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LAMPIRAN

- **HASIL KLASIFIKASI GAMBAR**

KONDISI POOR

CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 90.33%

Assesment Scale 90.33%

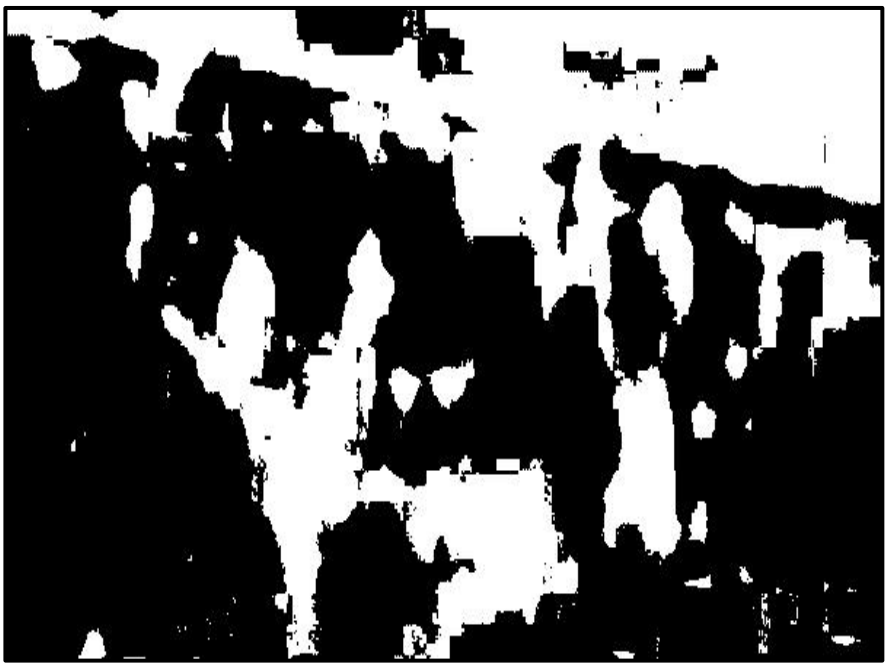
KONDISI POOR

CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 65.5%

Assesment Scale 65.5%



KONDISI POOR 
CATATAN: Kondisi: **POOR** Kerusakan pada lapisan/area terdampak korosi: 70.83%
Assesment Scale 70.83%

KONDISI POOR

CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 72%

Assesment Scale 72%

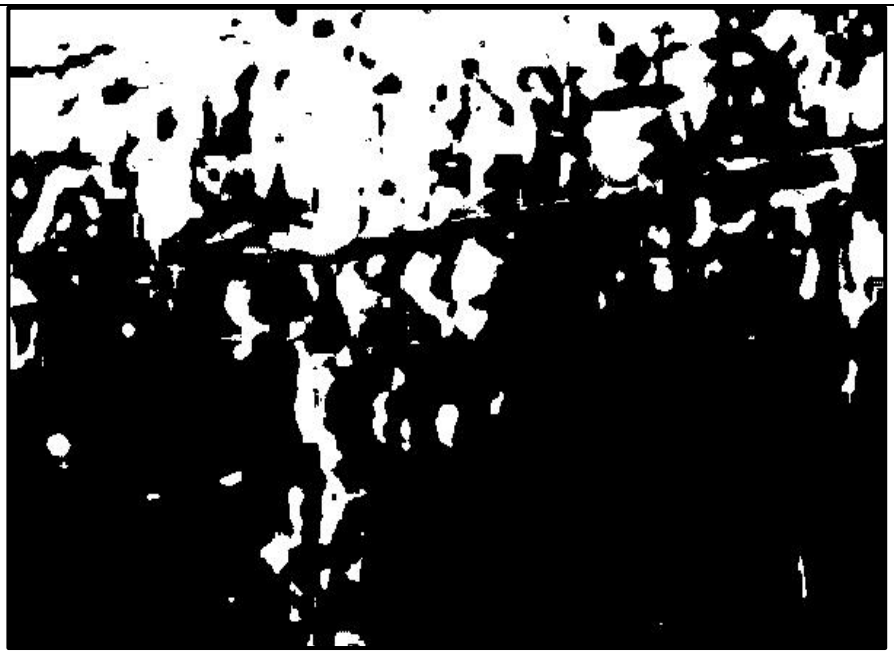
KONDISI POOR

CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 56.33%

Assesment Scale 56.33%



KONDISI POOR

CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 50.33%

Assesment Scale 50.33%

KONDISI POOR

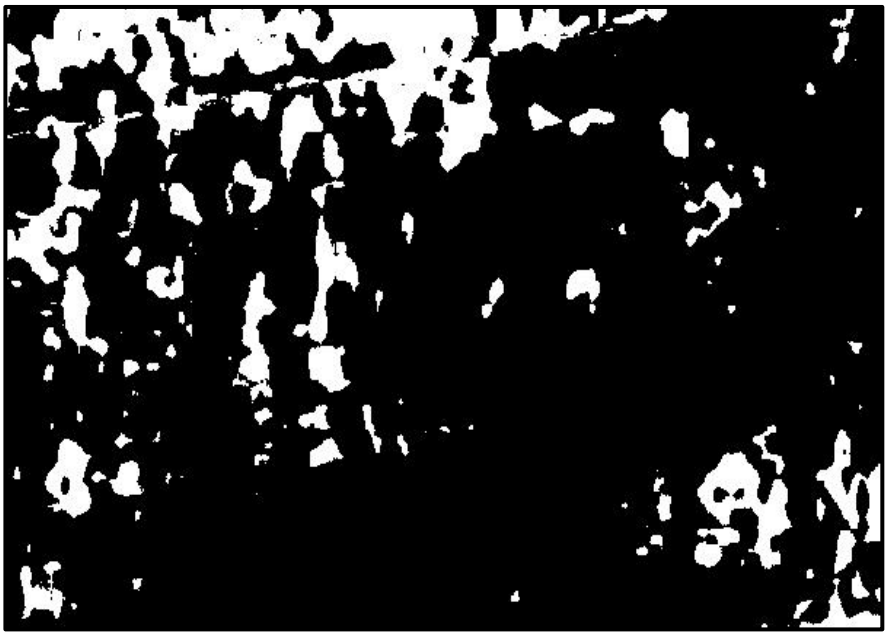
CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 74.16%

Assesment Scale 74.16%

KONDISI POOR

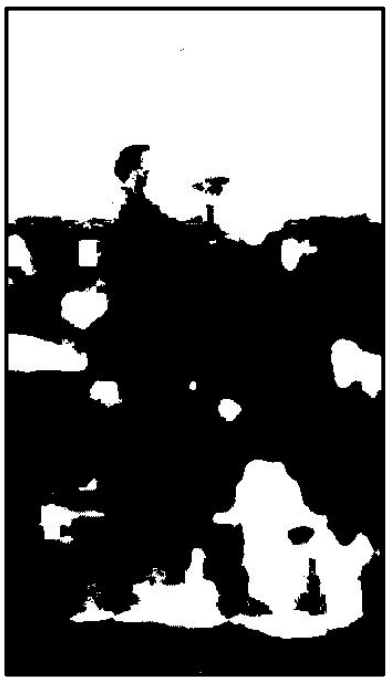
CATATAN: Kondisi: **POOR** Kerusakan pada lapisan/area terdampak korosi: 78.16%
Assesment Scale 78.16% 
KONDISI POOR

CATATAN:

Kondisi: **POOR**

Kerusakan pada lapisan/area terdampak korosi: 56.67%

Assesment Scale 56.67%



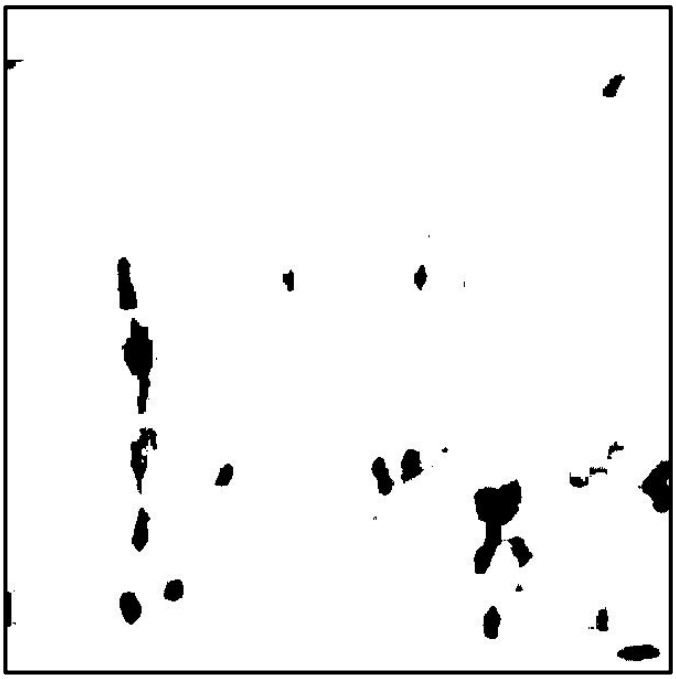
KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 6.83%

Assesment Scale 6.83%



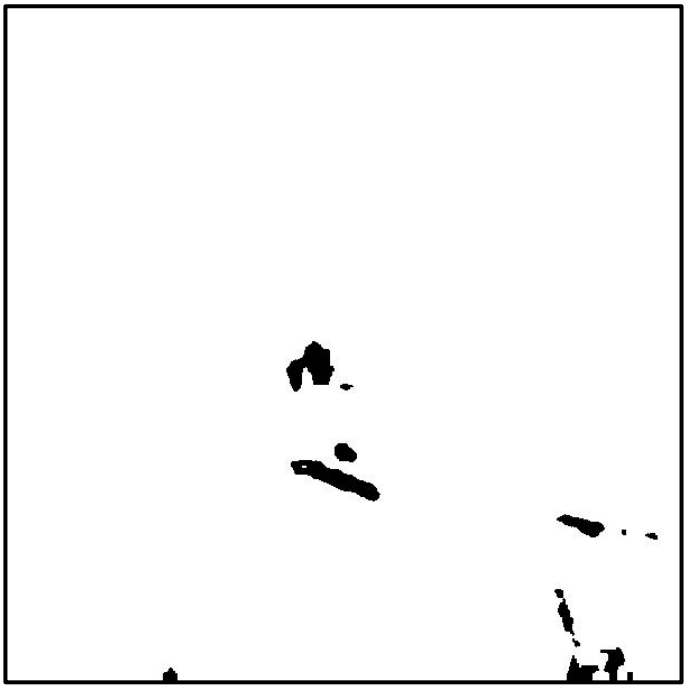
KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 3.27%

Assesment Scale 3.27%



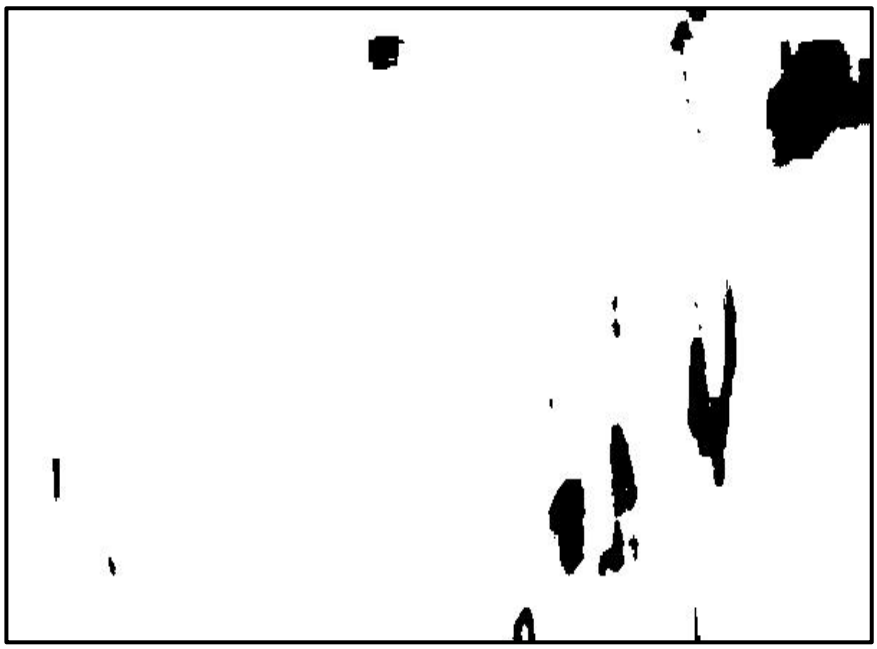
KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 3.96%

Assesment Scale 3.96%



KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 5.65%

Assesment Scale 5.65%

KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 8.16%

Assesment Scale 8.16%

KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 8.16%

Assesment Scale 8.16%

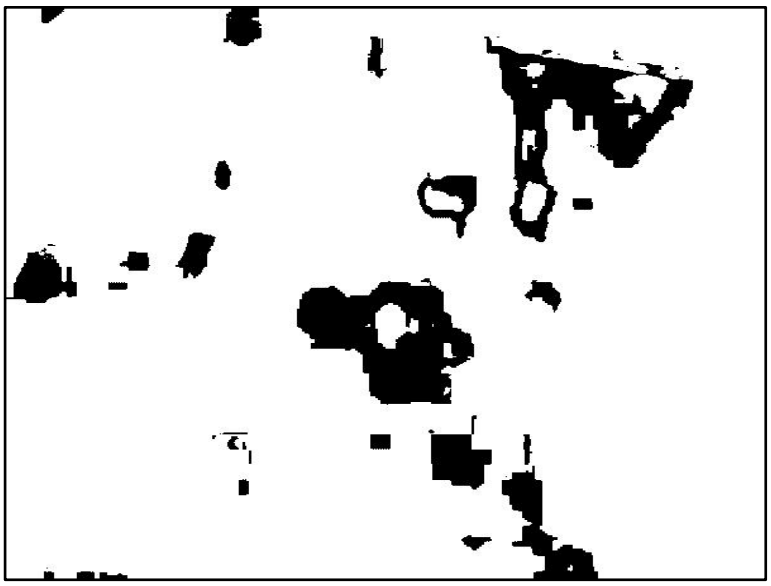
KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 9.8%

Assesment Scale 9.8%



KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi:5.75 %

Assesment Scale 5.75%

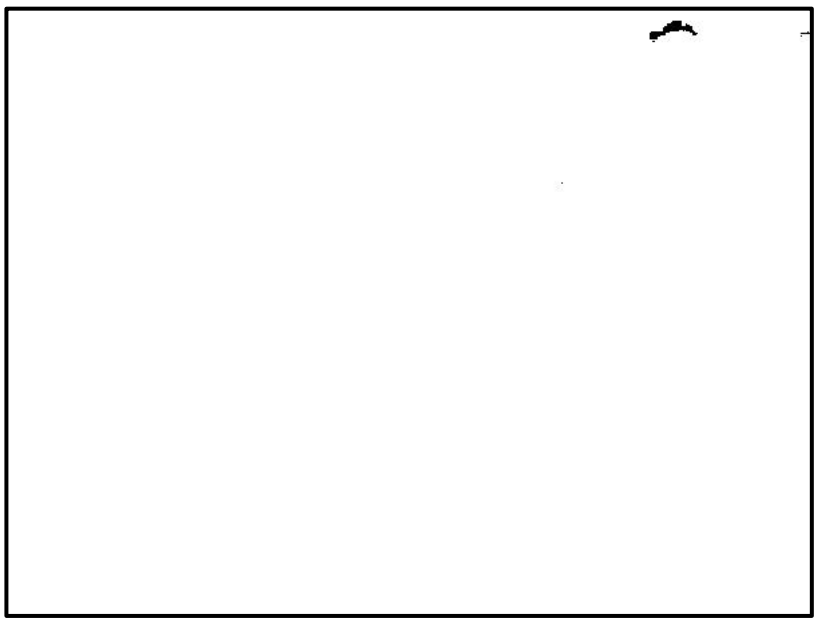
KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0.075%

Assesment Scale 0.075%



KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

KONDISI GOOD

CATATAN:

Kondisi: GOOD

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

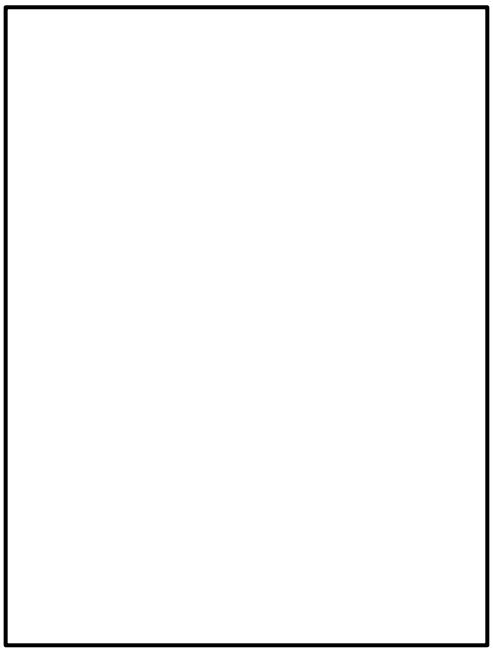
KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%



KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

KONDISI GOOD

CATATAN:

Kondisi: GOOD

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

KONDISI GOOD

CATATAN:

Kondisi: **GOOD**

Kerusakan pada lapisan/area terdampak korosi: 0%

Assesment Scale 0%

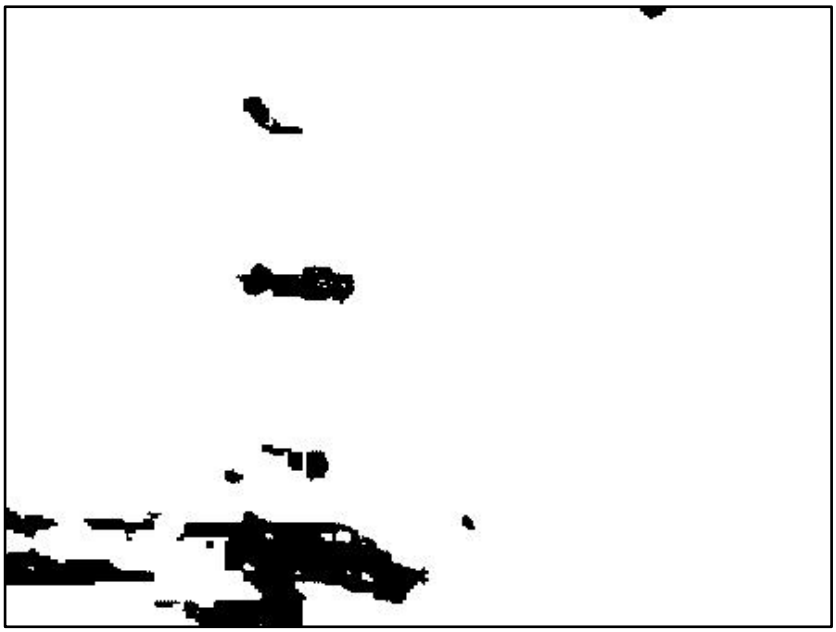
KONDISI FAIR

CATATAN:

Kondisi: **FAIR**

Kerusakan pada lapisan/area terdampak korosi: 4.9%

Assesment Scale 4.9%



- **Code Program Filter Color Threshold**

```
% Clear memory and command window
clc,clear,close all;
warning off


%% Uploading input image
[filename,pathname] = uigetfile('*.*','Choose the input
image');
im = imread([pathname,filename]);      % merubah image
menjadi nilai numerik
%set the image size to suitable value
scale = 600/(max(size(im(:,:,1))));   %Normalization
im = imresize(im,scale*size(im(:,:,1)));
% Image resize
[~,n,~] = size(im);

I = rgb2hsv(im);

% Define thresholds for channel 1 based on histogram
settings
channel1Min = 0.000;
channel1Max = 1.000;

% Define thresholds for channel 2 based on histogram
settings
channel2Min = 0.000;
channel2Max = 1.000;

% Define thresholds for channel 3 based on histogram
settings
channel3Min = 0.000;
```

```
channel3Max = 1.000;

% Create mask based on chosen histogram thresholds
sliderBW =  (I(:,:,1) >= channel1Min ) & (I(:,:,1) <=
channel1Max) & ...
            (I(:,:,2) >= channel2Min ) & (I(:,:,2) <=
channel2Max) & ...
            (I(:,:,3) >= channel3Min ) & (I(:,:,3) <=
channel3Max);

% Create mask based on selected regions of interest on
point cloud projection
I = double(I);
[m,n,~] = size(I);
polyBW = false([m,n]);
I = reshape(I,[m*n 3]);

% Convert HSV color space to canonical coordinates
Xcoord = I(:,2).*I(:,3).*cos(2*pi*I(:,1));
Ycoord = I(:,2).*I(:,3).*sin(2*pi*I(:,1));
I(:,1) = Xcoord;
I(:,2) = Ycoord;
%plot(Xcoord,Ycoord)
% clear Xcoord Ycoord

% Project 3D data into 2D projected view from current
camera view point within app
J = rotateColorSpace(I);

% Apply polygons drawn on point cloud in app
polyBW = applyPolygons(J,polyBW);

% Combine both masks
BW = sliderBW & polyBW;
```

```
%membalik nilai warna BW
BW1 = imcomplement(BW);

[a1,b1]=size(BW1);
a = 1;
b=1;
rust = 0;
for b=1:b1
    for a = 1:a1
        if BW1(a,b) == 0
            rust = rust + 1;
        else
            rust = rust;
         end
    a=a+1;
    end
    b=b+1;
end
z = string(rust);

persentase = (rust/(a1*b1))*100

%% BASED ON RULES FROM IACS Recomendation 87
if persentase > 20.00
    Re = "POOR"
elseif persentase > 3.00
    Re = "FAIR"
else
    Re = "GOOD"
end


n_fn = length(filename);
new_fn = filename(1,1:n_fn-4);
```

```
new_fn2 = new_fn +"_" + Re + "_" + persentase +
"_.jpg";
 imwrite(BW1,'DATA WORD/'+ Re + "/" + new_fn2);
T = string(filename);
 %delete(T)
 %imwrite(BW,'DATA WORD/GOOD/123.jpg');

string('SELESAI')



function J = rotateColorSpace(I)

% Translate the data to the mean of the current image
within app
shiftVec = [0.181864 0.096676 0.742684];
I = I - shiftVec;
I = [I ones(size(I,1),1)]';

% Apply transformation matrix
tMat = [0.987537 0.813953 0.000000 -0.673717;
    -0.002873 0.008873 0.770919 -0.501201;
    -0.510184 1.575477 -0.004342 7.842296;
    0.000000 0.000000 0.000000 1.000000];

J = (tMat*I)';
end

function polyBW = applyPolygons(J,polyBW)

% Define each manually generated ROI
hPoints(1).data = [-0.708173 -0.208816;
    -0.755325 -0.913486;
    -0.000907 -0.886140;
    -0.000907 -0.187781];
```

```
% Iteratively apply each ROI
for ii = 1:length(hPoints)
    if size(hPoints(ii).data,1) > 2
        in =
inpolygon(J(:,1),J(:,2),hPoints(ii).data(:,1),hPoints(i
i).data(:,2));
        in = reshape(in,size(polyBW));
        polyBW = polyBW | in;
    end
end

end
```

