DAFTAR PUSTAKA

Chiu, S. L. (1994) 'Fuzzy model identification based on cluster estimation', *Journal of Intelligent and Fuzzy Systems*, 2(3), pp. 267–278.

Desarkar, A. and Das, A. (2017) *Big-Data Analytics, Machine Learning Algorithms and Scalable/Parallel/Distributed Algorithms*.

Fadilla, R., Andarsyah, R. and Awangga, R. M. (2020) *Data Analytics: Peningkatan Performa Algoritma Rekomendasi Collaborative Filtering Menggunakan K-Means Clustering*. Edited by R. M. Awangga. Bandung: Kreatif Industri Nusantara. Available at:

Fayyad, U. M. *et al.* (1996) *Advances in Knowledge Discovery and Data Mining*. American Association for Artificial Intelligence 445 Burgess Drive Menlo Park, CA United States.

Han, J., Kamber, M. and Pei, J. (2011) *Data mining: Data mining concepts and techniques*. 3rd ed., *Morgan Kaufmann*. 3rd ed. Morgan Kaufmann.

Handoyo, R., Rumani, R. and Nasution, S. M. (2014) 'Perbandingan Metode Clustering Menggunakan Metode Single Linkage Dan K-Means Pada Pengelompokan Dokumen', *JSM STMIK Mikroskil*, 15(2), pp. 73–82.

Hidayat, A. A. A. (2008) *Pengantar Ilmu Kesehatan Anak untuk Pendidikan Kebidanan*. Jakarta: Salemba Medika.

Kulin, M. *et al.* (2016) 'Data-driven design of intelligentwireless networks: An overview and tutorial', *Sensors (Switzerland)*, 16(6).

Kusuma, V. M. A., Furqon, M. T. and Muflikhah, L. (2017) 'Implementasi Metode Fuzzy Subtractive Clustering Untuk Pengelompokan Data Potensi Kebakaran

Hutan/Lahan', *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, 1(Vol 1 No 9 (2017)), pp. 876–884.

Kusumadewi, S. and Purnomo, H. (2010) *Aplikasi Logika Fuzzy untuk Pendukung Keputusan*. Edisi 2. Yogyakarta: Graha Ilmu.

Larose, D. T. (2005) *Discovering Knowledge in Data: An Introduction to Data Mining, John Wiley & Sons, Inc., Hoboken, New Jersey*. John Wiley & Sons, Inc., Hoboken, New Jersey.

Nasteski, V. (2017) 'An overview of the supervised machine learning methods', *Horizons.B*, 4(December 2017), pp. 51–62.

Pemerintah Kota Makassar Dinas Kesehatan (2016) *Profil Kesehatan Kota Makassar 2015*. Pemerintah Kota Makassar Dinas Kesehatan.

Sari, E. A. (2015) 'Penerapan Algoritma K-Means Untuk Menentukan Tingkat Kesehatan Bayi Dan Balita Pada Kabupaten Dan Kota Di Jawa Tengah'.

Shofiani, N. (2017) *Segmentasi Supplier Menggunakan Metode K- Means Clustering (Studi Kasus : Ptpn X Pg Meritjan)*. Institut Teknologi Sepuluh Nopember.

Turban, E., Aronson, J. E. and Liang, T.-P. (2005) *Decision Support Systems and Intelligent Systems*. 7th Editio. Edited by Andi. Yogyakarta.

Wu, A. *et al.* (2011) 'A survey of application-level protocol identification based on machine learning', *Proceedings - 2011 4th International Conference on Information Management, Innovation Management and Industrial Engineering, ICIII 2011*, 3, pp. 201–204.

