected item from popupmenu1
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
metode = get(handles.popupmenu1,'Value')
switch metode
    case 1
        fitur = {'Mean','Entropy','Variansi','Skewness','Kurtosis','Energy'};
    case 2
        fitur = {'Autocorelation','Contrast','Correlation','Cluster Prominence',...
            'ClusterShade','Dissimilarity','Energy','Entropy','Homogeneity',...

'MaximumProbability','SumofSquares','SumAverage','SumVariance','SumEntropy',...

'DifferenceVariance','DifferenceEntropy','InformationMeasureofCorrelation1',...
            'InformationMeasureofCorrelation2','InverseDifferenceHomom',...
            'InverseDifferenceNormalized','InverseDifferenceMomentNormalized'};
    case 3
        fitur = {'ShortRunEmphasis','LongRunEmphasis','GrayLevelNonuniformity',...
            'RunLengthNonuniformity', 'RunPercentage','LowGrayLevelRunEmphasis',...

'HighGrayLevelRunEmphasis','ShortRunLowGrayLevelEmphasis','ShortRunHighGrayLevelEmpha
sis',...
            'LongRunLowGrayLevelEmphasis','LongRunHighGrayLevelEmphasis'};
    case 4
        fitur = {'Red','Green','Blue'};
end
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes during object creation, after setting all properties.
function popupmenu1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: popupmenu controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end
```

```
% --- Executes on button press in pushbutton5.
function pushbutton5_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes1)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])
axes(handles.axes2)

set(handles.uitable1,'Data',cell(size(get(handles.uitable1,'Data'))));
set(handles.uitable2,'Data',cell(size(get(handles.uitable2,'Data'))));
set(handles.uitable3,'Data',cell(size(get(handles.uitable2,'Data'))));
set(handles.uitable4,'Data',cell(size(get(handles.uitable2,'Data'))));

set(handles.edit1,'String', '');

waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
eigentabel = handles.eigentabel;
W = handles.W;
S = handles.S;
Prob = handles.Prob;
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)
%% Menginisiasi Save as
[filenames, pathname] = uiputfile('*.xls','save as');
%% Data Ke .xls
xlswrite(filenames, eigentabel, 1);
xlswrite(filenames, W, 2);
xlswrite(filenames, S, 3);
xlswrite(filenames, Prob, 4);
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles)

% --- Executes on button press in pushbutton4.
function pushbutton4_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
```

```
waktu = waitbar(0,'Please Wait...');
pause(.5)
waitbar(.33,waktu,'Loading Data...');
pause(1)
waitbar(.67,waktu,'Processing Data...');
pause(1)

frame_data_1=getframe(handles.axes1);
frame_data_2=getframe(handles.axes2);

image_frame_1=frame2im(frame_data_1);
image_frame_2=frame2im(frame_data_2);

metode = get(handles.popupmenu1,'Value')
switch metode
    case 1
        fitur = {'Mean','Entropy','Variansi','Skewness','Kurtosis','Energy'};
    case 2
        fitur = {'Autocorelation','Contrast','Correlation','Cluster Prominence',...
            'ClusterShade','Dissimilarity','Energy','Entropy','Homogeneity',...

'MaximumProbability','SumofSquares','SumAverage','SumVariance','SumEntropy',...

'DifferenceVariance','DifferenceEntropy','InformationMeasureofCorrelation1',...
            'InformationMeasureofCorrelation2','InverseDifferenceHomom',...
            'InverseDifferenceNormalized','InverseDifferenceMomentNormalized'};
end

%[nama_file, nama_path] = uiputfile('*.png');
%imwrite([image_frame_1,image_frame_2,image_frame_3,image_frame_4,image_frame_5,image
_frame_6,image_frame_7],fullfile(nama_path,nama_file));

imwrite([image_frame_1],['axes1Lda_',num2str(metode),'.jpg'])%'axes1','jpg');
imwrite([image_frame_2],['axes2Lda_',num2str(metode),'.jpg']);