- **Code Program TrainingNetwork (CNN)**

```
clear
clc
delete net.mat

%INPUT DATASET
imds = imageDatastore('data',...
    'IncludeSubfolders',true,...
    'LabelSource','foldernames');

% PROSES AUGMENTASI DATA
augmenter = imageDataAugmenter( ...
    'RandXReflection',true, ...
    'RandRotation',[-180 180],...
    'RandXScale',[1 4], ...
    'RandYReflection',true, ...
    'RandYScale',[1 4]);

% MEMISAHKAN DATA TRAINING DAN DATA UJI
[imdsTrain,imdsTest] =
splitEachLabel(imds,0.8,'randomize');

% UKURAN CITRA
imageSize = [64 64 3];
datastore = augmentedImageDatastore...

(imageSize,imdsTrain,'DataAugmentation',augmenter);

%LAYER CNN
layers = [ ...
    imageInputLayer(imageSize,'Name','input')
    convolution2dLayer(3,8,'Padding','same')
    batchNormalizationLayer
    reluLayer
    maxPooling2dLayer(2,'Stride',2)
```

```
    convolution2dLayer(3,16,'Padding','same')
    batchNormalizationLayer
    reluLayer
    maxPooling2dLayer(2,'Stride',2)
    convolution2dLayer(3,32,'Padding','same')
    batchNormalizationLayer
    reluLayer
    maxPooling2dLayer(2,'Stride',2)
    convolution2dLayer(3,64,'Padding','same')
    batchNormalizationLayer
    reluLayer
    fullyConnectedLayer(32)
    reluLayer
    fullyConnectedLayer(16)
    reluLayer
    fullyConnectedLayer(8)
    fullyConnectedLayer(6)
    fullyConnectedLayer(3)
    softmaxLayer
    classificationLayer ];

%PARAMETER-PARAMETER TRAINING DATA
options = trainingOptions('sgdm', ...
    'MaxEpochs',1500,...
    'InitialLearnRate',0.01, ...
    'Verbose',true, ...
    'Plots','training-progress');

%PROSES TRAINING DATA
net = trainNetwork(datastore,layers,options);
%
analyzeNetwork(net)
```

```
%%TESTING DATA, VALIDASI DATA
imdsTest_rsz = augmentedImageDatastore...

(imageSize,imdsTest,'DataAugmentation',augmenter)
YPred = classify(net,imdsTest_rsz);

figure
idx = randperm(length(imdsTest_rsz.Files),25);
for i = 1:25
    subplot(5,5,i);
    I = readimage(imdsTest,idx(i));
    label = YPred(idx(i));
    imshow(I)
    title(char(label))
end
save net
```

- **Code Program Desain GUI**

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

% Last Modified by GUIDE v2.5 16-Jan-2022 01:23:54

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

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

% Update handles structure
guidata(hObject, handles);

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


% --- Outputs from this function are returned to the
command line.
function varargout = class_gui_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.
```

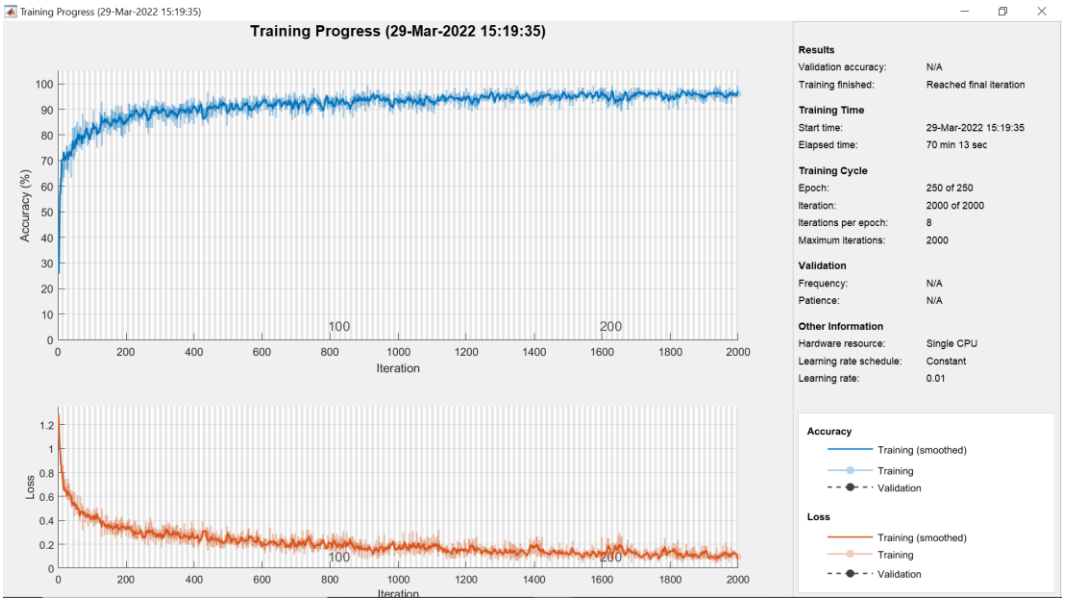
```
function pushbutton1_Callback(hObject, eventdata,
handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future
version of MATLAB
% handles    structure with handles and user data (see
GUIDATA)
clc,clear,close all;
warning off

%% Uploading input image
[filename,pathname] = uigetfile('*.*','Choose the input
image');
im = imread([pathname,filename]);     % merubah image
menjadi nilai numerik
% set the image size to suitable value
scale = 600/(max(size(im(:,:,1))));
im = imresize(im,scale*size(im(:,:,1)));
% % Image resize
[~,n,~] = size(im);

I = rgb2hsv(im);

% Define thresholds for channel 1 based on histogram
settings
channel1Min = 0.000;
channel1Max = 1.000;

% Define thresholds for channel 2 based on histogram
settings
channel2Min = 0.000;
channel2Max = 1.000;

% Define thresholds for channel 3 based on histogram
settings
```

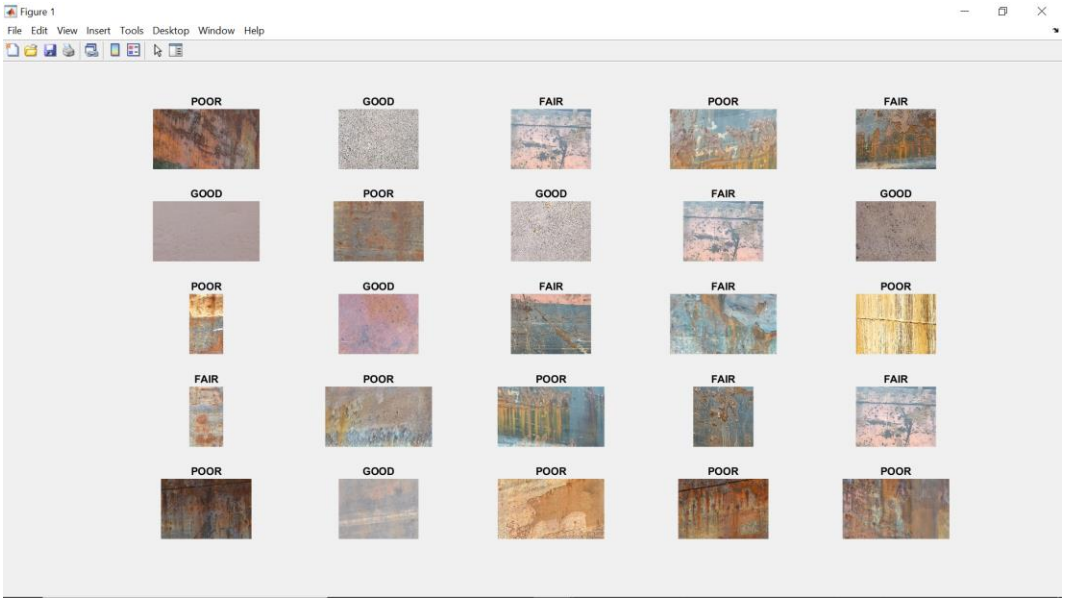
```
channel3Min = 0.000;
channel3Max = 1.000;

% Create mask based on chosen histogram thresholds
sliderBW = (I(:,:,1) >= channel1Min ) & (I(:,:,1) <=
channel1Max) & ...
    (I(:,:,2) >= channel2Min ) & (I(:,:,2) <=
channel2Max) & ...
    (I(:,:,3) >= channel3Min ) & (I(:,:,3) <=
channel3Max);

% Create mask based on selected regions of interest on
point cloud projection
I = double(I);
[m,n,~] = size(I);
polyBW = false([m,n]);
I = reshape(I,[m*n 3]);

% Convert HSV color space to canonical coordinates
Xcoord = I(:,2).*I(:,3).*cos(2*pi*I(:,1));
Ycoord = I(:,2).*I(:,3).*sin(2*pi*I(:,1));
I(:,1) = Xcoord;
I(:,2) = Ycoord;
clear Xcoord Ycoord

% Project 3D data into 2D projected view from current
camera view point within app
% J = rotateColorSpace(I);
% Translate the data to the mean of the current image
within app

shiftVec = [0.214497 0.110897 0.554577];
I = I - shiftVec;
I = [I ones(size(I,1),1)]';
```

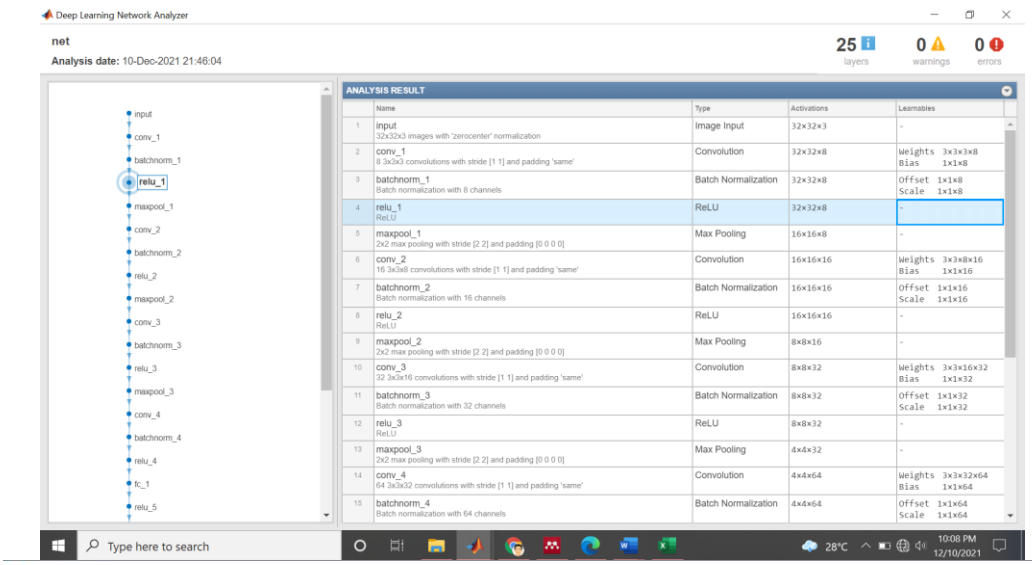
```
% Apply transformation matrix
tMat = [-1.469867 -0.968625 0.000000 0.657518;
    -0.115711 0.406616 1.103826 -0.538958;
    0.625913 -2.199506 0.204061 8.590879;
    0.000000 0.000000 0.000000 1.000000];

J = (tMat*I)';


% Apply polygons drawn on point cloud in app
%polyBW = applyPolygons(J,polyBW);

% Define each manually generated ROI
hPoints(1).data = [0.004425 -0.046427;
    0.799111 -0.059187;
    0.793801 -0.972793;
    0.025664 -0.960033];

% Iteratively apply each ROI
for ii = 1:length(hPoints)
    if size(hPoints(ii).data,1) > 2
        in =
inpolygon(J(:,1),J(:,2),hPoints(ii).data(:,1),hPoints(i
i).data(:,2));
        in = reshape(in,size(polyBW));
        polyBW = polyBW | in;
    end
end

% Combine both masks
BW = sliderBW & polyBW;

a = 1;
rust = 0;
for a=1:length(BW)
```

```
    if BW(a)==1
        rust = rust + 1;
    else
        rust = rust;
    end
    a=a+1;
end
persentase = rust/length(BW)*100;
%% BASED ON RULES FROM IACS Recomendation 87
if persentase > 20.00
    CLASS = "POOR"
elseif persentase > 3.00
    CLASS = "FAIR"
else
    CLASS = "GOOD"
end
persentase = persentase + "%"
n_fn = length(filename);
new_fn = filename(1,1:n_fn-4);
new_fn2 = i +"_" + CLASS + "_" + persentase + "_.jpg";
 imwrite(im,'data/'+ CLASS +"/" + new_fn2);
% imwrite(im, i + "_.jpg");
T = string(filename);
%  delete(T)

string('SELESAI')