LAMPIRAN

Lampiran 1. Kode program implementasi algoritma *fuzzy subtractive clustering*

- Pengelompokan tingkat kesehatan balita pada setiap kelurahan di Kota Makassar menggunakan aplikasi Matlab (tanpa *library fuzzy subtractive clustering*)

```
function varargout = latihan_7(varargin)
% LATIHAN_7 MATLAB code for latihan_7.fig
%      LATIHAN_7, by itself, creates a new LATIHAN_7 or raises the
existing
%      singleton*.
%      H = LATIHAN_7 returns the handle to a new LATIHAN_7 or the handle
to
%      the existing singleton*.
%      LATIHAN_7('CALLBACK',hObject,eventData,handles,...) calls the
local
%      function named CALLBACK in LATIHAN_7.M with the given input
arguments.
%
%      LATIHAN_7('Property','Value',...) creates a new LATIHAN_7 or
raises the
%      existing singleton*.  Starting from the left, property value pairs
are
%      applied to the GUI before latihan_7_OpeningFcn gets called.  An
%      unrecognized property name or invalid value makes property
application
%      stop.  All inputs are passed to latihan_7_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 latihan_7
% Last Modified by GUIDE v2.5 13-Sep-2021 16:59:32

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @latihan_7_OpeningFcn, ...
                   'gui_OutputFcn',  @latihan_7_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 latihan_7 is made visible.
function latihan_7_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 latihan_7 (see VARARGIN)

% Choose default command line output for latihan_7
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes latihan_7 wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = latihan_7_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)
formku = guidata(gcbo);
[namafile,direktori] = uigetfile('*xlsx','Load Data File');
alamatfile=fullfile(direktori,namafile);

[a b c] = xlsread(alamatfile);
bar=size(c,1);
col=size(c,2);
judul=c(1,1:col);
datareal=c(2:bar,2:col);
nom=linspace(1,bar-1,bar-1);
```

```
datareal = cell2table(datareal);
assignin('base','datareal',datareal);
handles.judul = judul;
handles.nom = nom;
handles.datareal = datareal;
guidata(hObject,handles);
set(formku.pushbutton1,'Userdata',datareal);

% --- 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)
datareal = handles.datareal;
judul = handles.judul;
nom = handles.nom;
S = vartype('double');
data_awal = table2array(datareal(:,S));
data_k=datareal(:,1);
[n,m] = size(data_awal);

r = str2double(get(handles.edit1,'string'));
accept_ratio = str2double(get(handles.edit2,'string'));
reject_ratio = str2double(get(handles.edit3,'string'));
q = str2double(get(handles.edit4,'string'));

%melakukan normalisasi data
 max_data = max(data_awal);
 min_data = min(data_awal);
 N = zeros(n,m);
 for y = 1:m
     N(:,y) = (data_awal(:,y)-min_data(y))./(max_data(y)-min_data(y));
 end


%faktor untuk mencari nilai potensi
pengali_1 = 1.0 ./ r;
pengali_2 = 1.0 ./ (q*r);

%potensi awal tiap data
potensi = zeros(1,n);
pengali_1baru = pengali_1(ones(1,n),:);

for i = 1:n
    nilaidata = N(i,:);
    nilaidata = nilaidata(ones(1,n),:);
    dx = (nilaidata - N) .* pengali_1baru;
    if m == 1
        potensi(i) = sum(exp(-4*dx.^2));
    else
        potensi(i) = sum(exp(-4*sum(dx.^2,2)));
    end
end
```

```
%menetapkan potensi tertinggi sebagai nilai referensi rasio
[refpotensi,maxPotIndex] = max(potensi);
maxpotensi = refpotensi;

%menetapkan center kluster
cntr = [];
jmlklaster = 0;
kondisi = 1;

while kondisi & maxpotensi
    kondisi = 0;
    maxnilai = N(maxPotIndex,:);
    rasio = maxpotensi/refpotensi;

    if rasio >= accept_ratio
        kondisi = 1;
    elseif rasio > reject_ratio
        minDistSq = -1;

        for i = 1 : jmlklaster
            dx = (maxnilai - cntr(i,:)).*pengali_1;
            dxSq = dx*dx';

            if minDistSq < 0 | dxSq < minDistSq
                minDistSq = dxSq;
            end
        end

        minDist = sqrt(minDistSq);
        condition = minDist+rasio;
        if condition >= 1
            kondisi = 1;

        else
            kondisi = 2;
        end
    end

    if kondisi == 1
        %menambahkan data sebagai pusat kluster baru
        cntr = [cntr ; maxnilai];
        jmlklaster = jmlklaster + 1;

        %perbarui potensi tetangga
        pengalibaru2 = pengali_2(ones(1,n),:);
        tmp = maxnilai(ones(1,n),:);
        dx = (tmp - N).*pengalibaru2;
        if m == 1
            pengurangan = maxpotensi*exp(-4*dx.^2);
        else
            pengurangan = maxpotensi*exp(-4*sum(dx.^2,2));
        end
        potensi = potensi - pengurangan'
```

```
        potensi(potensi<0)=0;
        [maxpotensi,matPotIndex]=max(potensi);
        fprintf('Iterasi ke-%d\nNilai Rasio = %d\n',jmlklaster,rasio);
    elseif kondisi == 2
        potensi(maxPotIndex) = 0;
        [maxpotensi,maxPotIndex] = max(potensi);
    end
end

%mengembalikan nilai pusat klaster ke data awal
for i = 1:m
    cntr_baru(:,i)=(cntr(:,i)*(max_data(i)-min_data(i)))+min_data(i);
end
assignin('base','cntr_baru',cntr_baru)

%menghitung sigma klaster
sigmascluster = (r .* (max_data - min_data)) / sqrt(8);
sb_temp = sigmascluster.^2;
sb = 2.*sb_temp;
%sumd = zeros(n,jmlklaster);

%derajat keanggotaan tiap data pada tiap klaster
for i = 1:n
    for j = 1:m
        for k = 1:jmlklaster
            hasil(i,j,k)=(((data_awal(i,j)-cntr_baru(k,j)).^2)./sb(j));
        end
    end
end
su = sum(hasil,2);
sq = squeeze(su);
drjt = exp(-sq);
assignin('base','drjt',drjt)