%saveas(frame_data_1,'axes1.jpg')
waitbar(1,waktu,'Finishing');
pause(1)
close(waktu);
guidata(hObject, handles);
```

YUDISIUM FMIPA
Universitas Negeri Jakarta

Virtual from Home

LULUSAN TERBAIK
PROGRAM STUDI FISIKA

Nama	:	Alma
NIM	:	3225160009
IPK	:	3.54
Lama Studi	:	8 Semester
Predikat	:	PUJIAN

Semester
112

No. : 3225200384

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN

UNIVERSITAS NEGERI JAKARTA

AKREDITASI BAN-PT No. 491/SK/BAN-PT/Ak-PTI/PT/VII/2020

Atas berkat rahmat Tuhan Yang Maha Kuasa

Universitas Negeri Jakarta

menyatakan bahwa

ALMA

NIM : 3225160009

Lahir di Jakarta tanggal 20 Juni 1998

telah menyelesaikan dan memenuhi segala persyaratan akademik

Program Sarjana pada Program Studi Fisika tanggal 27 Agustus 2020

sehingga kepadanya diberikan gelar

SARJANA SAINS

(S.Si.)

beserta segala hak, wewenang dan kewajiban yang melekat pada gelar tersebut

Jakarta, 5 November 2020

Dekan Fakultas Matematika dan Ilmu Pengetahuan Alam

Dr. Khurshigatna, M.Si

NIP. 19601111 198703 1 003

NIK. : 3273096006980012

Rektor

Prof. Dr. Komaruddin, M.Si

NIP. 19640301 199103 1 001

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
UNIVERSITAS NEGERI JAKARTA

Transkrip Akademik

Nomor : 202013066005
Lampiran Ijazah No:3225200384

Nama	:	Alma
Nomor Registrasi	:	3225160009
Tempat dan Tanggal Lahir	:	Jakarta, 20 Juni 1998
Fakultas	:	Fakultas Matematika dan Ilmu Pengetahuan Alam
Program Studi	:	Fisika
Jenjang Program	:	S1 / Sarjana
Mulai Terdaftar	:	2016/2017
Tanggal Lulus	:	27 Agustus 2020
Pendidikan Sebelumnya	:	SMA Negeri 11 Bekasi

SANDI	MATA KULIAH	SKS	NILAI	SKS x NILAI
00051132	Bahasa Inggris	2	B	6,0
00051262	Ilmu Sosial Budaya Dasar	2	A	8,0
32250122	Kimia Umum	3	A-	11,1
32250121	Praktikum Kimia Umum	1	A-	3,7
30050022	Filsafat Matematika Dan Ilmu Pengetahuan Alam	2	A	8,0
32254014	Kalkulus I	4	B	12,0
32251013	Fisika Dasar I	3	B	9,0
32251021	Praktikum Fisika Dasar I	1	B+	3,3
32250671	Olympisme	1	A	4,0
00051122	Pendidikan Pancasila	2	A-	7,4
00052033	Pendidikan Agama Islam	3	A	12,0
00051142	Bahasa Indonesia	2	A	8,0
34150012	Biologi Umum	2	A	8,0
32254024	Kalkulus II	4	B+	13,2
32251041	Praktikum Fisika Dasar II	1	B+	3,3
32252012	Pengantar Teknologi Informasi	2	B	6,0
32250602	English for Physics	2	B-	5,4
32251033	Fisika Dasar II	3	B+	9,9
32252022	Pemrograman Komputer	2	A-	7,4
32253021	Praktikum Elektronika	1	B+	3,3
32253014	ELektronika	4	B	12,0
32256013	Fisika Modern	3	A	12,0
32256021	Praktikum Fisika Modern	1	A-	3,7
00051062	Pendidikan Kewarganegaraan (Kewiraan)	2	B+	6,6
32254034	Fisika Matematika I	4	A-	14,8
32252031	Praktikum Pemrograman Komputer	1	A	4,0
32254044	Fisika Matematika II	4	A	16,0
32252051	Praktikum Fisika Komputasi	1	A-	3,7
32255034	Gelombang	4	B	12,0
32255044	Listrik Magnet	4	A-	14,8
32252043	Komputasi Fisika	3	B	9,0
32253041	Praktikum Elektronika Digital	1	A	4,0
32253033	Elektronika Digital	3	A-	11,1
32256033	Fisika Kuantum	3	B-	8,1
32254053	Statistika Dasar	3	A-	11,1
32153133	Termodinamika	3	B+	9,9
32258013	Kapita Selekta Fisika Komputasi	3	B	9,0

Transkrip Akademik

Nomor : 202013066005
Lampiran Ijazah No: 3225200384

SANDI	MATA KULIAH	SKS	NILAI	SKS x NILAI
32256073	Teori Medan Elektromagnetik	3	B+	9,9
32256112	Workshop Fisika	2	A	8,0
32256053	Pendahuluan Fisika Zat Padat	3	B	9,0
32257013	Mikroprosesor dan Antarmuka	3	A-	11,1
32256043	Fisika Statistik	3	A-	11,1
32256093	Fisika Zat Padat	3	B	9,0