run AppDETECT.m
```

- **Screenshot Proses Training Network (Epoch 250)**






Deep Learning Network Analyzer
net
Analysis date: 10-Dec-2021 21:46:04
25 layers
0 warnings
0 errors
ANALYSIS RESULT
Name
Type
Activations
Learnables
input
conv_1
batchnorm_1
relu_1
maxpool_1
conv_2
batchnorm_2
relu_2
maxpool_2
conv_3
batchnorm_3
relu_3
maxpool_3
conv_4
batchnorm_4
relu_4
fc_1
relu_5
Type here to search
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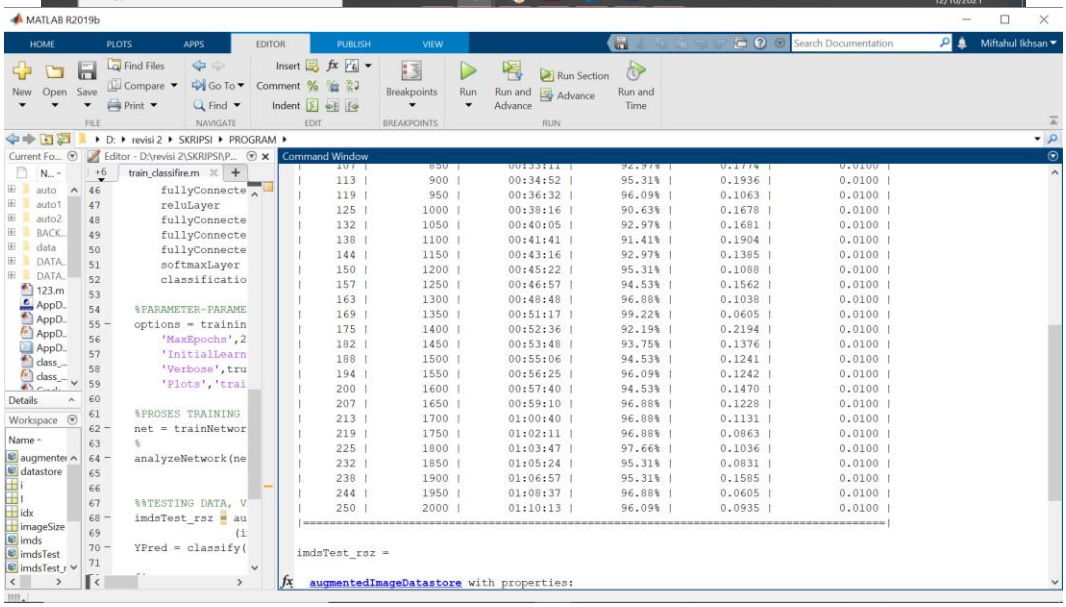
10:08 PM
12/10/2021


MATLAB R2019b
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
Search Documentation
Miftahul Ikhsan
New
Open
Save
Find Files
Compare
Print
Go To
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Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
FILE
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RUN
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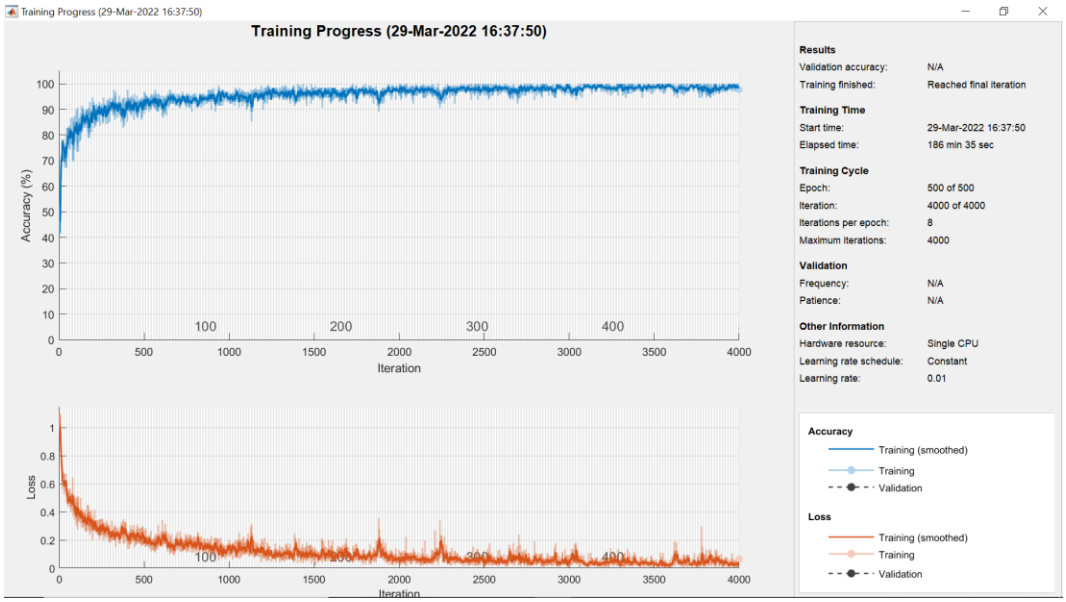
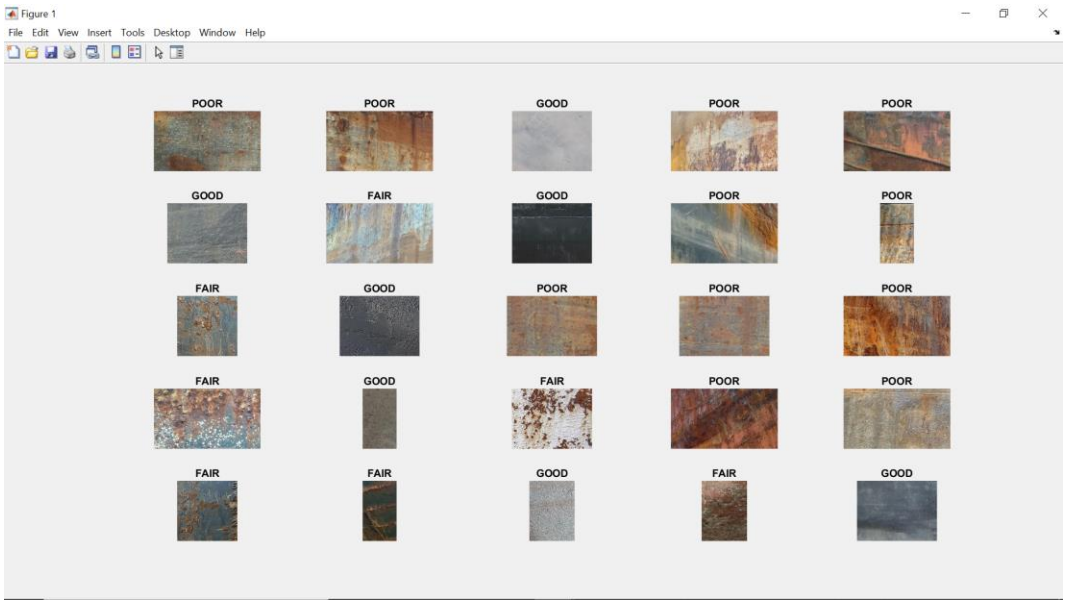
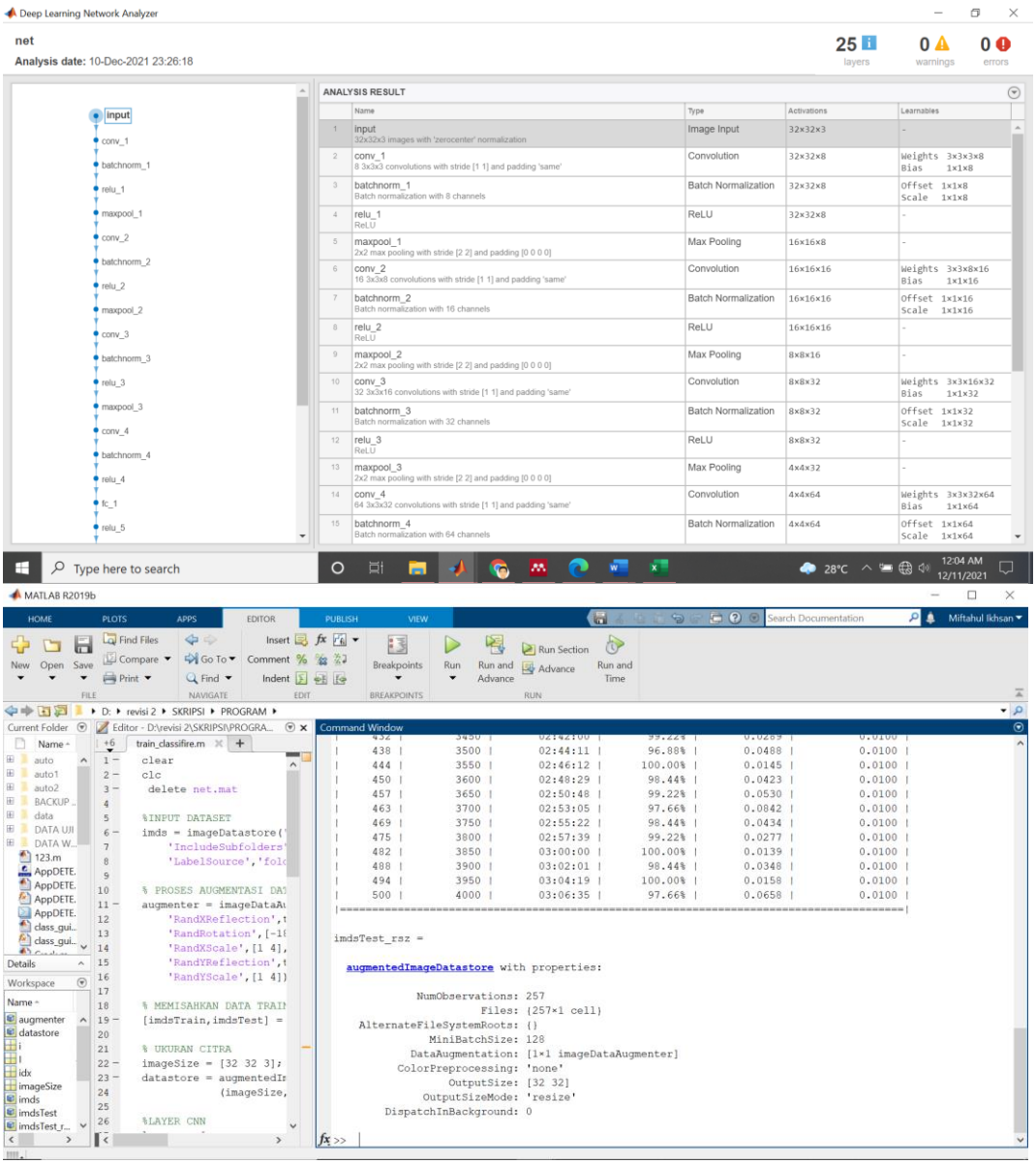
Editor - D:\revisi 2\SKRIPSI\P...
train_classifire.m
Command Window
Details
Workspace
Name
augmentedImageDatastore with properties:

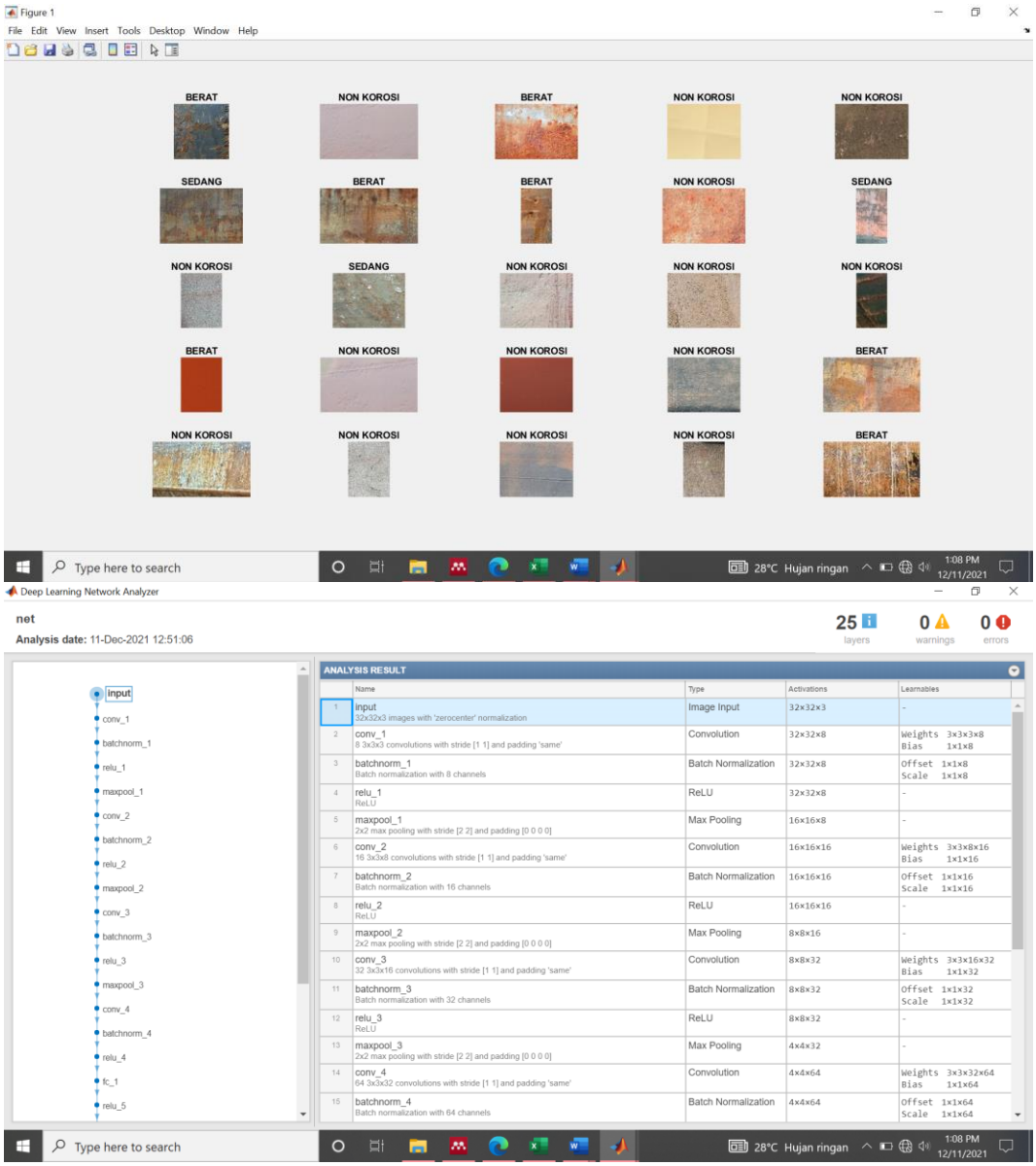
- **Screenshot Proses Training Network (Epoch 500)**

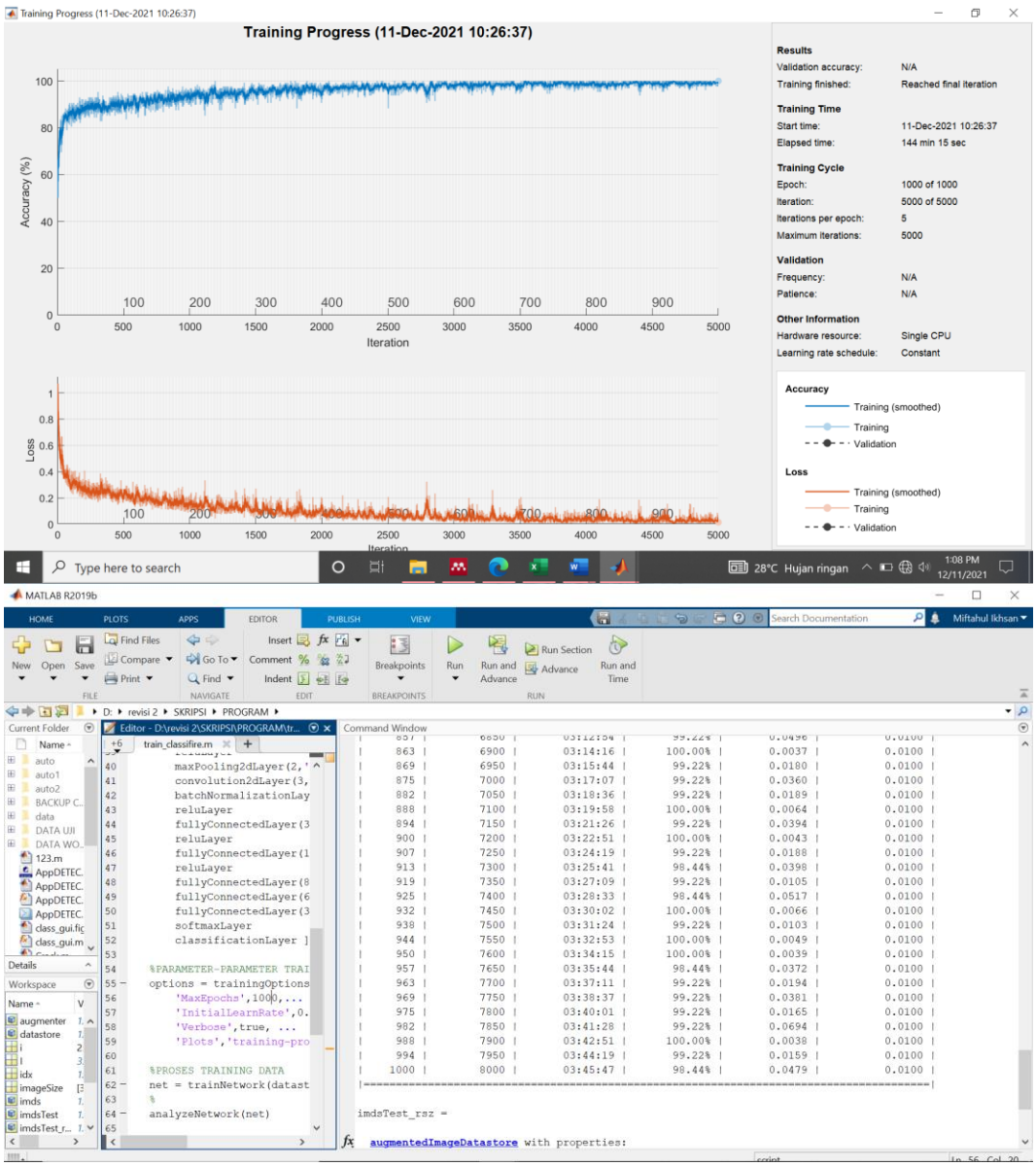





Deep Learning Network Analyzer
net
Analysis date: 10-Dec-2021 23:26:18
25 layers
0 warnings
0 errors
ANALYSIS RESULT
input
conv_1
batchnorm_1
relu_1
maxpool_1
conv_2
batchnorm_2
relu_2
maxpool_2
conv_3
batchnorm_3
relu_3
maxpool_3
conv_4
batchnorm_4
relu_4
fc_1
relu_5
MATLAB R2019b
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
NumObservations: 257
Files: {257×1 cell}
AlternateFileSystemRoots: {}
MiniBatchSize: 128
DataAugmentation: [1×1 imageDataAugmenter]
ColorPreprocessing: 'none'
OutputSize: [32 32]
OutputSizeMode: 'resize'
DispatchInBackground: 0

- **Screenshot Proses Training Network (Epoch 1000)**




Training Progress (11-Dec-2021 10:26:37)
Training Progress (11-Dec-2021 10:26:37)
Accuracy (%)
Iteration
Loss
Iteration
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 11-Dec-2021 10:26:37
Elapsed time: 144 min 15 sec
Training Cycle
Epoch: 1000 of 1000
Iteration: 5000 of 5000
Iterations per epoch: 5
Maximum iterations: 5000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
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MATLAB R2019b
HOME
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APPS
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Miftahul Ikhsan
New
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Save
Find Files
Compare
Print
Go To
Find
Insert
Comment
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Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
FILE
NAVIGATE
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BREAKPOINTS
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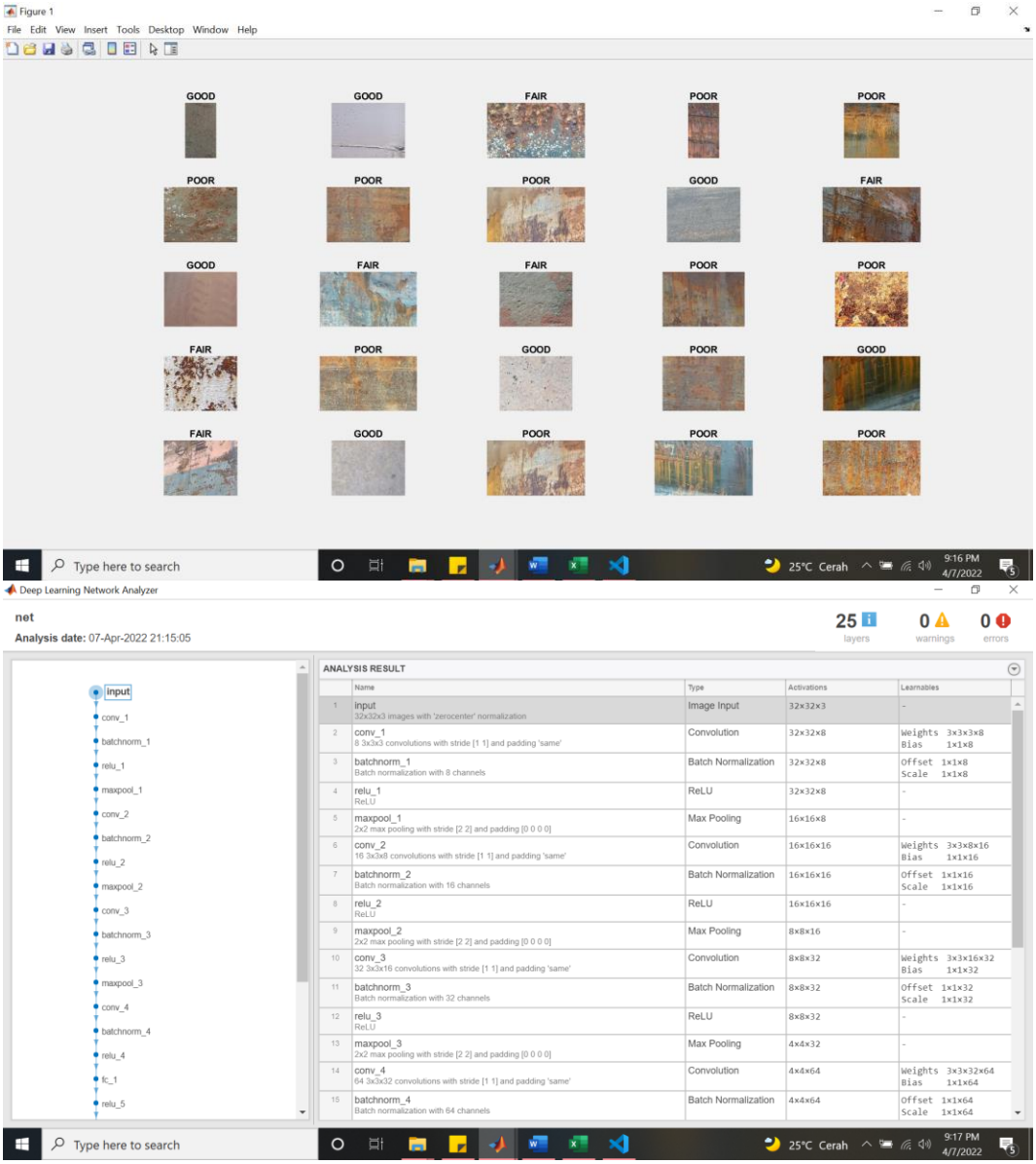
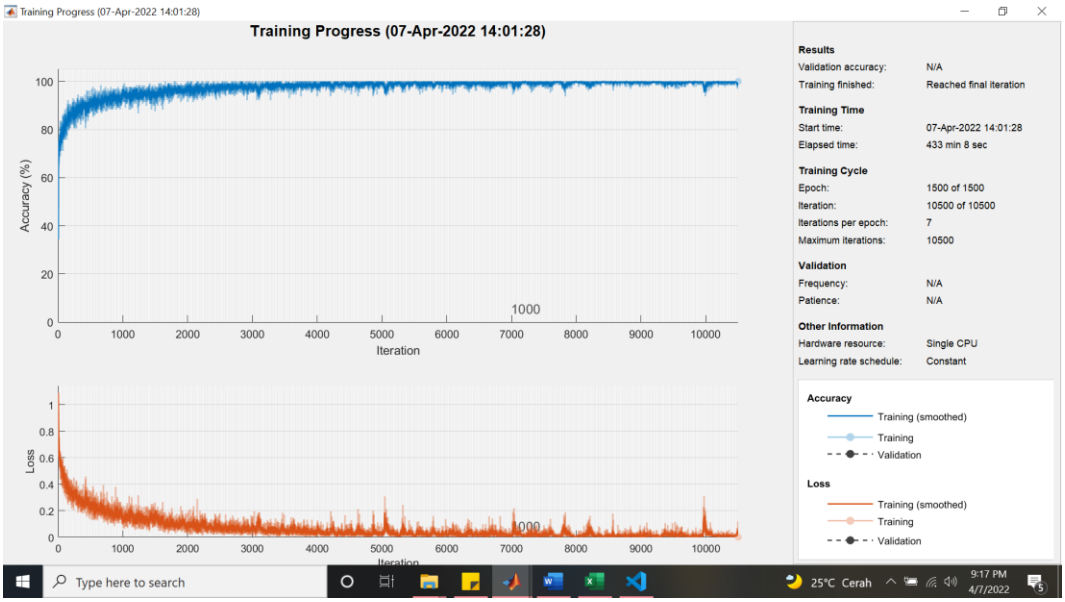
train_classifire.m
maxPooling2dLayer(2,'
convolution2dLayer(3,
batchNormalizationLay
reluLayer
fullyConnectedLayer(3
reluLayer
fullyConnectedLayer(1
reluLayer
fullyConnectedLayer(8
fullyConnectedLayer(6
fullyConnectedLayer(3
softmaxLayer
classificationLayer]
%PARAMETER-PARAMETER TRAI
options = trainingOptions
'MaxEpochs',1000,...
'InitialLearnRate',0.
'Verbose',true, ...
'Plots','training-pro
%PROSES TRAINING DATA
net = trainNetwork(datast
%
analyzeNetwork(net)
Command Window
863	6900	03:14:16	100.00%	0.0037	0.0100
869	6950	03:15:44	99.22%	0.0180	0.0100
875	7000	03:17:07	99.22%	0.0360	0.0100
882	7050	03:18:36	99.22%	0.0189	0.0100
888	7100	03:19:58	100.00%	0.0064	0.0100
894	7150	03:21:26	99.22%	0.0394	0.0100
900	7200	03:22:51	100.00%	0.0043	0.0100
907	7250	03:24:19	99.22%	0.0188	0.0100
913	7300	03:25:41	98.44%	0.0398	0.0100
919	7350	03:27:09	99.22%	0.0105	0.0100
925	7400	03:28:33	98.44%	0.0517	0.0100
932	7450	03:30:02	100.00%	0.0066	0.0100
938	7500	03:31:24	99.22%	0.0103	0.0100
944	7550	03:32:53	100.00%	0.0049	0.0100
950	7600	03:34:15	100.00%	0.0039	0.0100
957	7650	03:35:44	98.44%	0.0372	0.0100
963	7700	03:37:11	99.22%	0.0194	0.0100
969	7750	03:38:37	99.22%	0.0381	0.0100
975	7800	03:40:01	99.22%	0.0165	0.0100
982	7850	03:41:28	99.22%	0.0694	0.0100
988	7900	03:42:51	100.00%	0.0038	0.0100
994	7950	03:44:19	99.22%	0.0159	0.0100
1000	8000	03:45:47	98.44%	0.0479	0.0100
imdsTest_rsz =
augmentedImageDatastore with properties:

- **Screenshot Proses Training Network (Epoch 1500)**



	Name	Type	Activations	Learnables
1	input 32x32x3 images with 'zerocenter' normalization	Image Input	32×32×3	-
2	conv_1 8 3x3x3 convolutions with stride [1 1] and padding 'same'	Convolution	32×32×8	Weights 3×3×3×8 Bias 1×1×8
3	batchnorm_1 Batch normalization with 8 channels	Batch Normalization	32×32×8	Offset 1×1×8 Scale 1×1×8
4	relu_1 ReLU	ReLU	32×32×8	-
5	maxpool_1 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	16×16×8	-
6	conv_2 16 3x3x8 convolutions with stride [1 1] and padding 'same'	Convolution	16×16×16	Weights 3×3×8×16 Bias 1×1×16
7	batchnorm_2 Batch normalization with 16 channels	Batch Normalization	16×16×16	Offset 1×1×16 Scale 1×1×16
8	relu_2 ReLU	ReLU	16×16×16	-
9	maxpool_2 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	8×8×16	-
10	conv_3 32 3x3x16 convolutions with stride [1 1] and padding 'same'	Convolution	8×8×32	Weights 3×3×16×32 Bias 1×1×32
11	batchnorm_3 Batch normalization with 32 channels	Batch Normalization	8×8×32	Offset 1×1×32 Scale 1×1×32
12	relu_3 ReLU	ReLU	8×8×32	-
13	maxpool_3 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	4×4×32	-
14	conv_4 64 3x3x32 convolutions with stride [1 1] and padding 'same'	Convolution	4×4×64	Weights 3×3×32×64 Bias 1×1×64
15	batchnorm_4 Batch normalization with 64 channels	Batch Normalization	4×4×64	Offset 1×1×64 Scale 1×1×64


Training Progress (07-Apr-2022 14:01:28)
Training Progress (07-Apr-2022 14:01:28)
Accuracy (%)