%menentukan tiap data masuk pada cluster mana
[val,idx] = max(drjt,[],2)
n_idx = array2table(idx);
hasil_var = [n_idx datareal];
hasil_var = table2cell(hasil_var);
assignin('base','hasil_var',hasil_var)
set(handles.uitable1,'data',hasil_var,'ColumnName',judul,'RowName',nom);

%menghitung nilai silhouette
figure
[s,h]=silhouette(N,idx,'Euclidean');
rata = mean(s);
assignin('base','silhouette',rata)
w = [0.1; 0.2; 0.1; 0.2; 0.1; 0.2; 0.1]; % Set arbitrary weights for
illustration
chiSqrDist = @(x,Z,w)sqrt((bsxfun(@minus,x,Z).^2)*w);
hsl1 = silhouette(N,idx,chiSqrDist,w);
w2 = [1; 1; 1; 1; 1; 1; 1];
hsl2 = silhouette(N,idx,chiSqrDist,w2);
eq = isequal(hsl2,s);
```

```
title('Hasil Silhouette Coefficient')

%menampilkan nama kelurahan sesuai clusternya
G = jmlklaster ;   % number of cluster
ind = cell(G,1) ;
C = cell(G,1) ;
for i = 1:G
    ind{i} = idx == i;
    C_norm{i}=N(idx==i,:); %menampilkan data normalisasi sesuai cluster
    C{i} = datareal(idx==i,:);  %menampilkan nama kelurahan sesuai
clusternya
    CA{i} = data_awal(idx==i,:) ;
    C_stat{i} = stat(CA{i}); %menampilkan stat setiap cluster
    cSSE{i} = hitung_sse(C_norm,cntr,i);
    cMAE{i} = hitung_mae(C_norm,cntr,i);
end

sumSSE = sum(cell2mat(cSSE(:)),2);
SSE = sum(sumSSE);
sumMAE = (sum(cell2mat(cMAE(:)),2))./G;
MAE = sum(sumMAE);
assignin('base','jmlklaster',jmlklaster)
assignin('base','C',C)
assignin('base','C_stat',C_stat)
assignin('base','SSE',SSE)
assignin('base','MAE',MAE)

handles.data_awal = data_awal;
handles.cntr_baru = cntr_baru;
handles.idx = idx;
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)
data_awal = handles.data_awal;
cntr_baru = handles.cntr_baru;
idx = handles.idx;

var1 = get(handles.popupmenu1, 'value');
var2 = get(handles.popupmenu2, 'value');
var3 = get(handles.popupmenu3, 'value');

data1 = data_awal(:,var1);
data2 = data_awal(:,var2);
data3 = data_awal(:,var3);
cntr1 = cntr_baru(:,var1);
cntr2 = cntr_baru(:,var2);
cntr3 = cntr_baru(:,var3);

if var1 == 1
    label1 = ('Kematian');
```

```
elseif var1 == 2
    label1 = ('Gizi Kurang');
elseif var1 == 3
    label1 = ('Gizi Kurus');
elseif var1 == 4
    label1 = ('Pendek');
elseif var1 == 5
    label1 = ('BBLR');
elseif var1 == 6
    label1 = ('Pneumonia');
elseif var1 == 7
    label1 = ('Diare');
end

if var2 == 1
    label2 = ('Kematian');
elseif var2 == 2
    label2 = ('Gizi Kurang');
elseif var2 == 3
    label2 = ('Gizi Kurus');
elseif var2 == 4
    label2 = ('Pendek');
elseif var2 == 5
    label2 = ('BBLR');
elseif var2 == 6
    label2 = ('Pneumonia');
elseif var2 == 7
    label2 = ('Diare');
end

if var3 == 1
    label3 = ('Kematian');
elseif var3 == 2
    label3 = ('Gizi Kurang');
elseif var3 == 3
    label3 = ('Gizi Kurus');
elseif var3 == 4
    label3 = ('Pendek');
elseif var3 == 5
    label3 = ('BBLR');
elseif var3 == 6
    label3 = ('Pneumonia');
elseif var3 == 7
    label3 = ('Diare');
end

figure
scatter3(data1, data2, data3,15,idx,'filled')
hold on
scatter3(cntr1,cntr2,cntr3)
xlabel(label1); ylabel(label2); zlabel(label3);
title('Visualisasi Custer Terhadap 3 Variabel')
```

```
% --- 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


% --- 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 selection change in popupmenu2.
function popupmenu2_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu2 (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 popupmenu2
contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu2


% --- Executes during object creation, after setting all properties.
function popupmenu2_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu2 (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 selection change in popupmenu3.
function popupmenu3_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu3 (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 popupmenu3
contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu3


% --- Executes during object creation, after setting all properties.
function popupmenu3_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu3 (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



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
```

```
function edit2_Callback(hObject, eventdata, handles)
% hObject    handle to edit2 (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 edit2 as text
%        str2double(get(hObject,'String')) returns contents of edit2 as a
double


% --- Executes during object creation, after setting all properties.
function edit2_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit2 (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



function edit3_Callback(hObject, eventdata, handles)
% hObject    handle to edit3 (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 edit3 as text
%        str2double(get(hObject,'String')) returns contents of edit3 as a
double

% --- Executes during object creation, after setting all properties.


function edit3_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit3 (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
```

```
function edit4_Callback(hObject, eventdata, handles)
% hObject    handle to edit4 (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 edit4 as text
%        str2double(get(hObject,'String')) returns contents of edit4 as a
double
% --- Executes during object creation, after setting all properties.
function edit4_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit4 (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
```