32256083	Mekanika Kuantum	3	A-	11,1
32256122	Eksperimen Fisika	2	A	8,0
32256133	Metodologi Penelitian Fisika	3	A	12,0
32257022	Sistem Kontrol	2	A	8,0
32257033	Teknologi Sensor	3	A-	11,1
32257052	Pemrograman Bahasa C/C++	2	A	8,0
30052072	Seminar Pra Skripsi	2	A	8,0
32256222	Sifat Mekanikal Material	2	A	8,0
32250662	Kewirausahaan	2	B	6,0
32256063	Pendahuluan Fisika Nuklir	3	A-	11,1
32255014	Mekanika Klasik	4	B+	13,2
32256103	Laser dan Optika Modern	3	A	12,0
32250264	Praktek Kerja Lapangan (PKL)	4	A-	14,8
30054024	Skripsi	4	A	16,0

Jumlah Mata Kuliah = 57
Jumlah SKS = 146
Jumlah Bobot = 516,2

Indeks Prestasi Komulatif (IPK) $= \left\{ \frac{\text{Jumlah (SKS x Bobot)}}{\text{Jmlh SKS}} \right\} = \left\{ \frac{516,2}{146} \right\} = 3,54$

Predikat = Pujian

Judul Skripsi : Identifikasi Citra Daun Teh [illegible] menggunakan Kamera Digital Dengan Metode Dual Tree Complex Wavelet Transform Dan Gray Level Co-Occurrence Matrix

Keterangan Bobot Nilai :		
Tingkat Penguasaan	Nilai	Bobot
86 - 100	A	4
81 - 85	A-	3.7
76 - 80	B+	3.3
71 - 75	B	3.0
66 - 70	B-	2.7
61 - 65	C+	2.3
56 - 60	C	2.0
51 - 55	C-	1.7
46 - 50	D	1
0 - 45	E	0

Jakarta, 5 November 2020
Dekan Fakultas Matematika dan Ilmu Pengetahuan Alam

Dr. Adisyahputra, M.S.
NIP. 19601111 198703 1 003

POLRI DAERAH METRO JAYA
RESOR METRO BEKASI KOTA
SEKTOR JATIASIH
Jalan Swatantra IV Nomor 1 Jatiasih 17423

Nomor : 09-1129684

TIDAK UNTUK KELUAR NEGERI

SURAT KETERANGAN CATATAN KEPOLISIAN
POLICE RECORD

Nomor : SKCK/YANMAS/93/I/2022/POLSEK JATIASIH

Diterangkan bersama ini bahwa :
This is to certify that:

Nama *Name*	: ALMA
Jenis Kelamin *Sex*	: PEREMPUAN
Kebangsaan *Nationality*	: INDONESIA
Agama *Religion*	: ISLAM
Tempat dan tgl lahir *Place and date of birth*	: JAKARTA, 20 JUNI 1998
Tempat tinggal sekarang *Current address*	: KP. RAWA BOGO RT. 004/017 KEL. JATIMEKAR KEC. JATIASIH KOTA BEKASI
Pekerjaan *Occupation*	: –
Nomor Kartu Tanda Penduduk *Citizens card number*	: 3275096006980012
Nomor Paspor/KITAS/KITAP* *Passport/KITAS/KITAP number*	: –
Rumus sidik jari *Fingerprints Formula*	: 10 S 1 U OOI 10 S 1 U IOI

Setelah diadakan penelitian hingga saat dikeluarkan surat keterangan ini yang didasarkan kepada :
As of screening through the issue hereof by virtue of :

Catatan Kepolisian yang ada
Existing Police record

bahwa nama tersebut diatas tidak memiliki catatan atau keterlibatan dalam kegiatan kriminal apapun
the bearer hereof proves not to be involved in any criminal cases

selama ia berada di Indonesia dari *during his/her stay in Indonesia from*	: 20 JUNI 1998
sampai dengan *to*	: 10 JANUARI 2022

Keterangan ini dibenkan berhubungan dengan permohonan
This certificate is issued at the request to the applicant

Untuk keperluan/menuju* *For the purpose*	: PERSYARATAN MELAMAR PEKERJAAN
Berlaku dari tanggal *Valid from*	: 10 JANUARI 2022
Sampai dengan *To*	: 10 JULI 2022

Dikeluarkan di
Issued in : BEKASI

Pada tanggal
On : 10 JANUARI 2022

Apabila dikemudian hari ada terlibat kesahatan/ pelanggaran SKCK ini dinyatakan tidak berlaku.
If the future is concerned involved in the crimes violations, SKCK is declared invalid.

KEPALA KEPOLISIAN SEKTOR JATIASIH

ABRIANSYAH HARAHAP, S.H, S.I.K, M.H.
KOMISARIS POLISI NRP. 83081642

*) coret yang tidak perlu

Dipindai dengan CamScanner

mandiri
lembaga pelatihan kerja

Sertifikat

Nomor: SPPUR-03-04-24022022-MCU-2198001127