Iteration
Loss
Iteration
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 07-Apr-2022 14:01:28
Elapsed time: 433 min 8 sec
Training Cycle
Epoch: 1500 of 1500
Iteration: 10500 of 10500
Iterations per epoch: 7
Maximum iterations: 10500
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
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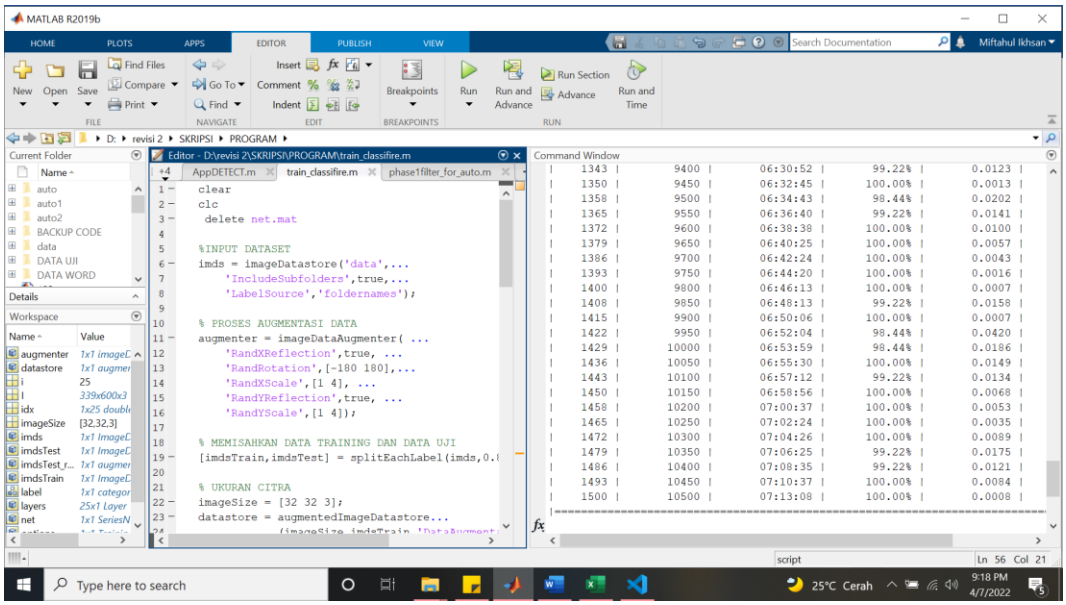
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Run and Advance
Run Section
Advance
Run and Time
FILE
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Current Folder
Name
auto
auto1
auto2
BACKUP CODE
data
DATA UJI
DATA WORD
Details
Workspace
Name
Value
augmenter
datastore
i
25
imageSize
[32,32,3]
imds
imdsTest
imdsTrain
label
layers
net
Editor - D:\revisi 2\SKRIPSI\PROGRAM\train_classifire.m
AppDETECT.m
train_classifire.m
phase1filter_for_auto.m
clear
clc
delete net.mat
%INPUT DATASET
imds = imageDatastore('data',...
'IncludeSubfolders',true,...
'LabelSource','foldernames');
% PROSES AUGMENTASI DATA
augmenter = imageDataAugmenter(...
'RandXReflection',true, ...
'RandRotation',[-180 180],...
'RandXScale',[1 4], ...
'RandYReflection',true, ...
'RandYScale',[1 4]);
% MEMISAHKAN DATA TRAINING DAN DATA UJI
% UKURAN CITRA
imageSize = [32 32 3];
datastore = augmentedImageDatastore...
Command Window
1343 | 9400 | 06:30:52 | 99.22% | 0.0123
1350 | 9450 | 06:32:45 | 100.00% | 0.0013
1358 | 9500 | 06:34:43 | 98.44% | 0.0202
1365 | 9550 | 06:36:40 | 99.22% | 0.0141
1372 | 9600 | 06:38:38 | 100.00% | 0.0100
1379 | 9650 | 06:40:25 | 100.00% | 0.0057
1386 | 9700 | 06:42:24 | 100.00% | 0.0043
1393 | 9750 | 06:44:20 | 100.00% | 0.0016
1400 | 9800 | 06:46:13 | 100.00% | 0.0007
1408 | 9850 | 06:48:13 | 99.22% | 0.0158
1415 | 9900 | 06:50:06 | 100.00% | 0.0007
1422 | 9950 | 06:52:04 | 98.44% | 0.0420
1429 | 10000 | 06:53:59 | 98.44% | 0.0186
1436 | 10050 | 06:55:30 | 100.00% | 0.0149
1443 | 10100 | 06:57:12 | 99.22% | 0.0134
1450 | 10150 | 06:58:56 | 100.00% | 0.0068
1458 | 10200 | 07:00:37 | 100.00% | 0.0053
1465 | 10250 | 07:02:24 | 100.00% | 0.0035
1472 | 10300 | 07:04:26 | 100.00% | 0.0089
1479 | 10350 | 07:06:25 | 99.22% | 0.0175
1486 | 10400 | 07:08:35 | 99.22% | 0.0121
1493 | 10450 | 07:10:37 | 100.00% | 0.0084
1500 | 10500 | 07:13:08 | 100.00% | 0.0008
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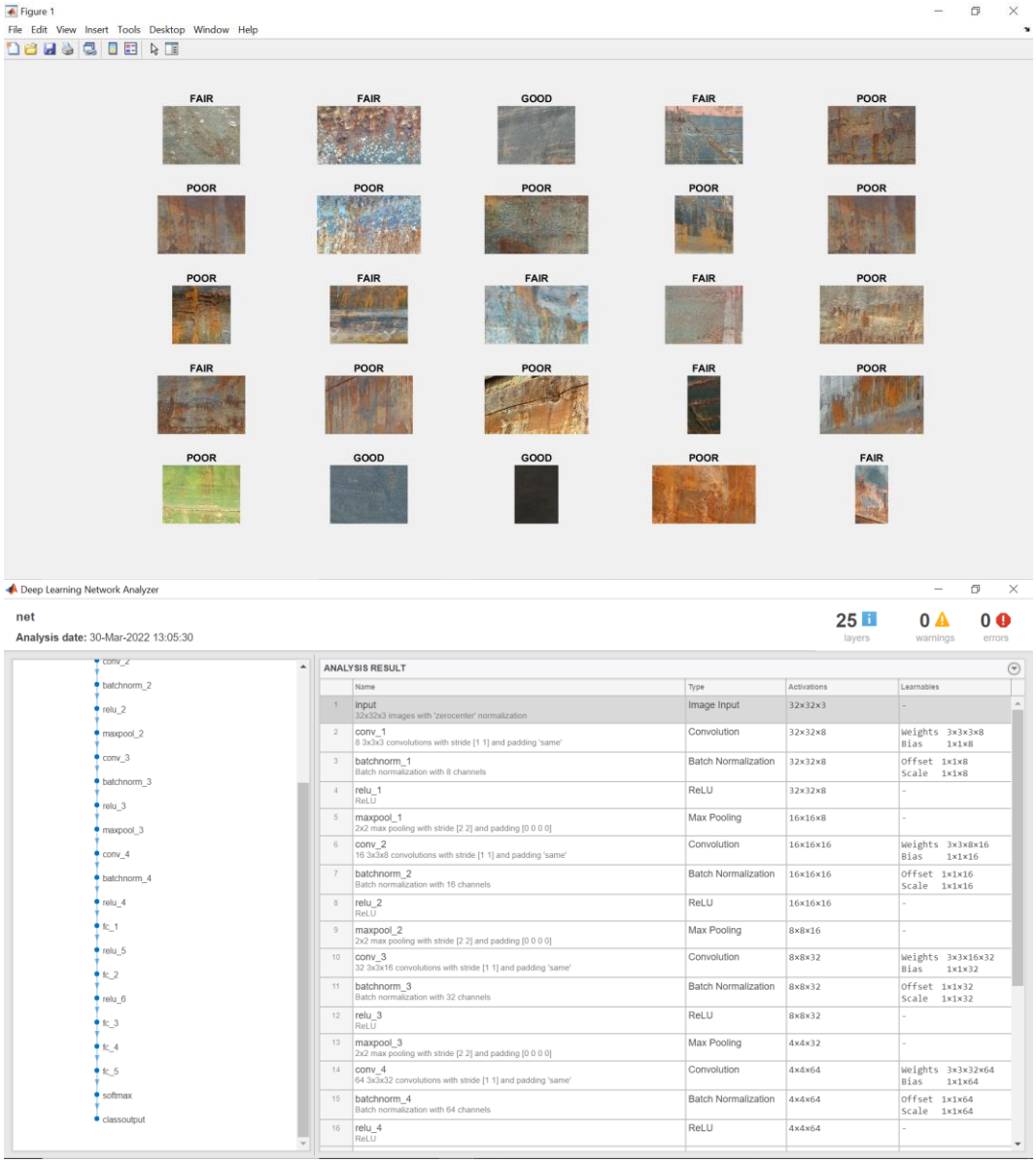
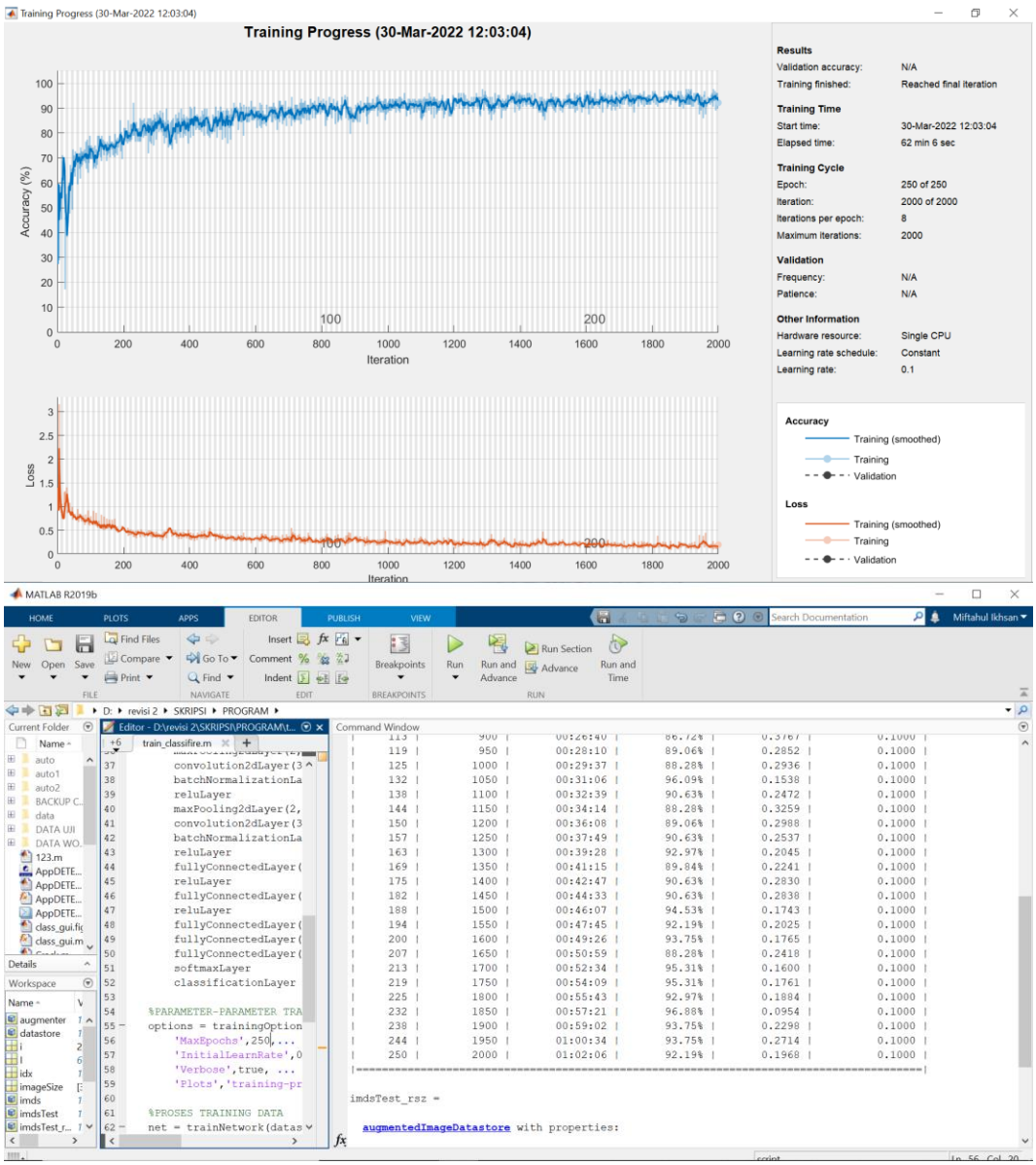
- **Screenshot Proses Training Network (Learning Rate 0.1)**




Training Progress (30-Mar-2022 12:03:04)
Training Progress (30-Mar-2022 12:03:04)
Accuracy (%)
Iteration
Loss
Iteration
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 30-Mar-2022 12:03:04
Elapsed time: 62 min 6 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Learning rate: 0.1
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
MATLAB R2019b
HOME
PLOTS
APPS
EDITOR
PUBLISH
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Search Documentation
Miftahul Ikhsan
New
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Find Files
Compare
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Run Section
Advance
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data
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AppDETE...
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class_gui.m
Details
Workspace
Name
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datastore
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imdsTest
imdsTest_r...
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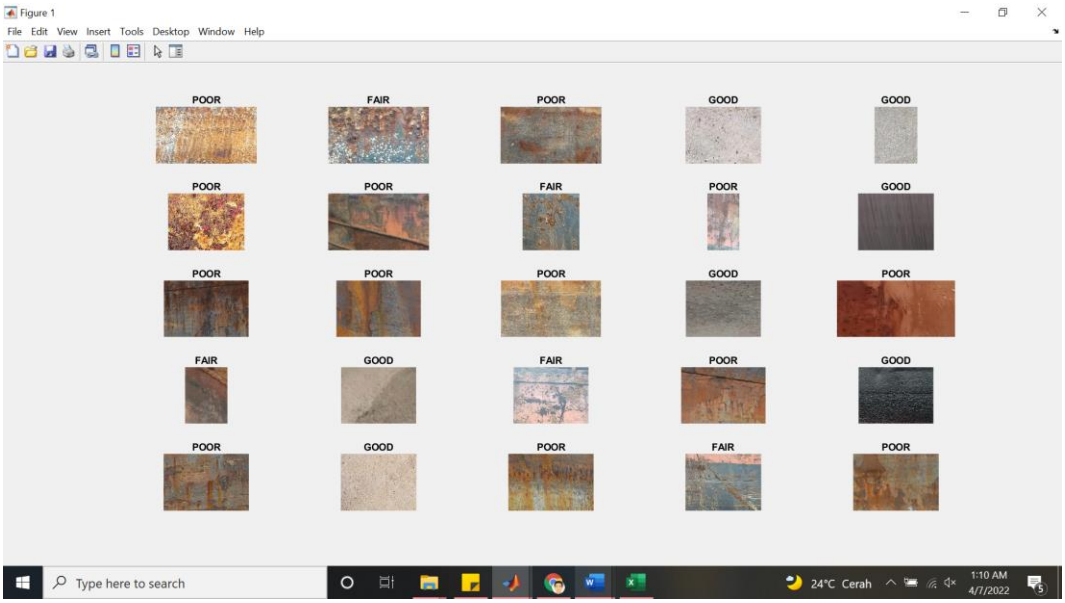
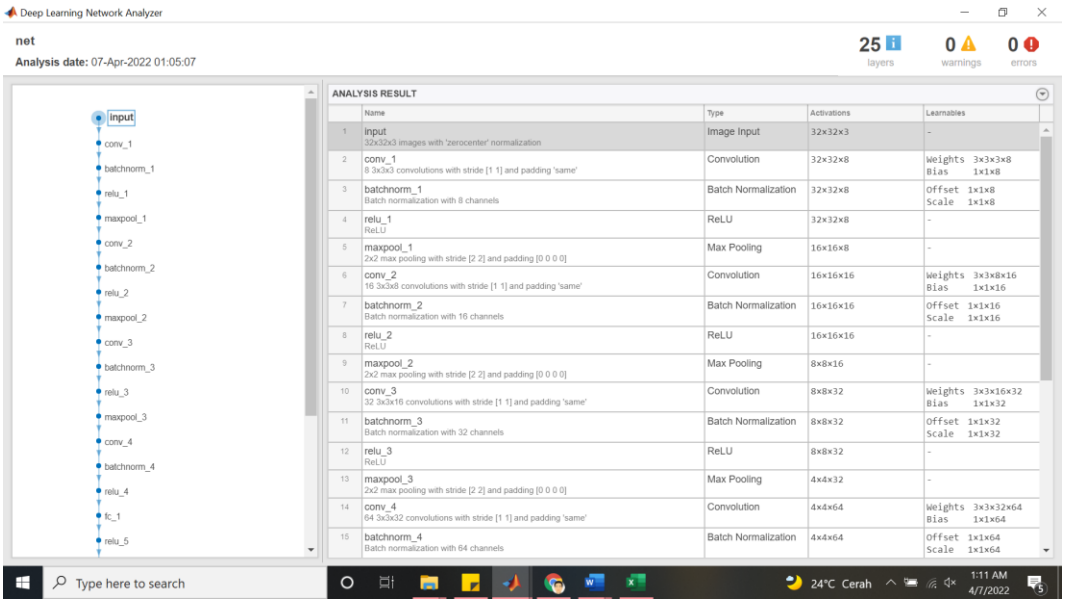
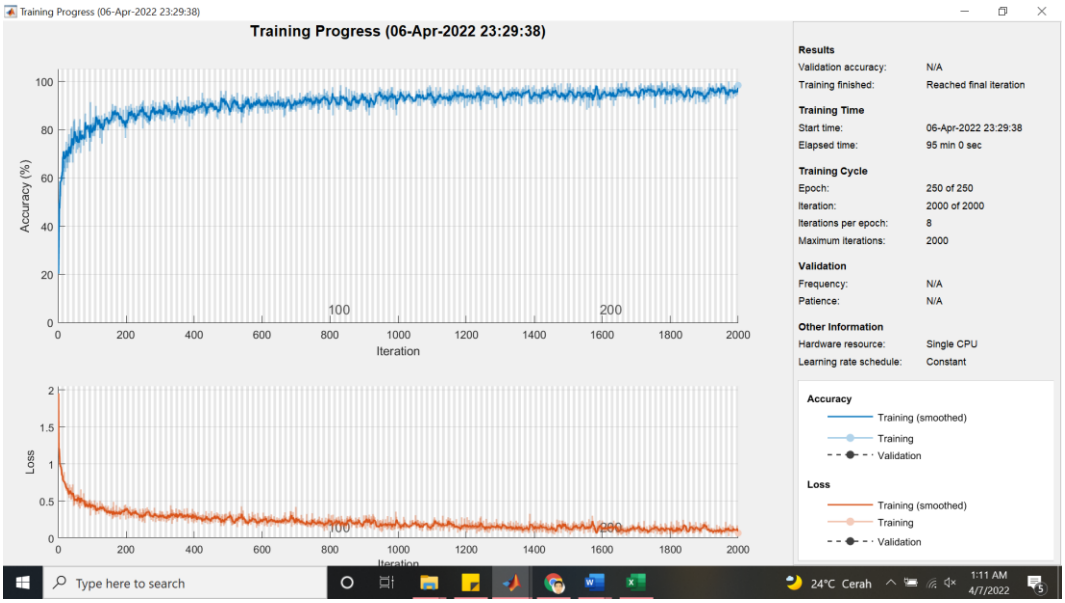
convolution2dLayer(3
batchNormalizationLa
reluLayer
maxPooling2dLayer(2,
convolution2dLayer(3
batchNormalizationLa
reluLayer
fullyConnectedLayer(
reluLayer
fullyConnectedLayer(
reluLayer
fullyConnectedLayer(
fullyConnectedLayer(
fullyConnectedLayer(
softmaxLayer
classificationLayer
%PARAMETER-PARAMETER TRA
options = trainingOption
'MaxEpochs',250,...
'InitialLearnRate',0
'Verbose',true, ...
'Plots','training-pr
%PROSES TRAINING DATA
net = trainNetwork(datas
Command Window
119	950	00:28:10	89.06%	0.2852	0.1000
125	1000	00:29:37	88.28%	0.2936	0.1000
132	1050	00:31:06	96.09%	0.1538	0.1000
138	1100	00:32:39	90.63%	0.2472	0.1000
144	1150	00:34:14	88.28%	0.3259	0.1000
150	1200	00:36:08	89.06%	0.2988	0.1000
157	1250	00:37:49	90.63%	0.2537	0.1000
163	1300	00:39:28	92.97%	0.2045	0.1000
169	1350	00:41:15	89.84%	0.2241	0.1000
175	1400	00:42:47	90.63%	0.2830	0.1000
182	1450	00:44:33	90.63%	0.2838	0.1000
188	1500	00:46:07	94.53%	0.1743	0.1000
194	1550	00:47:45	92.19%	0.2025	0.1000
200	1600	00:49:26	93.75%	0.1765	0.1000
207	1650	00:50:59	88.28%	0.2418	0.1000
213	1700	00:52:34	95.31%	0.1600	0.1000
219	1750	00:54:09	95.31%	0.1761	0.1000
225	1800	00:55:43	92.97%	0.1884	0.1000
232	1850	00:57:21	96.88%	0.0954	0.1000
238	1900	00:59:02	93.75%	0.2298	0.1000
244	1950	01:00:34	93.75%	0.2714	0.1000
250	2000	01:02:06	92.19%	0.1968	0.1000
imdsTest_rsz =
augmentedImageDatastore with properties:

- **Screenshot Proses Training Network (Learning Rate 0.01)**





	Name	Type	Activations	Learnables
1	input 32x32x3 images with 'zerocenter' normalization	Image Input	32×32×3	-
2	conv_1 8 3x3x3 convolutions with stride [1 1] and padding 'same'	Convolution	32×32×8	Weights 3×3×3×8 Bias 1×1×8
3	batchnorm_1 Batch normalization with 8 channels	Batch Normalization	32×32×8	Offset 1×1×8 Scale 1×1×8
4	relu_1 ReLU	ReLU	32×32×8	-
5	maxpool_1 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	16×16×8	-
6	conv_2 16 3x3x8 convolutions with stride [1 1] and padding 'same'	Convolution	16×16×16	Weights 3×3×8×16 Bias 1×1×16
7	batchnorm_2 Batch normalization with 16 channels	Batch Normalization	16×16×16	Offset 1×1×16 Scale 1×1×16
8	relu_2 ReLU	ReLU	16×16×16	-
9	maxpool_2 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	8×8×16	-