- Pengelompokan tingkat kesehatan balita pada setiap kelurahan di Kota Makassar menggunakan *library fuzzy subtractive clustering* pada aplikasi Matlab

```
function varargout = latihan_8(varargin)
% LATIHAN_8 MATLAB code for latihan_8.fig
%      LATIHAN_8, by itself, creates a new LATIHAN_8 or raises the
existing
%      singleton*.
%      H = LATIHAN_8 returns the handle to a new LATIHAN_8 or the handle
to
%      the existing singleton*.
%      LATIHAN_8('CALLBACK',hObject,eventData,handles,...) calls the
local
%      function named CALLBACK in LATIHAN_8.M with the given input
arguments.
%      LATIHAN_8('Property','Value',...) creates a new LATIHAN_8 or
raises the
%      existing singleton*.  Starting from the left, property value pairs
are
%      applied to the GUI before latihan_8_OpeningFcn gets called.  An
%      unrecognized property name or invalid value makes property
application
%      stop.  All inputs are passed to latihan_8_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 latihan_8

% Last Modified by GUIDE v2.5 28-Oct-2021 20:10:36

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @latihan_8_OpeningFcn, ...
                   'gui_OutputFcn',  @latihan_8_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 latihan_8 is made visible.
function latihan_8_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 latihan_8 (see VARARGIN)

% Choose default command line output for latihan_8
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes latihan_8 wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = latihan_8_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)
formku = guidata(gcbo);
[namafile,direktori] = uigetfile('*xlsx','Load Data File');
alamatfile=fullfile(direktori,namafile);

[a b c] = xlsread(alamatfile);
bar=size(c,1);
col=size(c,2);
judul=c(1,1:col);
datareal=c(2:bar,2:col);
nom=linspace(1,bar-1,bar-1);

datareal = cell2table(datareal);
assignin('base','datareal',datareal);
handles.judul = judul;
handles.nom = nom;
handles.datareal = datareal;
guidata(hObject,handles);
set(formku.pushbutton1,'Userdata',datareal);


% --- 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)
datareal = handles.datareal;
judul = handles.judul;
nom = handles.nom;
S = vartype('double');
data_awal = table2array(datareal(:,S));
data_k=datareal(:,1);
[n,m] = size(data_awal);

r = str2double(get(handles.edit1,'string'));
accept_ratio = str2double(get(handles.edit2,'string'));
reject_ratio = str2double(get(handles.edit3,'string'));
q = str2double(get(handles.edit4,'string'));
```

```
%melakukan normalisasi data
 max_data = max(data_awal);
 min_data = min(data_awal);
 N = zeros(n,m);
 for y = 1:m
     N(:,y) = (data_awal(:,y)-min_data(y))./(max_data(y)-min_data(y));
 end


%mencari nilai centroid menggunakan function subclust
options = [q accept_ratio reject_ratio 1];
cntr = subclust(N,[r r r r r r r],'Options',options);
[jmlklaster,z] = size(cntr);
%findcluster;

%Mengembalikan centroid dari bentuk yang sudah dinormalisasi ke bentuk
semula
for i = 1:m
    cntr_baru(:,i)=(cntr(:,i)*(max_data(i)-min_data(i)))+min_data(i);
end

%Menghitung nilai sigma cluster (nilai parameter fungsi keanggotaan
Gauss)
sigmascluster = (r .* (max_data - min_data)) / sqrt(8);
sb_temp = sigmascluster.^2;
sb = 2.*sb_temp;

%derajat keanggotaan tiap data pada tiap klaster
for i = 1:n
    for j = 1:m
        for k = 1:jmlklaster
            hasil(i,j,k)=(((data_awal(i,j)-cntr_baru(k,j)).^2)./sb(j));
            %sumd(i,k) = sumd(i,k)+hasil(i,k);
        end
    end
end
su = sum(hasil,2);
sq = squeeze(su);
drjt = exp(-sq);

%menentukan tiap data masuk pada cluster mana
[val,idx] = max(drjt,[],2);
n_idx = array2table(idx);
hasil_var = [n_idx datareal];
hasil_var = table2cell(hasil_var);
assignin('base','hasil_var',hasil_var)
set(handles.uitable1,'data',hasil_var,'ColumnName',judul,'RowName',nom);

figure
[s,h]=silhouette(N,idx,'Euclidean');
```

```
rata = mean(s);
assignin('base','rata',rata)
w = [0.1; 0.2; 0.1; 0.2; 0.1; 0.2; 0.1]; % Set arbitrary weights for
illustration
chiSqrDist = @(x,Z,w)sqrt((bsxfun(@minus,x,Z).^2)*w);
hsl1 = silhouette(N,idx,chiSqrDist,w);
w2 = [1; 1; 1; 1; 1; 1; 1];
hsl2 = silhouette(N,idx,chiSqrDist,w2);
eq = isequal(hsl2,s);

%menampilkan nama kelurahan sesuai clusternya
G = jmlklaster ;   % number of cluster
ind = cell(G,1) ;
C = cell(G,1) ;
for i = 1:G
    ind{i} = idx == i;
    C_norm{i}=N(idx==i,:); %menampilkan data normalisasi sesuai cluster
    C{i} = datareal(idx==i,:);  %menampilkan nama kelurahan sesuai