Kepala Lembaga Pelatihan Kerja Bank Mandiri berdasarkan Surat Keputusan Penyelenggaraan Pelatihan No. 249 tanggal 28 Januari 2021 menyatakan bahwa:

Nama : ALMA
Nomor Induk Pegawai : 2198001127

TELAH MENGIKUTI

Pelatihan Berbasis Kompetensi Bidang Sistem Pembayaran dan Pengelolaan Uang Rupiah **Jenjang Kualifikasi SPPUR 4 Subbidang Pengelolaan Uang Tunai** dan dinyatakan **KOMPETEN**

Jakarta, 24 Februari 2022

Kepala LPK Bank Mandiri

(Dindin Rosyidin)

DAFTAR UNIT KOMPETENSI YANG DICAPAI

Nama : ALMA
Nomor Induk Pegawai : 2198001127
Subbidang : Pengelolaan Uang Tunai

NO.	UNIT KOMPETENSI	KODE UNIT
1	Memberikan Layanan Kas	K-64SPP03. 001.1
2	Memproses Uang	K-64SPP03. 002.1
3	Melakukan Kegiatan Layanan Pengambilan Uang (Pick Up Service) atau Layanan Pengantaran Uang (Delivery Service)	K.64SPP03. 003.1
4	Melakukan Cash Replenishment	K-64SPP03. 004.1
5	Jiwa Service	

Jakarta, 24 Februari 2022

Kepala LPK Bank Mandiri

(Dindin Rosyidin)

ETS TOEFL ITP

CERTIFICATE OF ACHIEVEMENT

This is to certify that

Alma

achieved the following scores on the

TOEFL® ITP Test

Listening Comprehension:	52
Structure & Written Expression:	55
Reading Comprehension:	61
Total:	560

Under the auspices of:
IEF
AT-Jakarta
Date: December 20, 2021
SGER-[illegible]

Date of Birth: June 20, 1998

David L. Hunt
David L. Hunt
Vice President and Chief Operating Officer
ETS Global Division

REPUBLIK INDONESIA
KEMENTERIAN HUKUM DAN HAK ASASI MANUSIA

SURAT PENCATATAN
CIPTAAN

Dalam rangka pelindungan ciptaan di bidang ilmu pengetahuan, seni dan sastra berdasarkan Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta, dengan ini menerangkan:

Nomor dan tanggal permohonan	:	EC00202051148, 19 November 2020
Pencipta		
Nama	:	**Dr.rer.nat.Bambang Heru Iswanto.M,Si, Alma dkk**
Alamat	:	Jl. Kelapa Hijau No. 37a RT 001 RW 013, Utan Kayu Selatan, Matraman, Jakarta Timur, DKI JAKARTA, 13120
Kewarganegaraan	:	Indonesia
Pemegang Hak Cipta		
Nama	:	**LPPM Universitas Negeri Jakarta**
Alamat	:	Gd. Ki Hajar Dewantara Lt 6-7 Kampus A, Universitas Negeri Jakarta, Jalan Rawamangun Muka, Jakarta Timur, Kota Administrasi Jakarta Timur, DKI JAKARTA, 13220
Kewarganegaraan	:	Indonesia
Jenis Ciptaan	:	**Program Komputer**
Judul Ciptaan	:	**Program Ekstraksi Ciri Citra Daun Teh Dengan DTCWT-GLC Pada Matlab**
Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia	:	18 Juli 2020, di Jakarta
Jangka waktu pelindungan	:	Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali dilakukan Pengumuman.
Nomor pencatatan	:	000220061

adalah benar berdasarkan keterangan yang diberikan oleh Pemohon.
Surat Pencatatan Hak Cipta atau produk Hak terkait ini sesuai dengan Pasal 72 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta.

a.n. MENTERI HUKUM DAN HAK ASASI MANUSIA
DIREKTUR JENDERAL KEKAYAAN INTELEKTUAL

Dr. Freddy Harris, S.H., LL.M., ACCS.
NIP. 196611181994031001

LAMPIRAN PENCIPTA

No	Nama	Alamat
1	Dr.rer.nat.Bambang Heru Iswanto.M,Si	Jl. Kelapa Hijau No. 37a RT 001 RW 013, Utan Kayu Selatan, Matraman
2	Alma	Kp. Rawa Bogo, Jatimekar, Jatiasih
3	Dr. Iwan Sugihartono, M.Si	Jl. R. Sanim, Kavling UI Sektor Barat, Blok E2 No. 6D, Jl. Jati Putih, Tanah Baru, Beji

Organized by:

CERTIFICATE

No. 3425/UN40.R4/DT/2020

This certificate is awarded to

A Alma and B H Iswanto

as a **Presenter** of a paper entitled:

Texture histogram features for tea leaf identification using visible digital camera