10	conv_3 32 3x3x16 convolutions with stride [1 1] and padding 'same'	Convolution	8×8×32	Weights 3×3×16×32 Bias 1×1×32
11	batchnorm_3 Batch normalization with 32 channels	Batch Normalization	8×8×32	Offset 1×1×32 Scale 1×1×32
12	relu_3 ReLU	ReLU	8×8×32	-
13	maxpool_3 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	4×4×32	-
14	conv_4 64 3x3x32 convolutions with stride [1 1] and padding 'same'	Convolution	4×4×64	Weights 3×3×32×64 Bias 1×1×64
15	batchnorm_4 Batch normalization with 64 channels	Batch Normalization	4×4×64	Offset 1×1×64 Scale 1×1×64


Training Progress (06-Apr-2022 23:29:38)
Training Progress (06-Apr-2022 23:29:38)
Accuracy (%)
Iteration
Loss
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 06-Apr-2022 23:29:38
Elapsed time: 95 min 0 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
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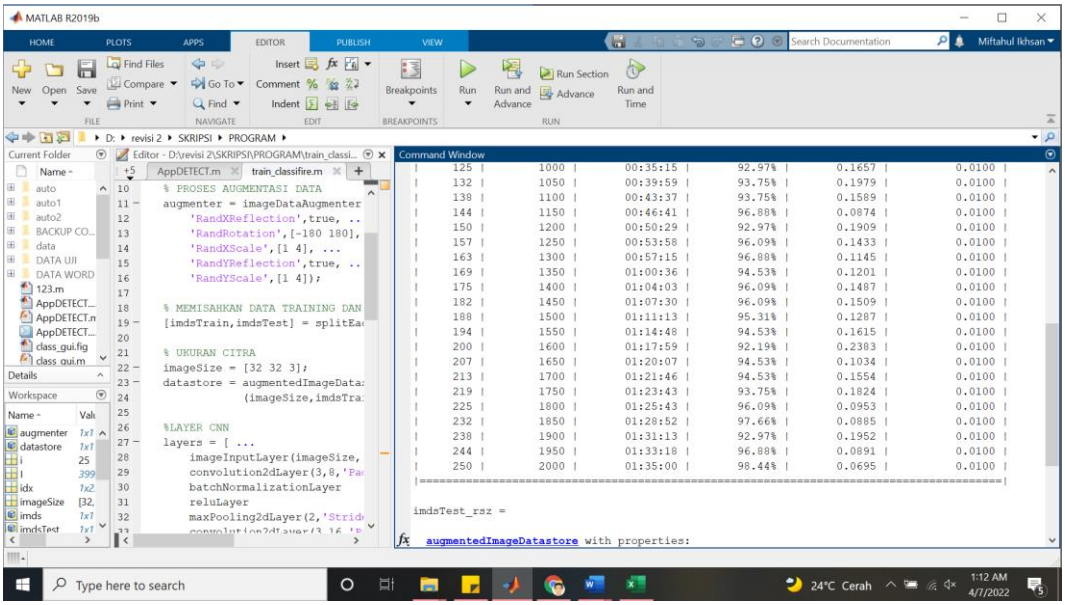
MATLAB R2019b
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D: ▸ revisi 2 ▸ SKRIPSI ▸ PROGRAM ▸
Current Folder
Editor - D:\revisi 2\SKRIPSI\PROGRAM\train_classi...
AppDETECT.m
train_classifire.m
% PROSES AUGMENTASI DATA
augmenter = imageDataAugmenter
'RandXReflection',true, ..
'RandRotation',[-180 180],
'RandXScale',[1 4], ...
'RandYReflection',true, ..
'RandYScale',[1 4]);
% MEMISAHKAN DATA TRAINING DAN
[imdsTrain,imdsTest] = splitEa
% UKURAN CITRA
imageSize = [32 32 3];
datastore = augmentedImageData
(imageSize,imdsTra
%LAYER CNN
layers = [...
imageInputLayer(imageSize,
convolution2dLayer(3,8,'Pa
batchNormalizationLayer
reluLayer
maxPooling2dLayer(2,'Stride
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
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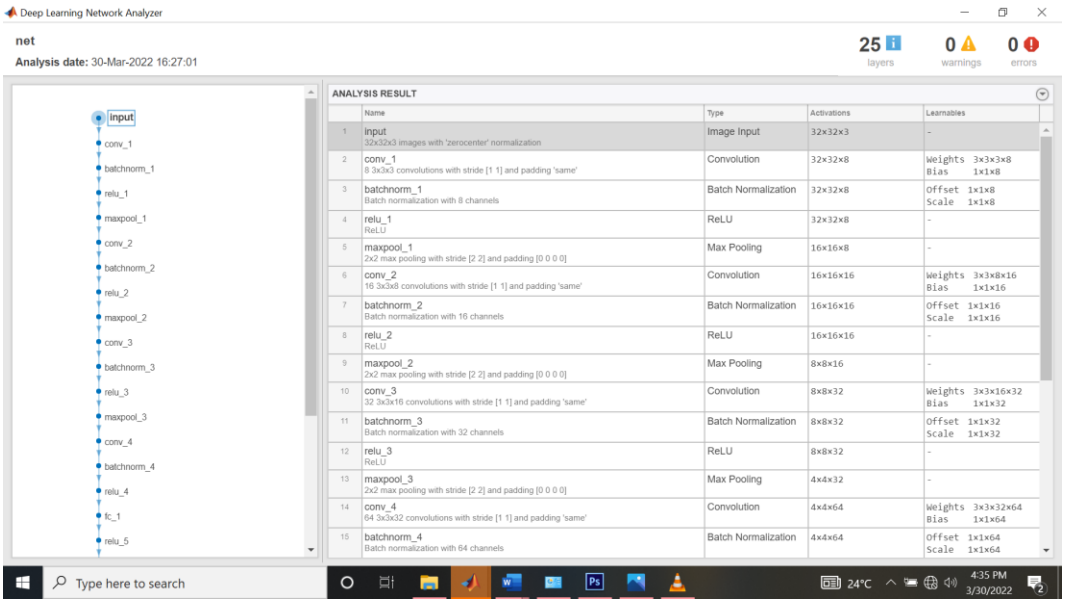
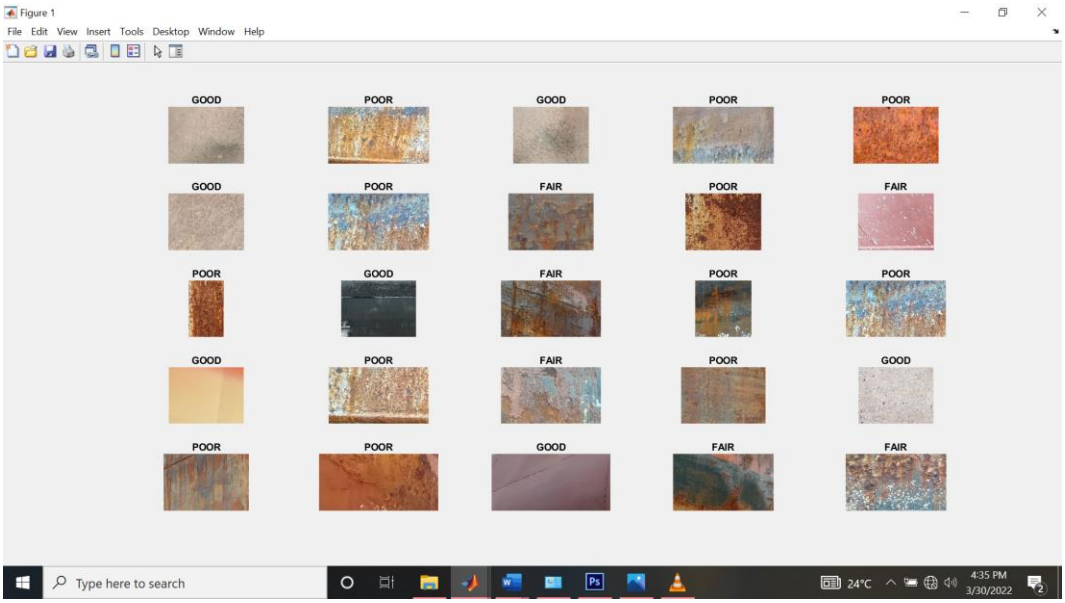
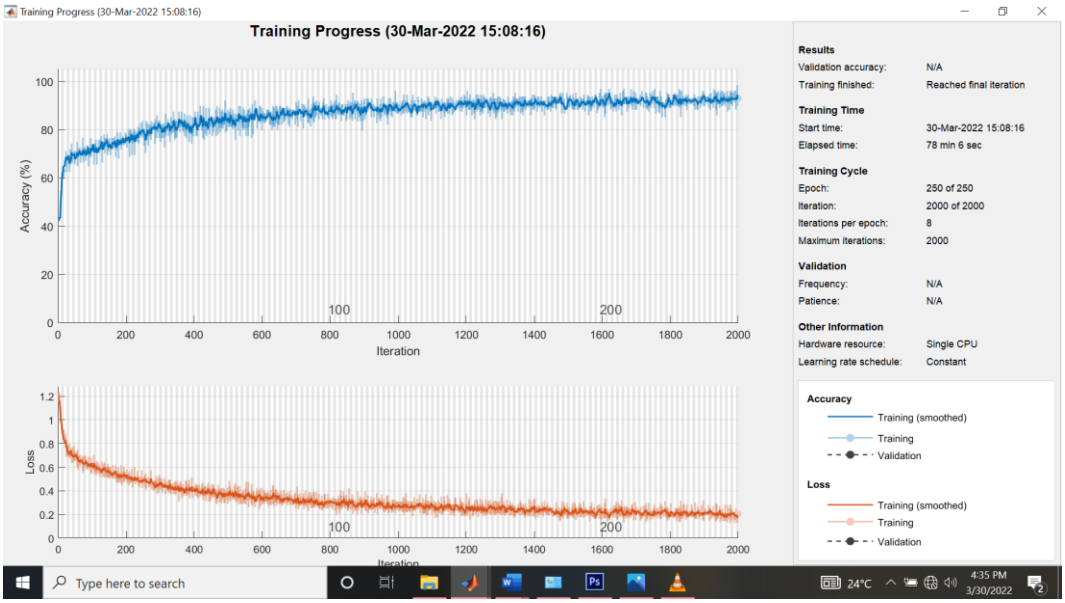
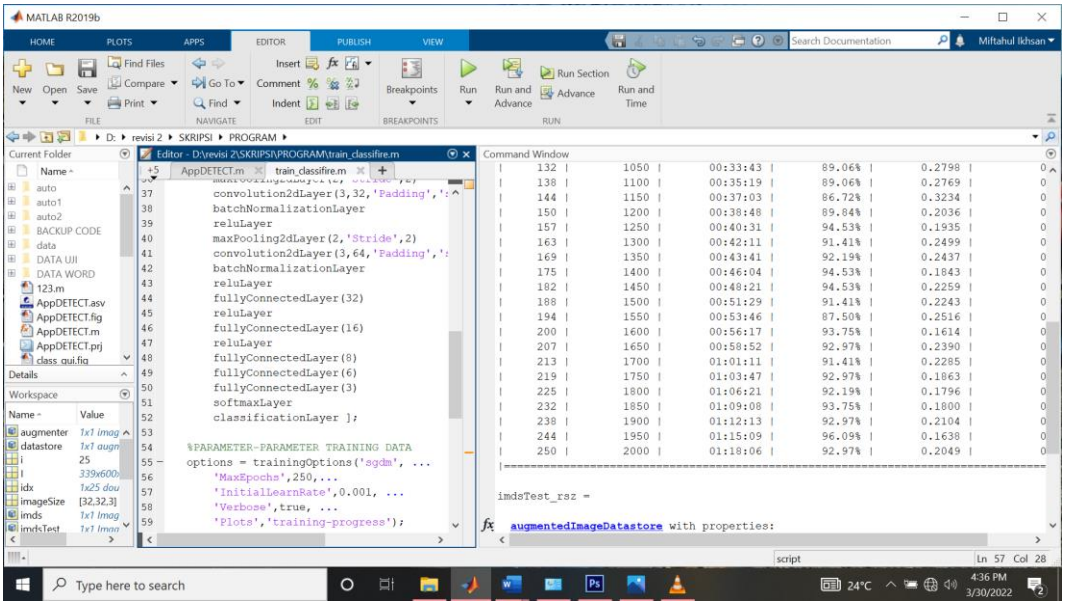
1:12 AM
4/7/2022

- **Screenshot Proses Training Network (Learning Rate 0.001)**






Training Progress (30-Mar-2022 15:08:16)
Training Progress (30-Mar-2022 15:08:16)
Accuracy (%)
Iteration
Loss
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 30-Mar-2022 15:08:16
Elapsed time: 78 min 6 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
Type here to search
4:35 PM
3/30/2022


MATLAB R2019b
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Current Folder
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auto1
auto2
BACKUP CODE
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123.m
AppDETECT.asv
AppDETECT.fig
AppDETECT.m
AppDETECT.prj
class_gui.fig
Details
Workspace
Name
Value
augmenter
datastore
i
25
I
idx
imageSize
[32,32,3]
imds
imdsTest
Editor - D:\revisi 2\SKRIPSI\PROGRAM\train_classifire.m
AppDETECT.m
train_classifire.m
convolution2dLayer(3,32,'Padding',
batchNormalizationLayer
reluLayer
maxPooling2dLayer(2,'Stride',2)
convolution2dLayer(3,64,'Padding',
batchNormalizationLayer
reluLayer
fullyConnectedLayer(32)
reluLayer
fullyConnectedLayer(16)
reluLayer
fullyConnectedLayer(8)
fullyConnectedLayer(6)
fullyConnectedLayer(3)
softmaxLayer
classificationLayer];
%PARAMETER-PARAMETER TRAINING DATA
options = trainingOptions('sgdm', ...
'MaxEpochs',250,...
'InitialLearnRate',0.001, ...
'Verbose',true, ...
'Plots','training-progress');
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
script
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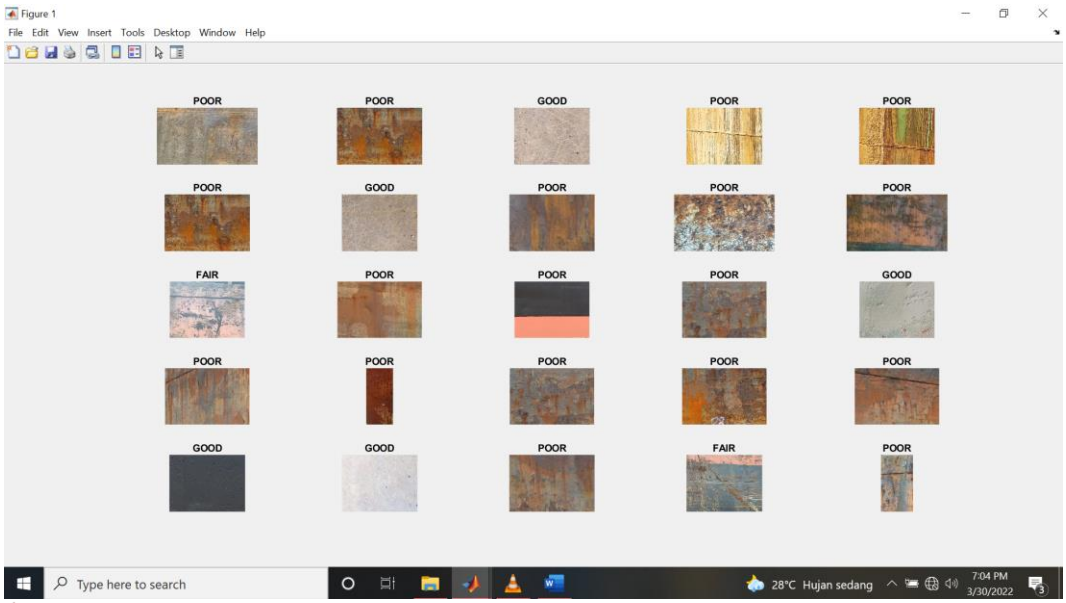
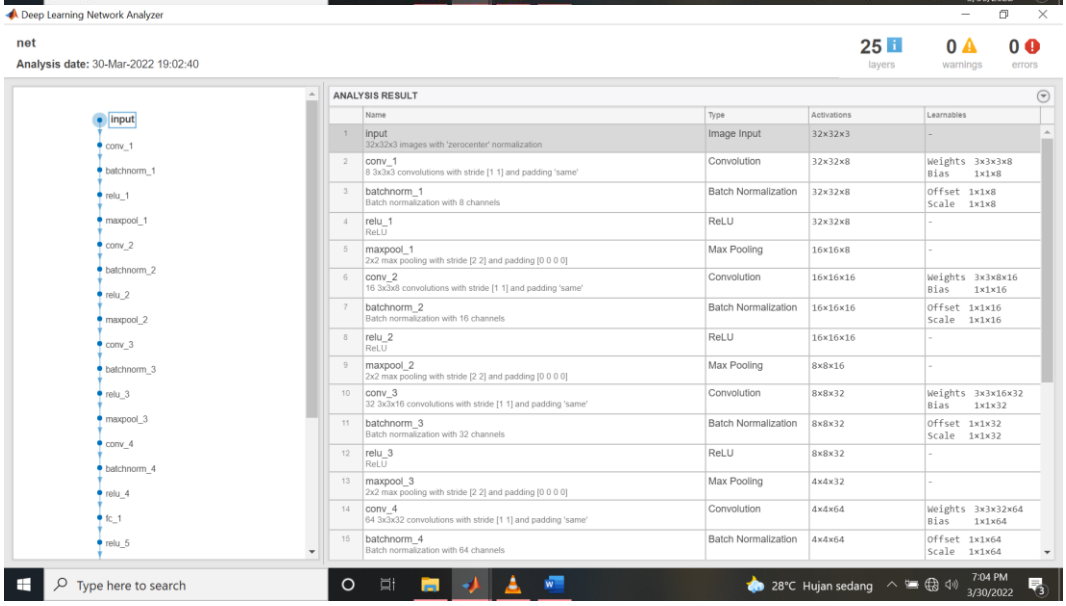
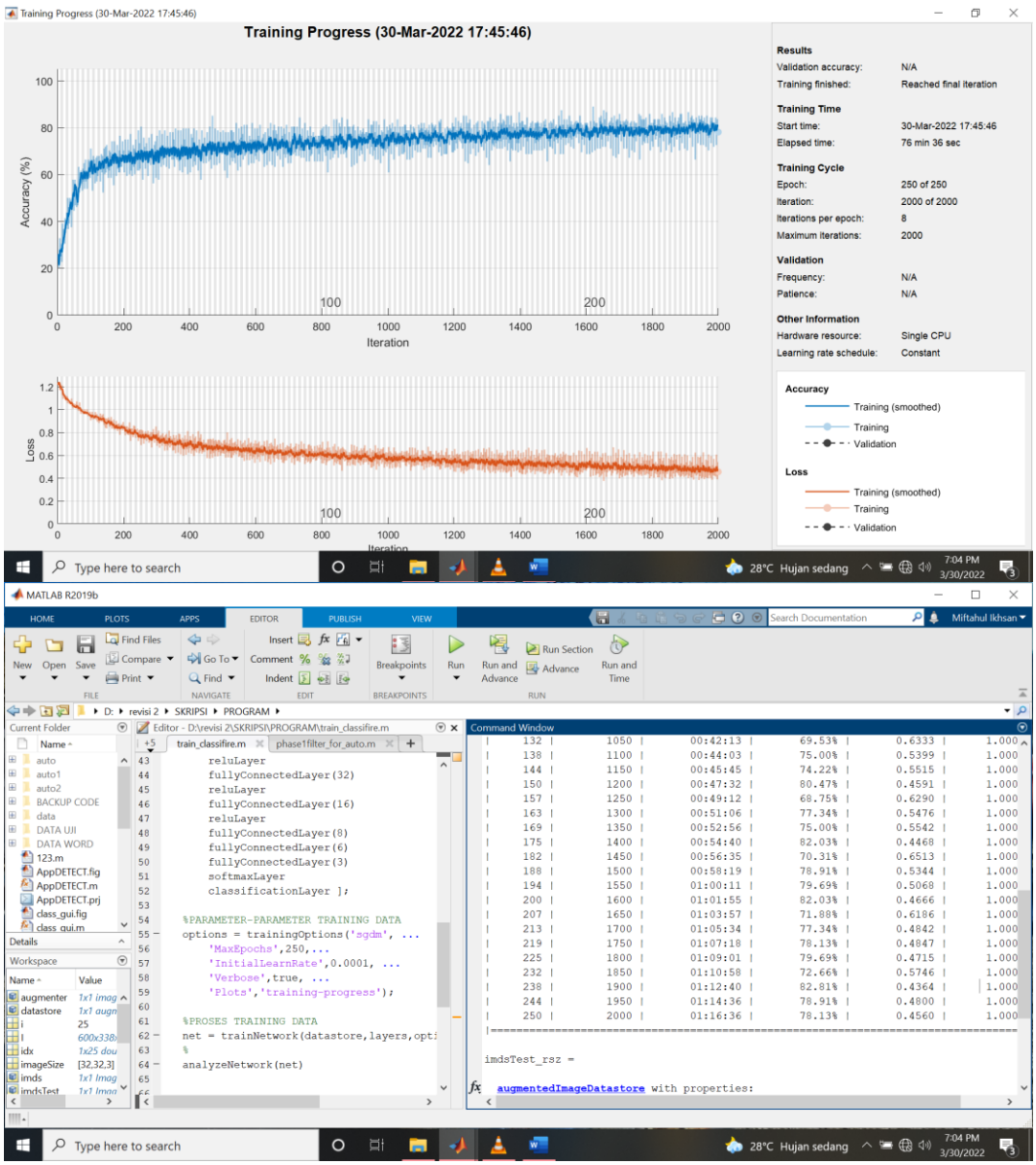
4:36 PM
3/30/2022

- **Screenshot Proses Training Network (Learning Rate 0.0001)**





	Name	Type	Activations	Learnables
1	input 32x32x3 images with 'zerocenter' normalization	Image Input	32×32×3	-
2	conv_1 8 3x3x3 convolutions with stride [1 1] and padding 'same'	Convolution	32×32×8	Weights 3×3×3×8 Bias 1×1×8
3	batchnorm_1 Batch normalization with 8 channels	Batch Normalization	32×32×8	Offset 1×1×8 Scale 1×1×8
4	relu_1 ReLU	ReLU	32×32×8	-
5	maxpool_1 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	16×16×8	-
6	conv_2 16 3x3x8 convolutions with stride [1 1] and padding 'same'	Convolution	16×16×16	Weights 3×3×8×16 Bias 1×1×16
7	batchnorm_2 Batch normalization with 16 channels	Batch Normalization	16×16×16	Offset 1×1×16 Scale 1×1×16
8	relu_2 ReLU	ReLU	16×16×16	-
9	maxpool_2 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	8×8×16	-
10	conv_3 32 3x3x16 convolutions with stride [1 1] and padding 'same'	Convolution	8×8×32	Weights 3×3×16×32 Bias 1×1×32
11	batchnorm_3 Batch normalization with 32 channels	Batch Normalization	8×8×32	Offset 1×1×32 Scale 1×1×32
12	relu_3 ReLU	ReLU	8×8×32	-
13	maxpool_3 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	4×4×32	-
14	conv_4 64 3x3x32 convolutions with stride [1 1] and padding 'same'	Convolution	4×4×64	Weights 3×3×32×64 Bias 1×1×64
15	batchnorm_4 Batch normalization with 64 channels	Batch Normalization	4×4×64	Offset 1×1×64 Scale 1×1×64


Training Progress (30-Mar-2022 17:45:46)
Training Progress (30-Mar-2022 17:45:46)
Accuracy (%)
Iteration
Loss
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 30-Mar-2022 17:45:46
Elapsed time: 76 min 36 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
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28°C Hujan sedang
7:04 PM
3/30/2022
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auto1
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BACKUP CODE
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AppDETECT.fig
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AppDETECT.prj
class_gui.fig
class_gui.m
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Workspace
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Value
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datastore
i
25
l
idx
imageSize
[32,32,3]
imds
imdsTest
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train_classifire.m
phase1filter_for_auto.m