clusternya
    CA{i} = data_awal(idx==i,:) ;
    C_stat{i} = stat(CA{i}); %menampilkan stat setiap cluster
    cSSE{i} = hitung_sse(C_norm,cntr,i);
    cMAE{i} = hitung_mae(C_norm,cntr,i);
end

sumSSE = sum(cell2mat(cSSE(:)),2);
SSE = sum(sumSSE);
sumMAE = (sum(cell2mat(cMAE(:)),2))./G;
MAE = sum(sumMAE);
assignin('base','jmlklaster',jmlklaster)
assignin('base','C',C)
assignin('base','C_stat',C_stat)
assignin('base','SSE',SSE)
assignin('base','MAE',MAE)
handles.data_awal = data_awal;
handles.cntr_baru = cntr_baru;
handles.idx = idx;
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)
data_awal = handles.data_awal;
cntr_baru = handles.cntr_baru;
idx = handles.idx;
var1 = get(handles.popupmenu1, 'value');
var2 = get(handles.popupmenu2, 'value');
var3 = get(handles.popupmenu3, 'value');
```

```
data1 = data_awal(:,var1);
data2 = data_awal(:,var2);
data3 = data_awal(:,var3);
cntr1 = cntr_baru(:,var1);
cntr2 = cntr_baru(:,var2);
cntr3 = cntr_baru(:,var3);

if var1 == 1
    label1 = ('Kematian');
elseif var1 == 2
    label1 = ('Gizi Kurang');
elseif var1 == 3
    label1 = ('Gizi Kurus');
elseif var1 == 4
    label1 = ('Pendek');
elseif var1 == 5
    label1 = ('BBLR');
elseif var1 == 6
    label1 = ('Pneumonia');
elseif var1 == 7
    label1 = ('Diare');
end

if var2 == 1
    label2 = ('Kematian');
elseif var2 == 2
    label2 = ('Gizi Kurang');
elseif var2 == 3
    label2 = ('Gizi Kurus');
elseif var2 == 4
    label2 = ('Pendek');
elseif var2 == 5
    label2 = ('BBLR');
elseif var2 == 6
    label2 = ('Pneumonia');
elseif var2 == 7
    label2 = ('Diare');
end

if var3 == 1
    label3 = ('Kematian');
elseif var3 == 2
    label3 = ('Gizi Kurang');
elseif var3 == 3
    label3 = ('Gizi Kurus');
elseif var3 == 4
    label3 = ('Pendek');
elseif var3 == 5
    label3 = ('BBLR');
elseif var3 == 6
    label3 = ('Pneumonia');
elseif var3 == 7
    label3 = ('Diare');
end
```

```
figure
scatter3(data1, data2, data3,15,idx,'filled')
hold on
scatter3(cntr1,cntr2,cntr3)
xlabel(label1); ylabel(label2); zlabel(label3);
title('Visualisasi Custer Terhadap 3 Variabel')

% --- 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


% --- 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 selection change in popupmenu2.
function popupmenu2_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu2 (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 popupmenu2
contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu2


% --- Executes during object creation, after setting all properties.
function popupmenu2_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu2 (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 selection change in popupmenu3.
function popupmenu3_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu3 (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 popupmenu3
contents as cell array
%        contents{get(hObject,'Value')} returns selected item from
popupmenu3


% --- Executes during object creation, after setting all properties.
function popupmenu3_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu3 (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



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



function edit2_Callback(hObject, eventdata, handles)
% hObject    handle to edit2 (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 edit2 as text
%        str2double(get(hObject,'String')) returns contents of edit2 as a
double


% --- Executes during object creation, after setting all properties.
function edit2_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit2 (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



function edit3_Callback(hObject, eventdata, handles)
% hObject    handle to edit3 (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 edit3 as text
%        str2double(get(hObject,'String')) returns contents of edit3 as a
double


% --- Executes during object creation, after setting all properties.
function edit3_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit3 (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

function edit4_Callback(hObject, eventdata, handles)
% hObject    handle to edit4 (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 edit4 as text
%        str2double(get(hObject,'String')) returns contents of edit4 as a
double

% --- Executes during object creation, after setting all properties.
function edit4_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit4 (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
```