in the 5th Annual Applied Science and Engineering Conference (AASEC) 2020 Universitas Pendidikan Indonesia "Green Technologies for Environmental Sustainability", 20-21 April 2020.

Prof. Dr. Didi Sukyadi, MA.
Vice Rector for Research, Partnership, and Business
Universitas Pendidikan Indonesia

Prof. Dr. Ade Gafar Abdullah, M.Si.
Conference Chair

the 5th aasec 2020 "Green Technologies for Environmental Sustainability"

Co-hosted by:

Green Conference

SERTIFIKAT

Diberikan kepada:

MUTIA DELINA, ALMA, SURANO MUHASYAH

atas partisipasinya sebagai **PEMAKALAH** dengan judul:

DIGITAL DATA PROTECTION IN BOARDING PASS BARCODE WITH IMAGE STENOGRAPHY USING SUBSTITUTION LEAST SIGNIFICANT BIT METHOD

pada acara:

Seminar Nasional Fisika

dengan tema **"Peranan fisika dan pendidikan fisika dalam inovasi teknologi untuk kemandirian bangsa di era industri 4.0"**

Jakarta, 29 Juni 2019

Ketua PSI Cabang Jakarta-Banten

Ariadne L. Juwono, M.Eng., Ph.D.

Ketua Panitia SNF 2019

Dr. Umiatin, M.Si.

SERTIFIKAT

diberikan kepada

ALMA

sebagai

ASISTEN PRAKTIKUM SEMESTER 109

Pada Praktikum

FISIKA DASAR I

Laboratorium Fisika, 30 Juli 2019

Kepala Laboratorium Fisika

Riser Fahdiran, M.Si

NIP 198307172009121008

JGU Jakarta Global University

Mengubah Hidup, Memperkaya Masa Depan

Seminar Online: How to Be A Programmer

Sertifikat

diberikan kepada:

Alma

sebagai: **Peserta**

pada seminar yang diselenggarakan oleh Jakarta Global University (JGU)
pada tanggal 9 Juli 2020 secara online interaktif melalui video conference aplikasi Zoom

Jakarta, 9 Juli 2020

WAKIL REKTOR III

JGU Jakarta Global University

Ade Sunardi, S.T., M.T.

Contact:
enquiry@jgu.ac.id
(+62) 87880001472

@JG_University
www.jgu.ac.id

Certificate of Participation

This is to certify that

Alma Alma

has participated in the

Shopee Code League 2020 (Student Category)

From 8 June to 8 August 2020

Proudly Organised by

Shopee

CHRIS FENG

Chief Executive Officer (CEO), Shopee

STATEMENT OF ACCOMPLISHMENT

#15,430,873

HAS BEEN AWARDED TO

alma alma

FOR SUCCESSFULLY COMPLETING

Introduction to Python

COMPLETED ON

OCT 23, 2020

datacamp

Martijn Theuwissen, CEO

STATEMENT OF ACCOMPLISHMENT

#16,522,872

HAS BEEN AWARDED TO

alma alma

FOR SUCCESSFULLY COMPLETING

Introduction to SQL

COMPLETED ON

OCT 23, 2020

datacamp

Martijn Theuwissen, CEO

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning Word Desktop (Office 365/Microsoft 365) (2018)

Course completed on Feb 20, 2022 at 03:14AM UTC • 40 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AZEpZEo_DTxEGSKK0k2FcnOPu8W7

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning Excel Desktop (Office 365/Microsoft 365) (2018)

Course completed on Feb 21, 2022 at 01:14AM UTC

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Instructional Delivery Method: QAS Self Study
In accordance with the standards of the National Registry of CPE Sponsors, CPE credits have been granted based on a 50-minute hour. LinkedIn is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its web site: www.nasbaregistry.org

Field of Study: Computer Software & Applications
Program: National Association of State Boards of Accountancy (NASBA) | Registry ID: #140940
Certificate No: AYrX0V3vmMj6BbmLkpP-8EHz8FWR
Continuing Professional Education Credit (CPE): 2.00

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning Excel Desktop (Office 365/Microsoft 365) (2018)