reluLayer
fullyConnectedLayer(32)
reluLayer
fullyConnectedLayer(16)
reluLayer
fullyConnectedLayer(8)
fullyConnectedLayer(6)
fullyConnectedLayer(3)
softmaxLayer
classificationLayer];
%PARAMETER-PARAMETER TRAINING DATA
options = trainingOptions('sgdm', ...
'MaxEpochs',250,...
'InitialLearnRate',0.0001, ...
'Verbose',true, ...
'Plots','training-progress');
%PROSES TRAINING DATA
net = trainNetwork(datastore,layers,opti
%
analyzeNetwork(net)
Command Window
132 1050 00:42:13 69.53% 0.6333 1.000
138 1100 00:44:03 75.00% 0.5399 1.000
144 1150 00:45:45 74.22% 0.5515 1.000
150 1200 00:47:32 80.47% 0.4591 1.000
157 1250 00:49:12 68.75% 0.6290 1.000
163 1300 00:51:06 77.34% 0.5476 1.000
169 1350 00:52:56 75.00% 0.5542 1.000
175 1400 00:54:40 82.03% 0.4468 1.000
182 1450 00:56:35 70.31% 0.6513 1.000
188 1500 00:58:19 78.91% 0.5344 1.000
194 1550 01:00:11 79.69% 0.5068 1.000
200 1600 01:01:55 82.03% 0.4666 1.000
207 1650 01:03:57 71.88% 0.6186 1.000
213 1700 01:05:34 77.34% 0.4842 1.000
219 1750 01:07:18 78.13% 0.4847 1.000
225 1800 01:09:01 79.69% 0.4715 1.000
232 1850 01:10:58 72.66% 0.5746 1.000
238 1900 01:12:40 82.81% 0.4364 1.000
244 1950 01:14:36 78.91% 0.4800 1.000
250 2000 01:16:36 78.13% 0.4560 1.000
imdsTest_rsz =
augmentedImageDatastore with properties:
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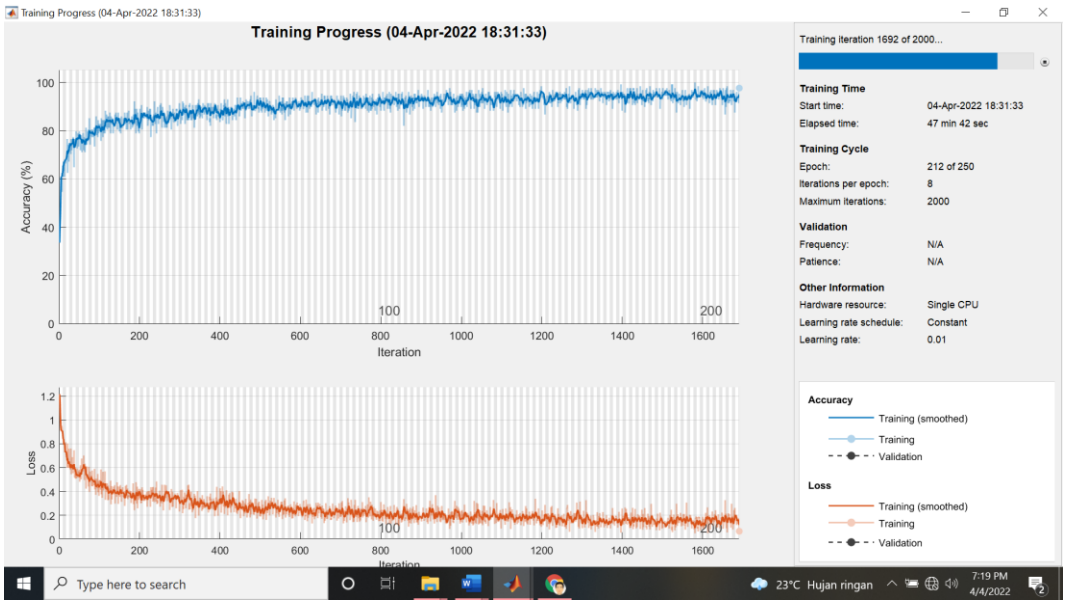
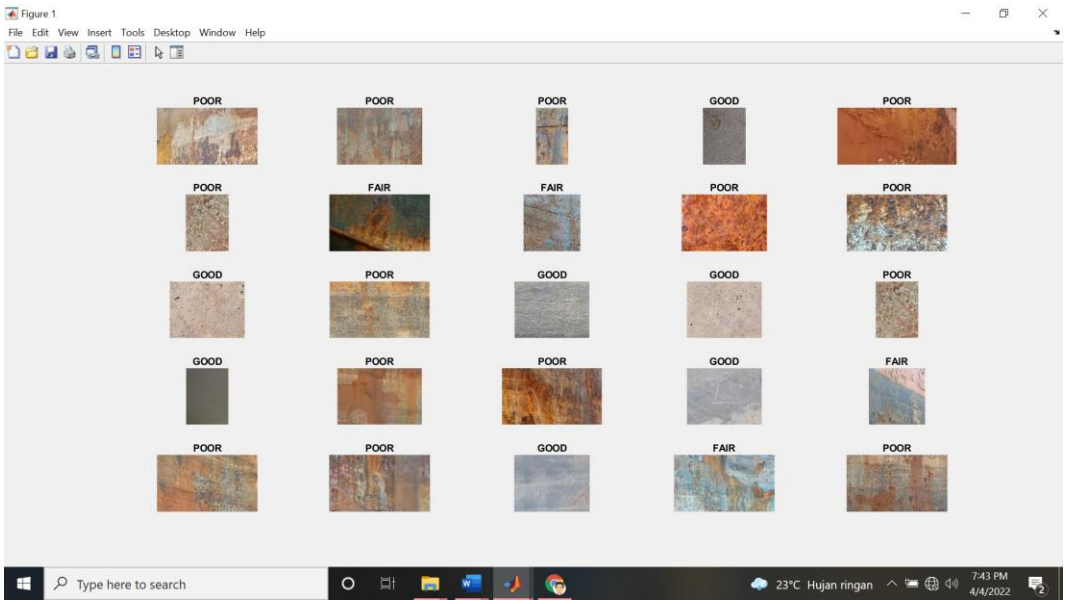
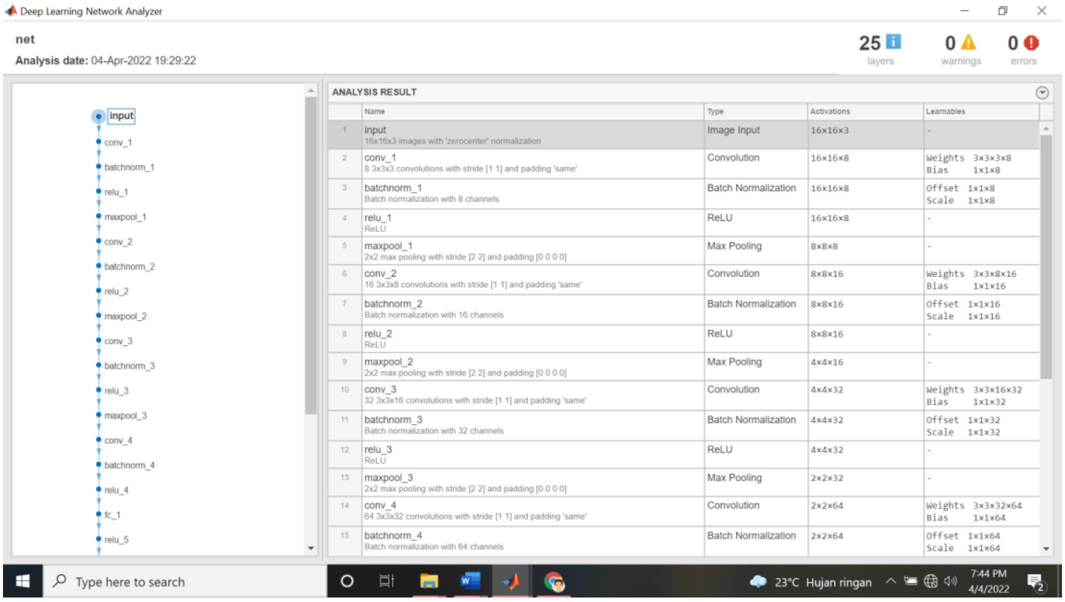
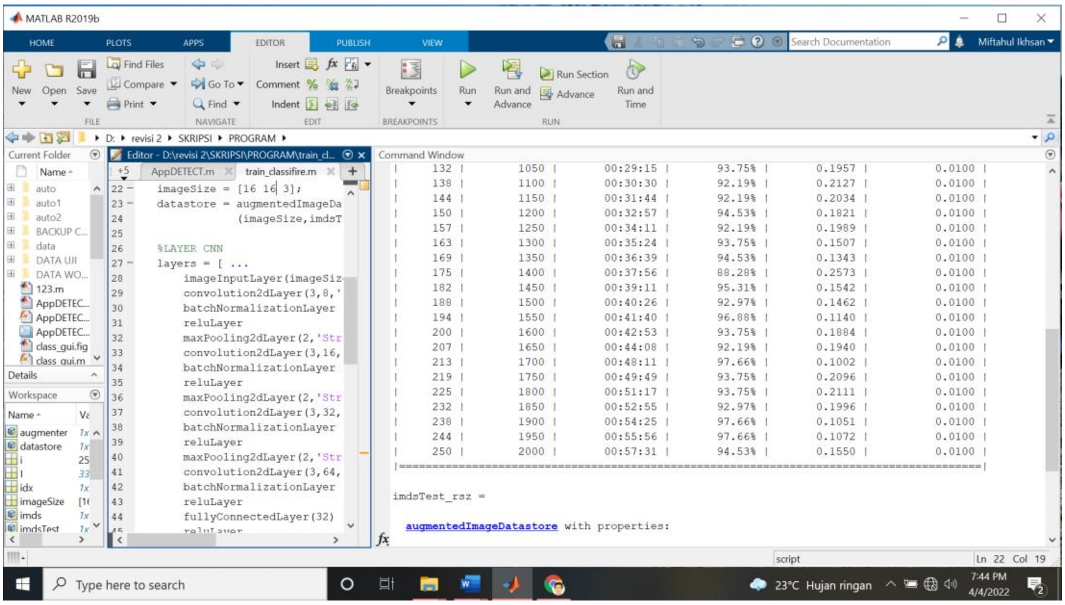
28°C Hujan sedang
7:04 PM
3/30/2022

- **Screenshot Proses Training Network (Image Size 16x16x3)**






Deep Learning Network Analyzer
net
Analysis date: 04-Apr-2022 19:29:22
25 layers
0 warnings
0 errors
ANALYSIS RESULT
input
conv_1
batchnorm_1
relu_1
maxpool_1
conv_2
batchnorm_2
relu_2
maxpool_2
conv_3
batchnorm_3
relu_3
maxpool_3
conv_4
batchnorm_4
relu_4
fc_1
relu_5
Name
Type
Activations
Learnables
Image Input
Convolution
Batch Normalization
ReLU
Max Pooling
Type here to search
23°C Hujan ringan
7:44 PM
4/4/2022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AppDETECT.m
train_classifire.m
imageSize = [16 16 3];
datastore = augmentedImageDa
%LAYER CNN
layers = [...
imageInputLayer(imageSiz
convolution2dLayer(3,8,'
batchNormalizationLayer
reluLayer
maxPooling2dLayer(2,'Str
fullyConnectedLayer(32)
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
Workspace
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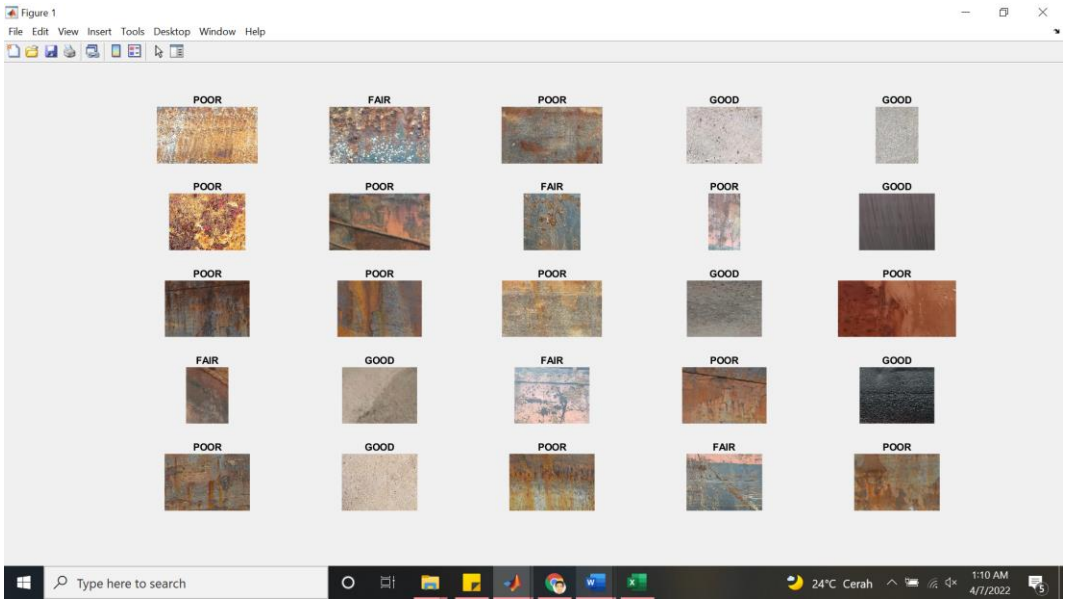
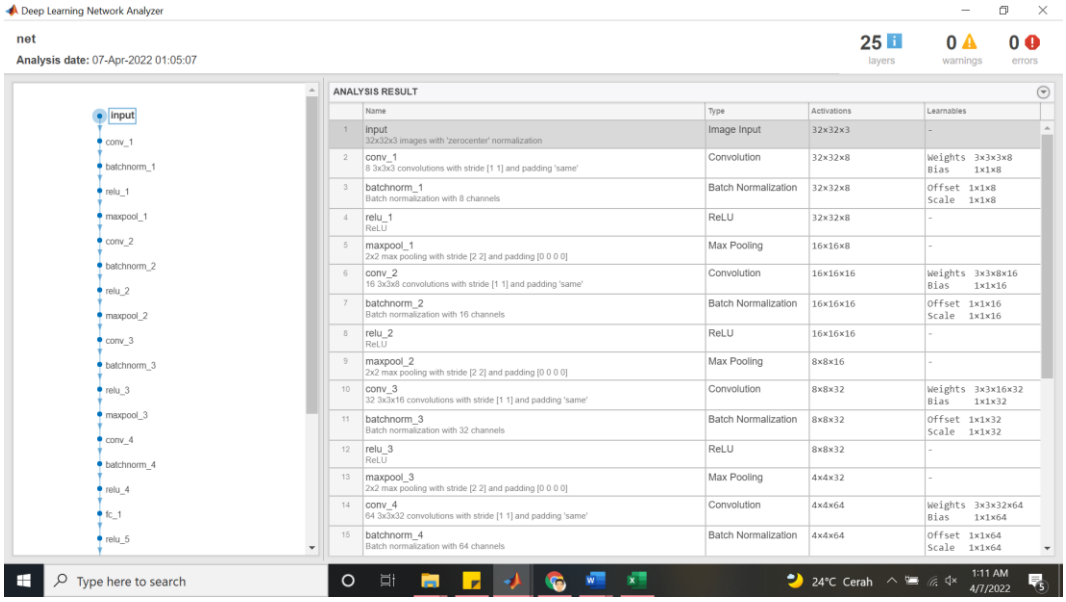
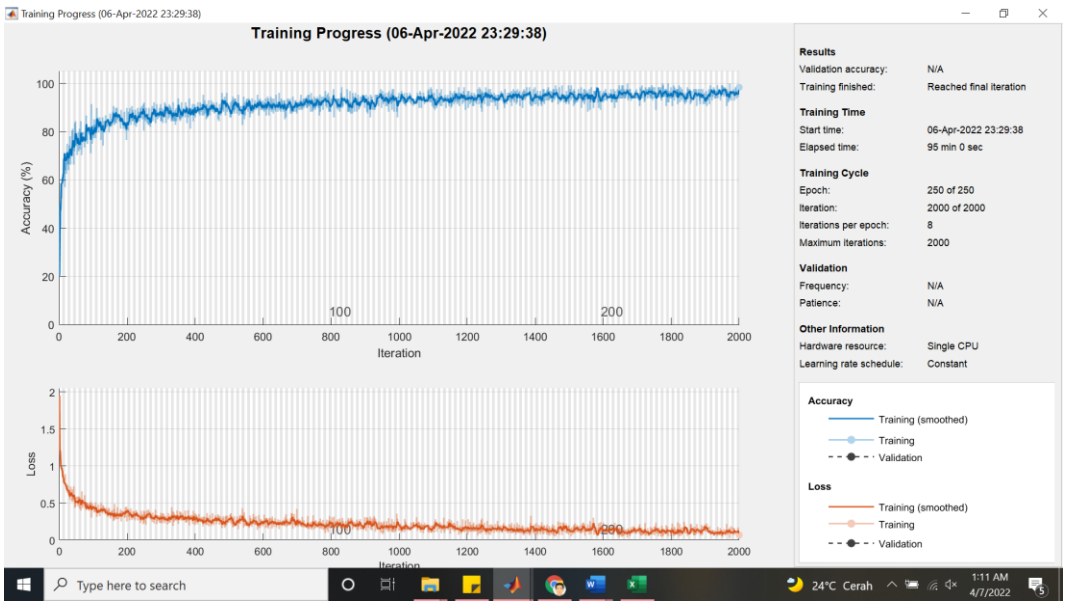
4/4/2022

- **Screenshot Proses Training Network (Image Size 32x32x3)**





	Name	Type	Activations	Learnables
1	input 32x32x3 images with 'zerocenter' normalization	Image Input	32×32×3	-
2	conv_1 8 3x3x3 convolutions with stride [1 1] and padding 'same'	Convolution	32×32×8	Weights 3×3×3×8 Bias 1×1×8
3	batchnorm_1 Batch normalization with 8 channels	Batch Normalization	32×32×8	Offset 1×1×8 Scale 1×1×8
4	relu_1 ReLU	ReLU	32×32×8	-
5	maxpool_1 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	16×16×8	-
6	conv_2 16 3x3x8 convolutions with stride [1 1] and padding 'same'	Convolution	16×16×16	Weights 3×3×8×16 Bias 1×1×16
7	batchnorm_2 Batch normalization with 16 channels	Batch Normalization	16×16×16	Offset 1×1×16 Scale 1×1×16
8	relu_2 ReLU	ReLU	16×16×16	-
9	maxpool_2 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	8×8×16	-
10	conv_3 32 3x3x16 convolutions with stride [1 1] and padding 'same'	Convolution	8×8×32	Weights 3×3×16×32 Bias 1×1×32
11	batchnorm_3 Batch normalization with 32 channels	Batch Normalization	8×8×32	Offset 1×1×32 Scale 1×1×32
12	relu_3 ReLU	ReLU	8×8×32	-
13	maxpool_3 2x2 max pooling with stride [2 2] and padding [0 0 0 0]	Max Pooling	4×4×32	-
14	conv_4 64 3x3x32 convolutions with stride [1 1] and padding 'same'	Convolution	4×4×64	Weights 3×3×32×64 Bias 1×1×64
15	batchnorm_4 Batch normalization with 64 channels	Batch Normalization	4×4×64	Offset 1×1×64 Scale 1×1×64


Training Progress (06-Apr-2022 23:29:38)
Training Progress (06-Apr-2022 23:29:38)
Accuracy (%)
Iteration
Loss
Iteration
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 06-Apr-2022 23:29:38
Elapsed time: 95 min 0 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
Type here to search
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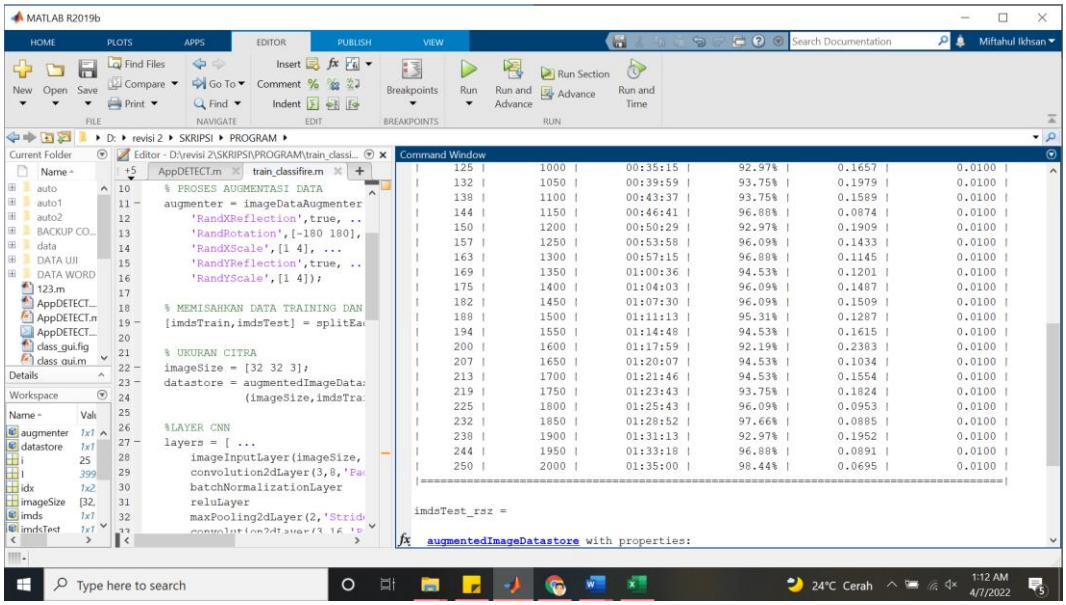
4/7/2022


MATLAB R2019b
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RUN
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Current Folder
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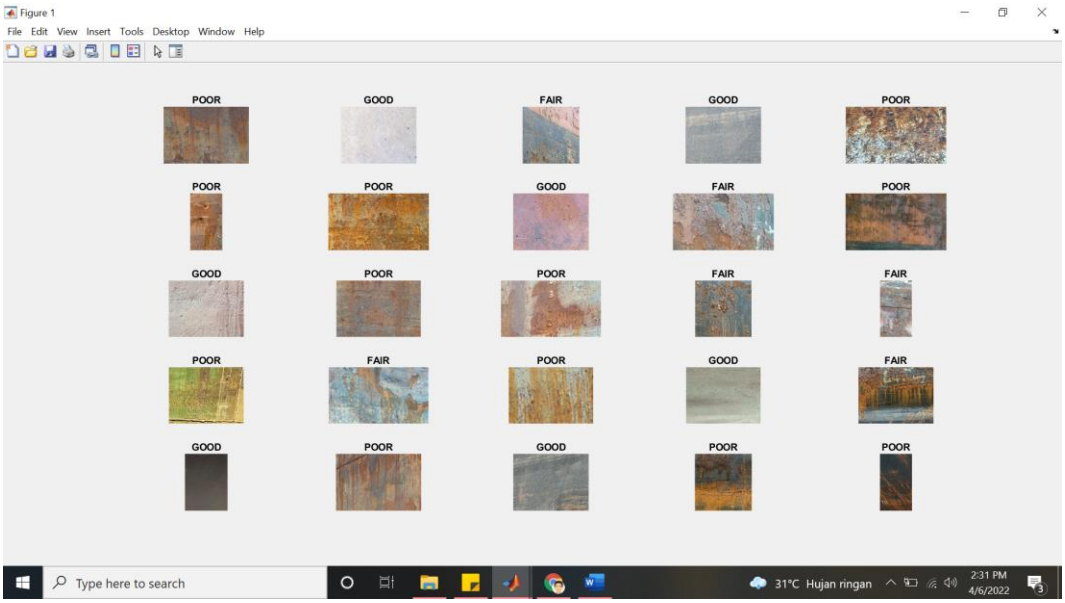
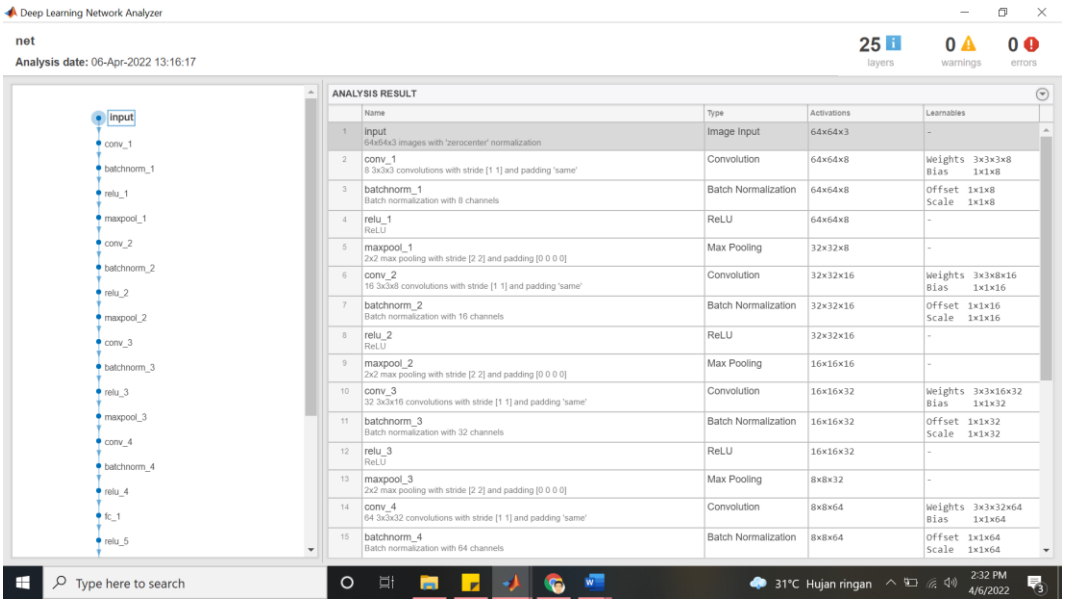
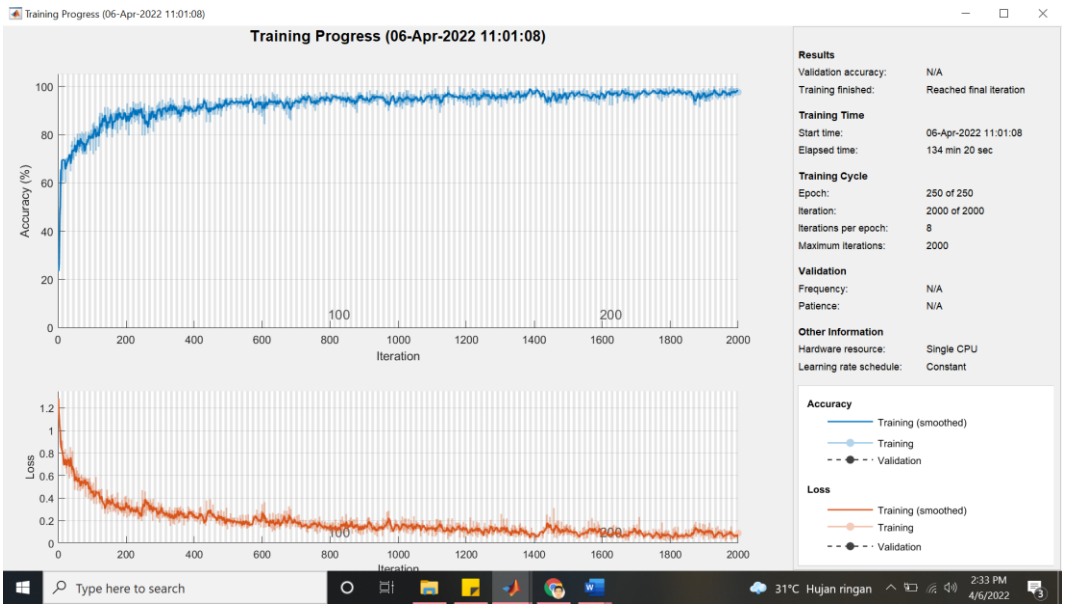
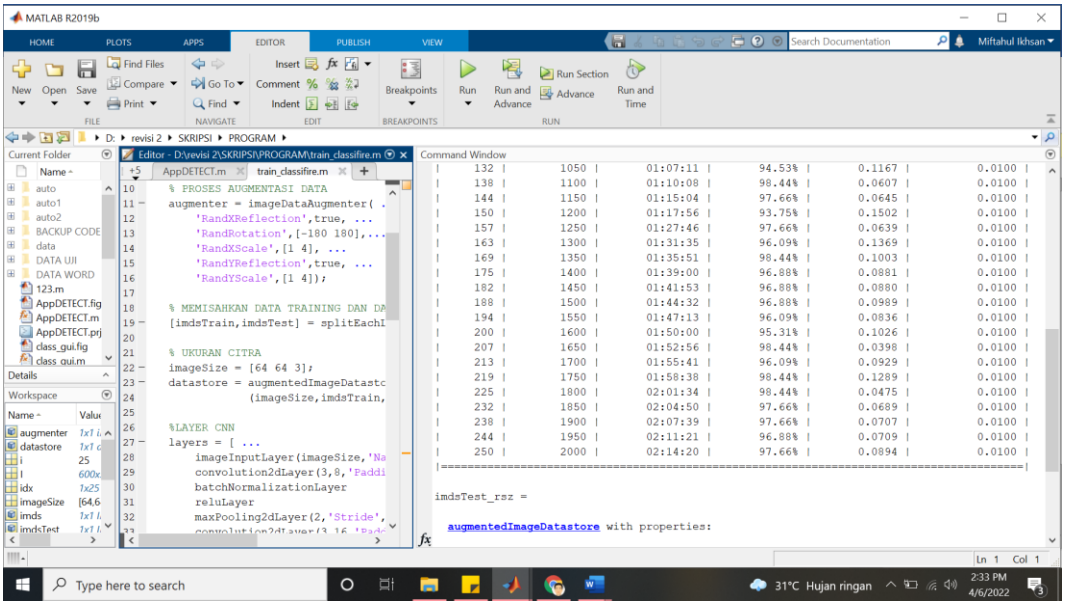
AppDETECT.m
train_classifire.m
% PROSES AUGMENTASI DATA
augmenter = imageDataAugmenter
'RandXReflection',true, ..
'RandRotation',[-180 180],
'RandXScale',[1 4], ...
'RandYReflection',true, ..
'RandYScale',[1 4]);
% MEMISAHKAN DATA TRAINING DAN
[imdsTrain,imdsTest] = splitEa
% UKURAN CITRA
imageSize = [32 32 3];
datastore = augmentedImageData
(imageSize,imdsTra
%LAYER CNN
layers = [...
imageInputLayer(imageSize,
convolution2dLayer(3,8,'Pa
batchNormalizationLayer
reluLayer
maxPooling2dLayer(2,'Stride
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
Type here to search
24°C Cerah
1:12 AM
4/7/2022

- **Screenshot Proses Training Network (Image Size 64x64x3)**






Training Progress (06-Apr-2022 11:01:08)
Training Progress (06-Apr-2022 11:01:08)
Accuracy (%)
Iteration
Loss
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 06-Apr-2022 11:01:08
Elapsed time: 134 min 20 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
Type here to search
31°C Hujan ringan
2:33 PM
4/6/2022


MATLAB R2019b
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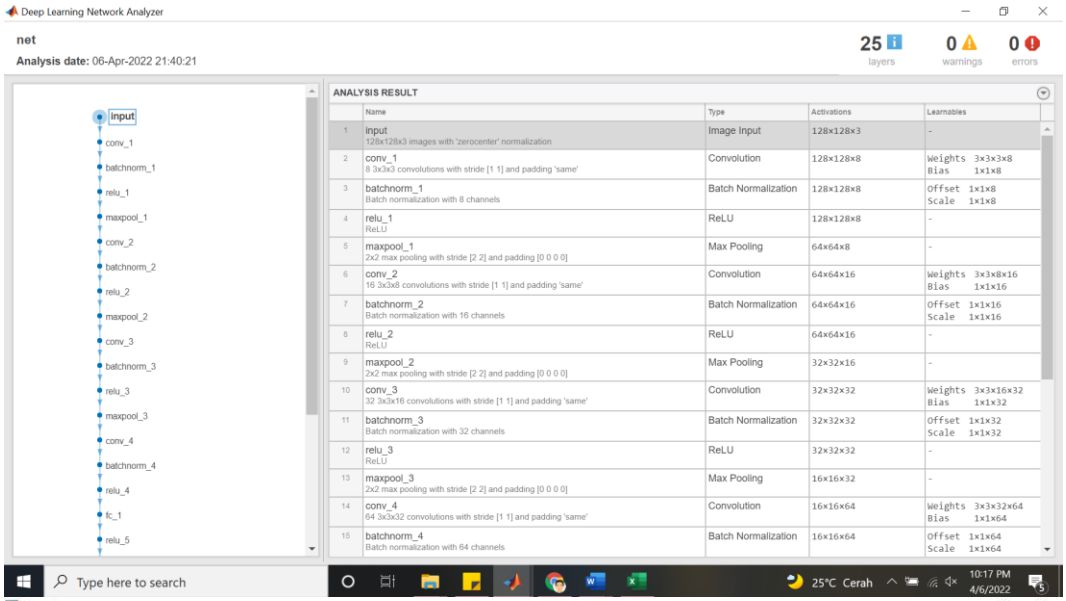