- Fungsi *stat* untuk menampilkan nilai statistik pada aplikasi Matlab

```
function [stat_table] = stat (clstr)
cnt = [length(clstr(:,1)) length(clstr(:,2)) length(clstr(:,3))
length(clstr(:,4)) ...
    length(clstr(:,5)) length(clstr(:,6)) length(clstr(:,7))];
mea = mean(clstr);
var = [cnt; mea];
stat_table = array2table(var, ...
    'VariableNames', {'Kematian', 'Gizi_Kurang', 'Gizi_Kurus', 'Pendek',
'BBLR','Pneumonia', 'Diare'}, ...
    'RowNames', {'Count','Mean'});
```

- Fungsi *hitung_sse* untuk menampilkan menghitung nilai *SSE* pada aplikasi Matlab

```
function csse = hitung_sse (norm, cntr, clust)
C = norm{1,clust};
[n m] = size(C);
pC = (C-cntr(clust,:)).^2;
csse = sum(pC);
```

- Fungsi *hitung_mae* untuk menampilkan menghitung nilai *MAE* pada aplikasi Matlab

```
function cmae = hitung_mae (norm, cntr, clust)
C = norm{1,clust};
[n m] = size(C);
pC = abs(C-cntr(clust,:));
cmae = sum(pC)./(n);
```