Course completed on Feb 21, 2022 at 12:29AM UTC • 1 hour 16 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AYGZ1PAyvgbblTPEX1yD1nMpt73p

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning PowerPoint Desktop (Office 365/Microsoft 365)

Course completed on Feb 21, 2022 at 02:53PM UTC

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Instructional Delivery Method: QAS Self Study
In accordance with the standards of the National Registry of CPE Sponsors, CPE credits have been granted based on a 50-minute hour. LinkedIn is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its web site: www.nasbaregistry.org

Field of Study: Computer Software & Applications
Program: National Association of State Boards of Accountancy (NASBA) | Registry ID: #140940
Certificate No: AW3TsIkjw-tjB7lRDzyr7gibnsGS
Continuing Professional Education Credit (CPE): 2.00

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning PowerPoint Desktop (Office 365/Microsoft 365)

Course completed on Feb 21, 2022 at 01:33AM UTC • 1 hour 11 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AU1Jlz0VEMadMIMDCzKC6lnOA8dm

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning Outlook Desktop (Office 365/Microsoft 365)

Course completed on Feb 21, 2022 at 03:09PM UTC • 42 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: ATti0XwhjwnwFwFzSxNUKe3CrPpp

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

OneDrive for Business Essential Training

Course completed on Feb 24, 2022 at 03:50AM UTC • 1 hour 0 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AeFJwRc128T2Bztce1ZjzqdSq_Vq

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

SharePoint Online Essential Training: The Basics (2020)

Course completed on Feb 24, 2022 at 06:24AM UTC • 2 hours 1 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: ARDIIGykJ8FAjLjShKoyYlOdWToH

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Microsoft Teams Essential Training

Course completed on Feb 25, 2022 at 11:20AM UTC • 2 hours 21 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AfCC5l6ZiGwhkWK7ezFApgYpC-7B

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Microsoft Planner Essential Training

Course completed on Feb 25, 2022 at 11:40AM UTC

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

The PMI Registered Education Provider logo is a registered mark of the Project Management Institute, Inc.

Program: PMI® Registered Education Provider | Provider ID: #4101
Certificate No: AZN4hC0sOtLf006BsRkn2flgRZ-a
PDUs/ContactHours: 1.25 | Activity #: 4101AILL51

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Microsoft Planner Essential Training

Course completed on Feb 25, 2022 at 11:40AM UTC • 1 hour 27 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AZN4hC0sOtLf006BsRkn2flgRZ-a

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Learning OneNote for the web (Office 365/Microsoft 365)

Course completed on Feb 27, 2022 at 02:22PM UTC • 1 hour 39 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AbhUdKisfafzYrNT5EGraivIMOzB

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Office 365 New Features (Microsoft 365)

Course completed on Feb 20, 2022 at 03:00AM UTC

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

Head of Content Strategy, Learning

LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