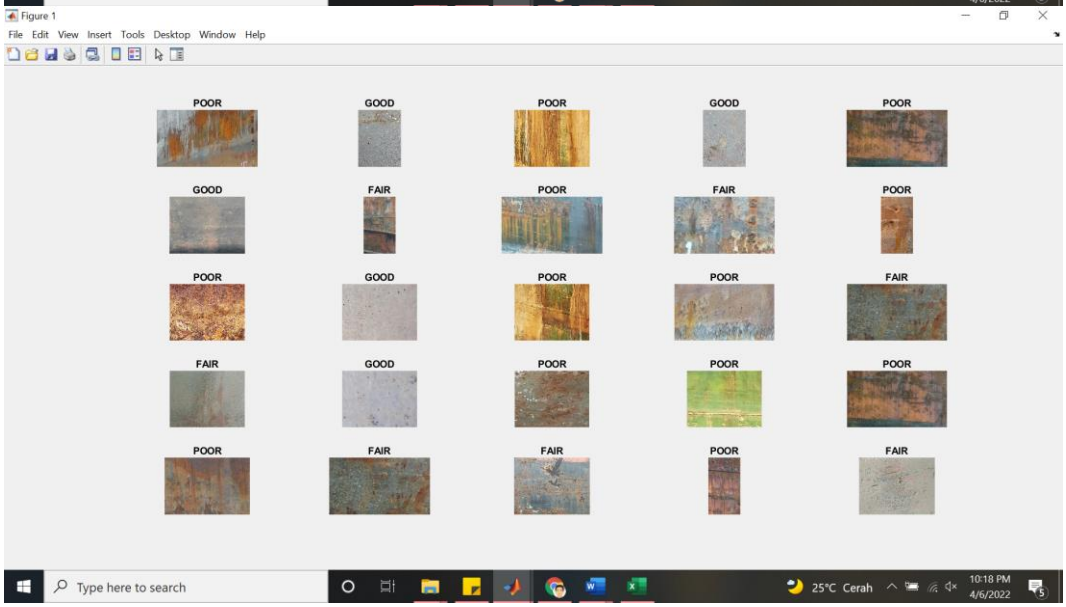
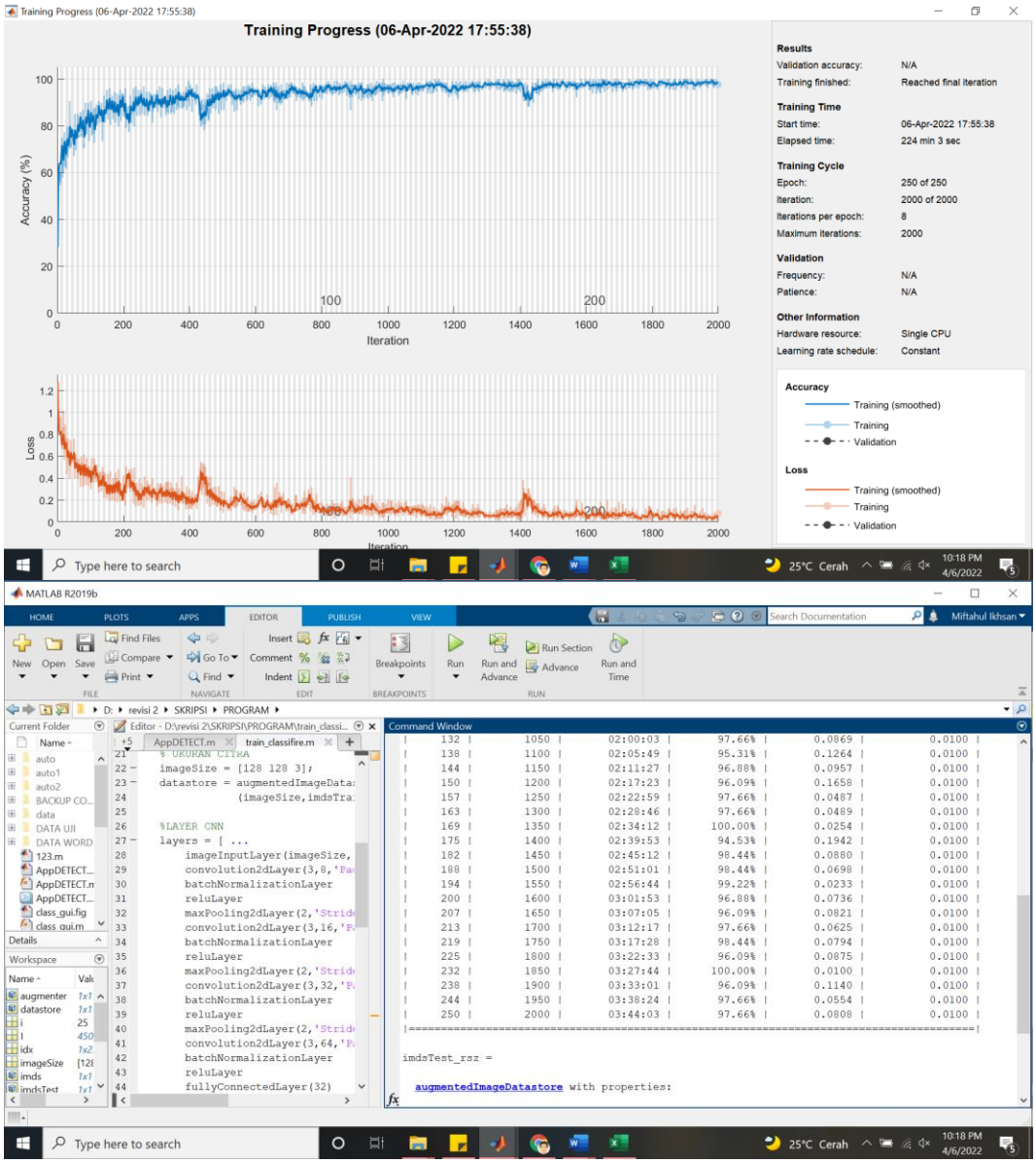
RUN
D: ▸ revisi 2 ▸ SKRIPSI ▸ PROGRAM ▸
Current Folder
Editor - D:\revisi 2\SKRIPSI\PROGRAM\train_classifire.m
AppDETECT.m
train_classifire.m
% PROSES AUGMENTASI DATA
augmenter = imageDataAugmenter(...
'RandXReflection',true, ...
'RandRotation',[-180 180],...
'RandXScale',[1 4], ...
'RandYReflection',true, ...
'RandYScale',[1 4]);
% MEMISAHKAN DATA TRAINING DAN DA
[imdsTrain,imdsTest] = splitEachL
% UKURAN CITRA
imageSize = [64 64 3];
datastore = augmentedImageDatastc
(imageSize,imdsTrain,
%LAYER CNN
layers = [...
imageInputLayer(imageSize,'Na
convolution2dLayer(3,8,'Paddi
batchNormalizationLayer
reluLayer
maxPooling2dLayer(2,'Stride',
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
Ln 1 Col 1
Type here to search
31°C Hujan ringan
2:33 PM
4/6/2022

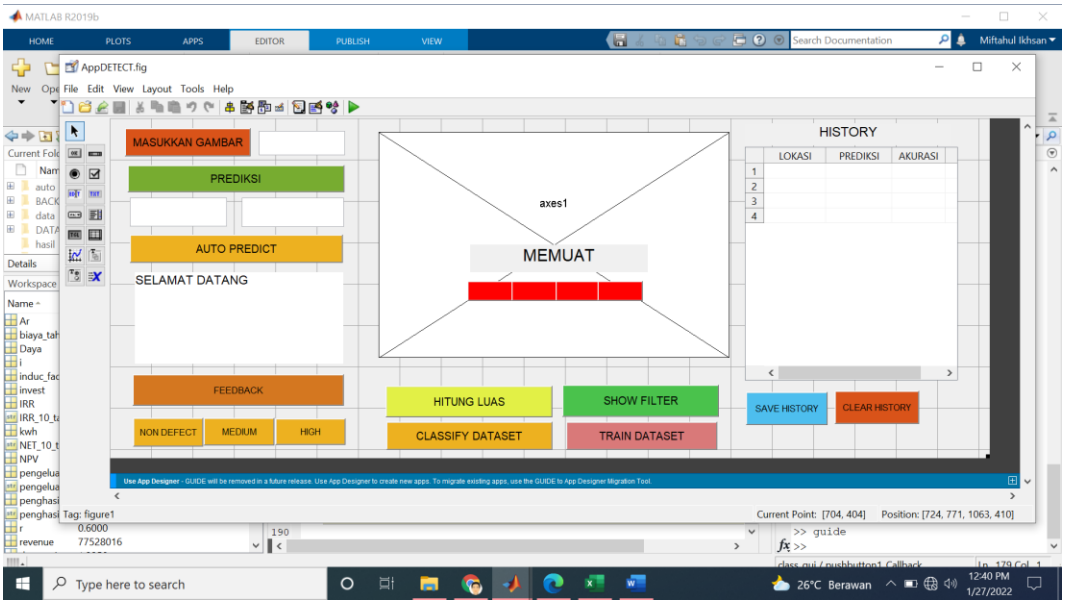
- **Screenshot Proses Training Network (Image Size 128x128x3)**



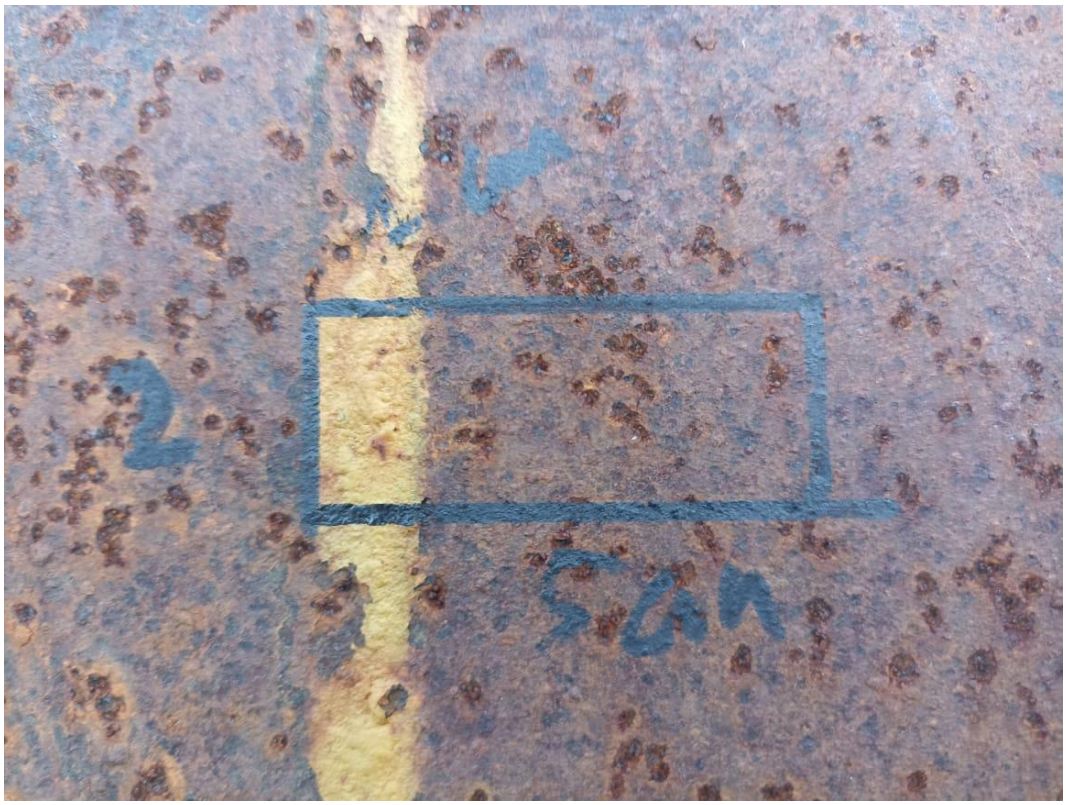


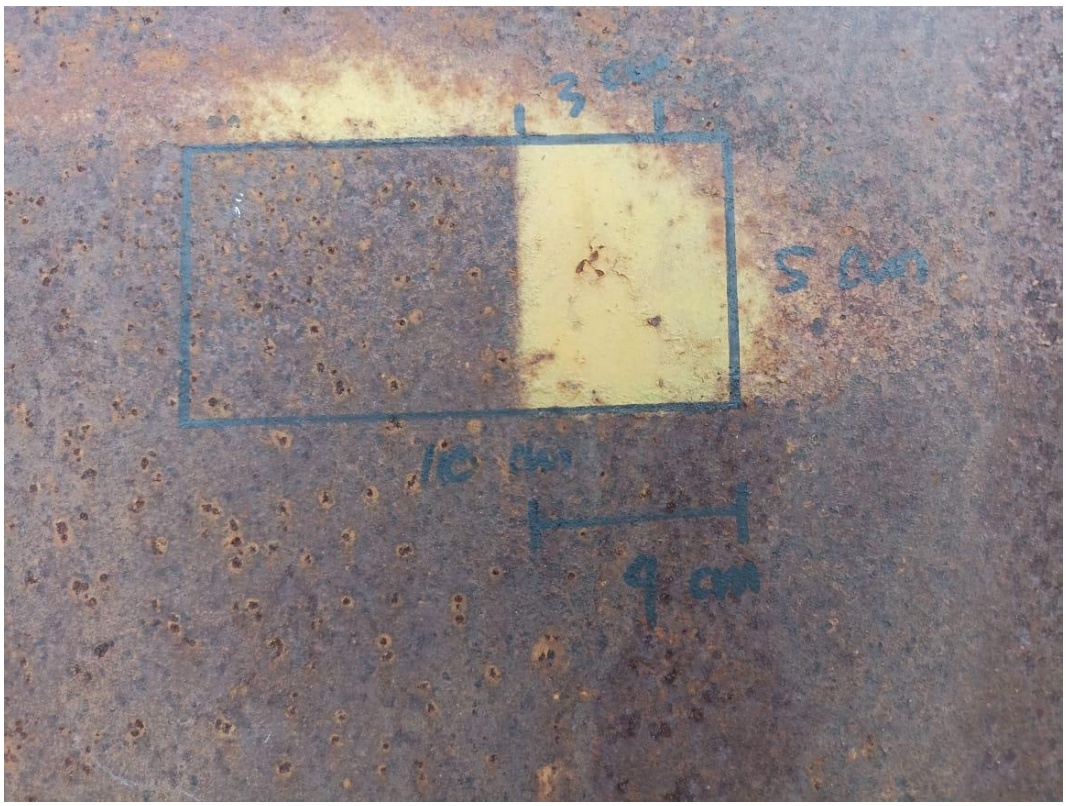

Training Progress (06-Apr-2022 17:55:38)
Accuracy (%)
Iteration
Loss
Results
Validation accuracy: N/A
Training finished: Reached final iteration
Training Time
Start time: 06-Apr-2022 17:55:38
Elapsed time: 224 min 3 sec
Training Cycle
Epoch: 250 of 250
Iteration: 2000 of 2000
Iterations per epoch: 8
Maximum iterations: 2000
Validation
Frequency: N/A
Patience: N/A
Other Information
Hardware resource: Single CPU
Learning rate schedule: Constant
Accuracy
Training (smoothed)
Training
Validation
Loss
Training (smoothed)
Training
Validation
Type here to search
25°C Cerah
10:18 PM
4/6/2022
MATLAB R2019b
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
Search Documentation
Miftahul Ikhsan
New
Open
Save
Find Files
Compare
Print
Go To
Find
Insert
Comment
Indent
Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
FILE
NAVIGATE
EDIT
BREAKPOINTS
RUN
D: revisi 2 SKRIPSI PROGRAM
Current Folder
Editor - D:\revisi 2\SKRIPSI\PROGRAM\train_classi...
AppDETECT.m
train_classifire.m
Command Window
imdsTest_rsz =
augmentedImageDatastore with properties:
Type here to search
25°C Cerah
10:18 PM
4/6/2022

- **Screenshot Proses Desain GUI**



- **Foto uji validasi luas karat**





KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
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http://eng.unhas.ac.id Email : teknik@unhas.ac.id

SURAT PENUGASAN

No. 2168/UN4.7.1/TD.06/2022

Dari : Dekan Fakultas Teknik Universitas Hasanuddin

Kepada : **1. Haryanti Rivai, S.T., M.T..Ph.D.** **Pemb. I**
2. Rahimuddin, S.T., M.T., Ph.D. **Pemb. II**

Isi : 1. Berdasarkan Surat Ketua Departemen Teknik Sistem Perkapalan Fakultas Teknik Nomor: 2167/UN4.7.7/TD.06/2021 tanggal 4 Januari 2022, tentang usul DOSEN PEMBIMBING MAHASISWA, maka dengan ini kami menugaskan Saudara untuk membimbing penulisan Skripsi/Tugas Akhir mahasiswa Teknik Sistem Perkapalan Fakultas Teknik Universitas Hasanuddin di bawah ini :

Nama : No. Stambuk :
Miftahul Ikhsan Tahir **D33116307**

Judul Skripsi/Tugas Akhir:
Aplikasi Pendeteksi Korosi pada Pelat kapal dengan Metode Convolutional Neural Network

2. Surat penugasan pembimbing ini mulai berlaku sejak tanggal ditetapkannya dan berakhir sampai selesainya penulisan Skripsi/Tugas Akhir Mahasiswa tersebut.

3. Agar surat penugasan ini dilaksanakan sebaik - baiknya dengan penuh rasa tanggung jawab.

Ditetapkan di Gowa,
Pada tanggal 4 Februari 2022
a.n Dekan,
Wakil Dekan I Bidang Akademik, Riset dan Inovasi Fakultas Teknik UH

Prof. Baharuddin Hamzah, ST.,M.Arch.,Ph.D
Nip. 19690308 199512 1 001

Tembusan:
1. Dekan FT-UH.
2. Ketua Departemen Teknik Sistem Perkapalan FT-UH.
3. Mahasiswa yang bersangkutan

KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
DEPARTEMEN TEKNIK SISTEM PERKAPALAN
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Jalan Poros Malino Km. 6 Bontomarannu, Gowa, Sulawesi Selatan, 92172
Telp/Fax: +62-411-588400, Email: kapal9uh@indosat.net.id

No. : 2167/UN4.7.7/TD.06/2022
Lamp : -
Hal : Penugasan Bimbingan Tugas Akhir

Kepada Yth : **Wakil Dekan I**
Bidang Akademik, Riset dan Inovasi
Fakultas Teknik UNHAS
di-
Gowa

Dengan hormat,
Kiranya dosen pembimbing tugas akhir (skripsi) dari mahasiswa :

Nama : Miftahul Ikhsan Tahir
Stambuk : D33116307
Program Studi : Teknik Sistem Perkapalan

Dengan judul Tugas Akhir:
Aplikasi Pendeteksi Korosi pada Pelat kapal dengan Metode Convolutional Neural Network

Dosen Pembimbing :
1. Haryanti Rivai, S.T., M.T..Ph.D.
2. Rahimuddin, S.T., M.T., Ph.D.

Dapat dibuatkan Surat Penugasan Bimbingan Tugas Akhir
Demikian penyampaian kami, atas perhatian dan kerjasamanya diucapkan terima kasih.

Gowa, 4 Februari 2022
Ketua,

Dr.Eng. Faisal Mahmuddin, S.T., M.Inf.Tech., M.Eng.
Nip. 19810211 200501 1 003

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI
UNIVERSITAS HASANUDDIN
KAMPUS TAMALANREA
JALAN PERINTIS KEMERDEKAAN KM.10 MAKASSAR 90245
TELEPON : 0411-586200 (6 SALURAN), 584002, FAX. 585188

SURAT PERSETUJUAN

Nomor : 10563/UN4.1.1.2.1.1/PK.02.03/2022

Berdasarkan Peraturan Rektor Universitas Hasanuddin tentang Penyelenggaraan Program Sarjana Nomor : 2781/UN4.1/KEP/2018 tanggal 16 Juli 2018, dengan ini menerangkan bahwa :

NIK	: 7315060808980008
N a m a	: MIFTAHUL IKHSAN TAHIR
Tempat/Tanggal Lahir	: SIDOMULYO, 14 AGUSTUS 1998
NIM	: D33116307
Fakultas	: TEKNIK
Program Studi	: TEK. SISTEM PERKAPALAN

Telah memenuhi syarat untuk Ujian Skripsi Strata I (S1) **PERIODE IV MEI 2022 TAHAP I**. Demikian Surat Persetujuan ini dibuat untuk digunakan dalam proses pelaksanaan ujian skripsi, dengan ketentuan dapat mengikuti wisuda **PERIODE IV MEI 2022 TAHAP I,** jika **persyaratan kelulusan/wisuda telah dipenuhi**. Terima Kasih.

Makassar, 13 APRIL 2022

Kepala Biro Administrasi Akademik
u.b Kepala Sub Bagian Pendidikan dan Evaluasi
Universitas Hasanuddin,

MURSALIM, S.Sos.
NIP. 19730216 199601 1001