Lampiran 2. Data Kesehatan Balita Kota Makassar Tahun 2018

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	Sudiang	3	7.6	1.3	2.6	2.2	0.4	55.3
2	Bulurokeng	3	12.8	8.6	8.4	5.4	0	34.1
3	Sudiang Raya	1	9.1	8.4	7	1.1	0.9	21.3
4	Paccerakkang	0	27.2	21	10.5	0.6	0.5	4.4
5	Layang	0	15.6	3.1	6.9	2.5	7.1	44.9
6	Malimongan Baru	0	6.1	1.9	1.6	0	49.4	26.6
7	Bara-barayya	1	8.7	7.5	4.5	5.6	25.7	27.5
8	Maccini Sawah	0	5.4	7.4	7.4	2.1	0	48.9
9	Maradekaya	0	1.7	3.9	0.9	5.3	0	33.6
10	Mamajang	0	3.8	1.8	5.1	6.2	43.2	37.1
11	Cendrawasih	1	8.4	6.1	7	0	4	5.7
12	Antang	4	4.2	2.8	3.8	5.5	0	55.7
13	Batua	4	7.5	2.2	1.8	3.2	2.3	9.4
14	Antang Perumnas	7	2.9	0.2	0.8	4.9	0	63.7
15	Tamangapa	2	2	1.2	1.7	11.1	16.7	85.8
16	Bangkala	0	21.7	9.9	7.9	8.7	0	16.2
17	Dahlia	2	2.6	3.8	2.8	9.9	11.4	56.4
18	Pertiwi	0	8.7	10.4	6.9	0.7	0	70.8
19	Panambungan	1	6.6	3	2.3	1.2	0	57.3
20	Toddopuli	0	9	2.1	4.6	0.7	0	32.9
21	Pampang	1	10.2	0.6	8.6	4	0	44.9

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
22	Tamamaung	0	14.2	5.5	10.5	1.4	22.4	31.7
23	Karuwisi	1	3.5	2.4	1.7	3.9	0	32.1
24	Kassi-kassi	3	6.4	3.7	3.1	0	0.3	9.9
25	Mangasa	3	4.1	4.3	1.6	2.6	6.4	14.2
26	Minasa Upa	0	6.9	3.1	3.1	2.1	0	8.5
27	Ballaparang	0	4.2	2.6	1.4	3	20.8	31
28	Barrang Lompo	0	9.3	2.4	10.1	0.6	5.6	100
29	Pulau Kodingareng	0	3	3.1	1.4	0	0	100
30	Jumpandang Baru	0	10	4.6	3.3	5.3	5.5	44.8
31	Rappokalling	3	8.4	17	5.8	6.7	3.2	21.3
32	Kaluku Bodoa	0	6.5	3.2	7.3	5.4	0	17.1
33	Tamalanrea	0	2.7	5.6	5.3	4.3	0	17.1
34	Tamalanrea Jaya	0	17.66	0.9	3.42	5.2	0	29.3
35	Bira	2	17.52	12.54	5.7	5.7	21.1	61.9
36	Antara	0	2.59	1.71	1.27	3.5	63.4	29.5
37	Kapasa	0	6.63	5	2.25	3.9	0	35.4
38	Tamalate	0	47.4	25.5	44.1	2.1	8.2	11.9
39	Jongaya	1	57.8	33.3	35.8	1.3	17.2	11.1
40	Barombong	0	1.9	0.2	0.7	4	0	29.8
41	Maccini Sombala	0	3.5	4.3	4.3	5.2	1.4	33.9
42	Makkasau	0	2.8	3.2	2.1	2.1	23.9	27.4
43	Pattingalloang	3	6.1	3.9	5.2	9.7	15.6	100
44	Tabaringan	1	6.4	4.7	7.5	3.6	0	11
45	Tarakan	1	1.1	0.1	2	0.4	39.7	16.1
46	Andalas	0	3.2	0.4	0.7	1.5	37.9	46

Lampiran 3. Hasil *clustering* tingkat kesehatan balita pada setiap kelurahan di Kota Makassar dengan r = 0.5

- Klaster 1

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Layang'	0	15.6	3.1	6.9	2.5	7.1	44.9
2	'Maccini Sawah'	0	5.4	7.4	7.4	2.1	0	48.9
3	'Maradekaya'	0	1.7	3.9	0.9	5.3	0	33.6
4	'Bangkala'	0	21.7	9.9	7.9	8.7	0	16.2
5	'Panambungan'	1	6.6	3	2.3	1.2	0	57.3

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
6	'Toddopuli'	0	9	2.1	4.6	0.7	0	32.9
7	'Pampang'	1	10.2	0.6	8.6	4	0	44.9
8	'Karuwisi'	1	3.5	2.4	1.7	3.9	0	32.1
9	'Jumpandang Baru'	0	10	4.6	3.3	5.3	5.5	44.8
10	'Kaluku Bodoa'	0	6.5	3.2	7.3	5.4	0	17.1
11	'Tamalanrea'	0	2.7	5.6	5.3	4.3	0	17.1
12	'Tamalanrea Jaya'	0	17.66	0.9	3.42	5.2	0	29.3
13	'Kapasa'	0	6.63	5	2.25	3.9	0	35.4
14	'Barombong'	0	1.9	0.2	0.7	4	0	29.8
15	'Maccini Sombala'	0	3.5	4.3	4.3	5.2	1.4	33.9
16	'Tabaringan'	1	6.4	4.7	7.5	3.6	0	11