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Certificate No: ARJ04znDqVqw-RhJCmBnNcTm7bTB
PDUs/ContactHours: 0.75 | Activity #: 41011LGRM0

LinkedIn LEARNING

Certificate of Completion

Congratulations, alma alma

Office 365 New Features (Microsoft 365)

Course completed on Feb 20, 2022 at 03:00AM UTC • 1 hour 44 min

By continuing to learn, you have expanded your perspective, sharpened your skills, and made yourself even more in demand.

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Sunnyvale, CA 94085

Certificate Id: ARJ04znDqVqw-RhJCmBnNcTm7bTB

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SPSS Statistics Essential Training

Course completed on Feb 28, 2022 at 04:33AM UTC • 5 hours 49 min

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LinkedIn Learning
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Sunnyvale, CA 94085

Certificate Id: AY_aristFr-C_adbUe0gO5OA3AJk

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Certificate of Completion

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Windows 10 Essential Training

Course completed on Feb 27, 2022 at 02:52PM UTC • 3 hours 25 min

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LinkedIn Learning
1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: Abg6TllxTCgHpSlCwWbhZhmiQ5y2

LEARNING

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Getting Started with Microsoft 365

Learning Path completed on Feb 27, 2022 at 02:52PM UTC • 17 hours 30 min

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Top skills covered

Microsoft Office, Microsoft PowerPoint, Microsoft Word, SharePoint, Windows, Microsoft Access, Microsoft Excel, Microsoft Outlook

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1000 W Maude Ave
Sunnyvale, CA 94085

Certificate Id: AVWYyLmx5r0FgselL88SwqKyjZ0s

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XERATIC UMN

#DQLABMLFCREEFUHF

CERTIFICATE

OF COMPLETION

This Certificate is Proudly Presented to

Alma Alma

Has Completed in

Data Science in Finance: Credit Risk Analysis

10 Dec 2022

DQLab

XERATIC UMN

#DQLABDTWP1NPVFJQ

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Has Completed in

Data Wrangling Python

30 Jan 2023

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Has Completed in

Python Fundamental for Data Science

02 Feb 2023

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Has Completed in

Statistics using R for Data Science

04 Feb 2023

#DQLABDTWR1VUWNAQ

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Alma Alma

Has Completed in

Data Preparation in Data Science using R

05 Feb 2023

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Has Completed in

Data Science in Retail: Market Basket Analysis

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Has Completed in

Data Science in Marketing: Customer Segmentation

29 Jan 2023

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Alma Alma

Has Completed in

R Fundamental for Data Science

08 Dec 2022

PROVINSI JAWA BARAT
KOTA BEKASI

NIK : 3275096006980012

Nama	: ALMA
Tempat/Tgl Lahir	: JAKARTA, 20-06-1998
Jenis kelamin	: PEREMPUAN Gol. Darah : -
Alamat	: KP RAWA BOGO
RT/RW	: 004/017
Kel/Desa	: JATIMEKAR
Kecamatan	: JATIASIH
Agama	: ISLAM
Status Perkawinan	: BELUM KAWIN
Pekerjaan	: PELAJAR/MAHASISWA
Kewarganegaraan	: WNI
Berlaku Hingga	: SEUMUR HIDUP

KOTA BEKASI
26-09-2017

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