Keterangan :
Nomor User : D33116307
Nomor password/pin : 2163511
Alamat Website : http://unhas.ac.id/akad/wisuda/
Catatan :

1. Bagi Mahasiswa yang telah melaksanakan ujian Sarjana dan dinyatakan lulus, segera menyerahkan lembar pengesahan Skripsi dan Berita Acara Ujian Sarjana ke Sub Bagian Akademik Fakultas, untuk memperoleh nomor Alumni dan didaftar sebagai Wisudawan pada periode berjalan.
2. Jika terjadi perubahan Judul Skripsi agar melaporkan ke Kasubag. Pendidikan Fakultas sebelum didaftar sebagai Wisudawan pada Periode berjalan
3. Pada saat ON-LINE Mahasiswa diharapkan mengisi identitas diri sesuai surat izin ujian ini
4. Surat izin ini hanya berlaku untuk Wisuda periode berjalan (WISUDA PERIODE IV MEI 2022 TAHAP I)

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET, DAN TEKNOLOGI
DEPARTEMEN TEKNIK SISTEM PERKAPALAN
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Telp. (0411) 588400 Fax. (0411) 2006

No. : 8236/UN4.7.7/TD.06/2022
Lamp : -
Hal : Penerbitan Surat Penugasan Panitia
Ujian Sarjana Strata Satu (S1)

Kepada Yth : **Wakil Dekan I**
Bidang Akademik, Riset dan Inovasi
Fakultas Teknik UNHAS
di-
Gowa

Dengan hormat,

Berdasarkan Persetujuan Pembimbing Mahasiswa, Bersama ini diusulkan susunan Panitia Ujian Sarjana Strata Satu (S1) bagi mahasiswa Departemen Teknik Sistem Perkapalan Fakultas Teknik Universitas Hasanuddin atas nama :

Nama : Miftahul Ikhsan Tahir
Stambuk : D33116307

Maka dengan ini kami sampaikan Susunan Panitia Ujian Sarjana Strata Satu (S1) sebagai berikut :

Ketua : Haryanti Rivai, S.T., M.T..Ph.D.
Sekretaris : Rahimuddin, S.T., M.T., Ph.D.
Anggota : 1. Andi Haris Muhammad, S.T., M.T,. Ph.D
2. Dr. Ir. Ganding Sitepu, Dipl.-Ing.

Judul Tugas Akhir mahasiswa yang bersangkutan adalah :

Aplikasi Pendeteksi Korosi pada Pelat kapal dengan Metode Convolutional Neural Network

Untuk dapat diterbitkan surat penugasannya.

Demikian penyampaian kami, atas perhatian dan kerjasamanya diucapkan terima kasih.

G o w a, 22 April 2022
Ketua Departemen Teknik Sistem Perkapalan

Dr. Eng. Faisal Mahmuddin,S.T, M.Inf.Tech., M.Eng
Nip. 19810211 200501 1 003

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET, DAN TEKNOLOGI
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http://eng.unhas.ac.id. E-mail:teknik@unhas.ac.id

SURAT PENUGASAN

No.8237/UN4.7.7/TD.06/2022

Dari : Dekan Fakultas Teknik Universitas Hasanuddin
Kepada : Mereka yang tercantum namanya dibawah ini.

Isi :

1. Bahwa berdasarkan peraturan Akademik Universitas Hasanuddin Tahun 2018 pasal 19 (SK. Rektor Unhas nomor : 2781/UN4.1/KEP/2018), dengan ini menugaskan Saudara sebagai PANITIA UJIAN SARJANA Program Strata Satu (S1) Teknik Sistem Perkapalan Fakultas Teknik Universitas Hasanuddin dengan susunan sebagai berikut :

   Ketua : Haryanti Rivai, S.T., M.T..Ph.D.
   Sekretaris : Rahimuddin, S.T., M.T., Ph.D.
   Anggota : 1. Andi Haris Muhammad, S.T., M.T,. Ph.D
   2. Dr. Ir. Ganding Sitepu, Dipl.-Ing.

   Untuk menguji bagi mahasiswa tersebut dibawah ini :

   Nama/Nim : Miftahul Ikhsan Tahir / D33116307
   Departemen : Teknik Sistem Perkapalan

   Judul Thesis/Skripsi :
   Aplikasi Pendeteksi Korosi pada Pelat kapal dengan Metode Convolutional Neural Network

2. Waktu ujian ditetapkan oleh Panitia Ujian Akhir Program Strata Satu (S1).
3. Agar surat penugasan ini dilaksanakan sebaik-baiknya dengan penuh rasa tanggung jawab.
4. Surat penugasan ini berlaku sejak tanggal ditetapkan sampai dengan berakhirnya Ujian Sarjana tersebut, dengan ketentuan bahwa segala sesuatunya akan ditinjau dan diperbaiki sebagaimana mestinya apabila dikemudian hari ternyata terdapat kekeliruan dalam keputusan ini.

Ditetapkan di Gowa,
Pada tanggal , 22 April 2022
a.n Dekan,
Wakil Dekan I Bidang Akademik, Riset dan Inovasi Fakultas Teknik UH

Prof. Baharuddin Hamzah, ST.,M.Arch.,Ph.D
Nip. 19690308 199512 1 001

Tembusan :
1. Dekan FT-UH.
2. Ketua Departemen Teknik Sistem Perkapalan FT-UH.
3. Kasubag Umum dan Perlengkapan FT-UH

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET, DAN TEKNOLOGI
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Telp. (0411) 588400 Fax. (0411) 2006

Nomor : 8236/UN4.7.7/TD.06/2022 22 April 2022
Lamp : -
Hal : Undangan Ujian Akhir

Kepada
Yth. : 1. Andi Haris Muhammad, S.T., M.T,. Ph.D
2. Dr. Ir. Ganding Sitepu, Dipl.-Ing.

Dengan hormat,
Kami mengundang Saudara/saudari kiranya berkenan hadir untuk menyaksikan/bertindak selaku penguji Ujian Akhir Strata Satu Fakultas Teknik Universitas Hasanuddin yang akan diselenggarakan pada :

Hari / Tanggal : Selasa, 26 April 2022
Jam : 13.00 Wita - selesai
Tempat : Ruang Sidang Teknik Sistem Perkapalan (Daring/Luring)

Dibawakan oleh :
Nama / Stambuk : Miftahul Ikhsan Tahir / D33116307

Atas kesedian dan kehadiran Saudara/Saudari diucapkan terima kasih.

Ketua,

Dr.Eng. Faisal Mahmuddin, S.T., M.Inf.Tech., M.Eng.
Nip. 19810211 200501 1 003

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Telp. (0411) 586015, 586262 Fax (0411) 586015.
http://eng.unhas.ac.id E-mail:teknik@unhas.ac.id

BERITA ACARA UJIAN SARJANA

Terhadap Mahasiswa

N am a	:	Miftahul Ikhsan Tahir
Stambuk	:	D33116307
Judul	:	***Aplikasi Pendeteksi Korosi Pada Pelat Kapal Dengan Metode Convolutional Neural Network***
Hari/Tanggal	:	Selasa, 26 April 2022
Waktu	:	13.00 Wita - selesai
Tempat	:	Ruang Sidang Teknik Sistem Perkapalan (Daring/Luring)
Keputusan Sidang / Catatan	:	Lulus dengan nilai A = 87

PANITIA UJIAN

No.	Susunan Panitia	N a m a	Tanda Tangan
1	Ketua/Anggota	Haryanti Rivai, S.T., M.T..Ph.D.	1.
2	Sekretaris/Anggota	Rahimuddin, S.T., M.T., Ph.D.	2.
3	Anggota	Andi Haris Muhammad, S.T., M.T,. Ph.D	3.
4	Anggota	Dr. Ir. Ganding Sitepu, Dipl.-Ing.	4.

Gowa , 2022

Ketua Sidang,

Haryanti Rivai, S.T., M.T..Ph.D.
Nip. 19790225 200212 2 001

Sekretaris Sidang,

Rahimuddin, S.T., M.T., Ph.D.
Nip. 19710825 199903 1 002