- Klaster 2

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Batua'	4	7.5	2.2	1.8	3.2	2.3	9.4
2	'Kassi-kassi'	3	6.4	3.7	3.1	0	0.3	9.9
3	'Mangasa'	3	4.1	4.3	1.6	2.6	6.4	14.2
4	'Rappokalling'	3	8.4	17	5.8	6.7	3.2	21.3

- Klaster 3

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Bara-barayya'	1	8.7	7.5	4.5	5.6	25.7	27.5
2	'Mamajang'	0	3.8	1.8	5.1	6.2	43.2	37.1
3	'Tamamaung'	0	14.2	5.5	10.5	1.4	22.4	31.7
4	'Ballaparang'	0	4.2	2.6	1.4	3	20.8	31
5	'Makkasau'	0	2.8	3.2	2.1	2.1	23.9	27.4

- Klaster 4

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Sudiang Raya'	1	9.1	8.4	7	1.1	0.9	21.3
2	'Paccerakkang'	0	27.2	21	10.5	0.6	0.5	4.4
3	'Cendrawasih'	1	8.4	6.1	7	0	4	5.7

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
4	'Minasa Upa'	0	6.9	3.1	3.1	2.1	0	8.5
5	'Tamalate'	0	47.4	25.5	44.1	2.1	8.2	11.9
6	'Sudiang Raya'	1	9.1	8.4	7	1.1	0.9	21.3

- Klaster 5

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Malimongan Baru'	0	6.1	1.9	1.6	0	49.4	26.6
2	'Antara'	0	2.59	1.71	1.27	3.5	63.4	29.5
3	'Tarakan'	1	1.1	0.1	2	0.4	39.7	16.1
4	'Andalas'	0	3.2	0.4	0.7	1.5	37.9	46

- Klaster 6

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Tamangapa'	2	2	1.2	1.7	11.1	16.7	85.8
2	'Dahlia'	2	2.6	3.8	2.8	9.9	11.4	56.4
3	'Pattingalloang'	3	6.1	3.9	5.2	9.7	15.6	100

- Klaster 7

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Pertiwi'	0	8.7	10.4	6.9	0.7	0	70.8
2	'Barrang Lompo'	0	9.3	2.4	10.1	0.6	5.6	100
3	'Pulau Kodingareng'	0	3	3.1	1.4	0	0	100

- Klaster 8

No	Kelurahan	Kematian	Gizi_ Kurang	Gizi_ Kurus	Pendek	BBLR	Pneumonia	Diare
1	'Sudiang'	3	7.6	1.3	2.6	2.2	0.4	55.3
2	'Bulurokeng'	3	12.8	8.6	8.4	5.4	0	34.1
3	'Antang'	4	4.2	2.8	3.8	5.5	0	55.7
4	'Antang Perumnas'	7	2.9	0.2	0.8	4.9	0	63.7
5	'Bira'	2	17.52	12.54	5.7	5.7	21.1	61.9

LEMBAR PERBAIKAN SKRIPSI

"*CLUSTERING* TINGKAT KESEHATAN BALITA MENGGUNAKAN METODE *FUZZY SUBTRACTIVE CLUSTERING* PADA KOTA MAKASSAR"

OLEH:

FABYOLA LARASATI MASYITA
D42116510

Skripsi ini telah dipertahankan pada Ujian Akhir Sarjana tanggal 12 November 2021.

Telah dilakukan perbaikan penulisan dan isi skripsi berdasarkan usulan dari penguji dan pembimbing skripsi.

Persetujuan perbaikan oleh tim penguji:

	Nama	Tanda Tangan
Ketua	Dr. Ir. Ingrid Nurtanio,M.T	
Sekretaris	Elly Warni, S.T., M.T.	
Anggota	Dr. Amil Ahmad Ilham, S.T., M.IT.	
	Dr. Indrabayu, S.T., M.T., M.Bus.Sys.	

Persetujuan Perbaikan oleh pembimbing:

Pembimbing	Nama	Tanda Tangan
I	Dr. Ir. Ingrid Nurtanio,M.T	
II	Elly Warni, S.T., M.T.	