

LAMPIRAN

SURAT KETERANGAN

Yang bertanda tangan di bawah ini:

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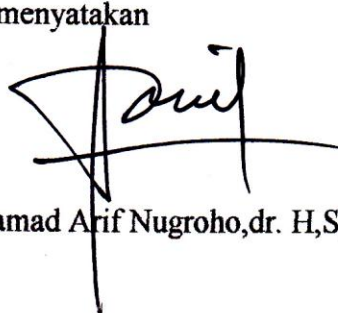
Alamat : Rumah Sakit Umum Pusat (RSUP) Dr. Kariadi Semarang

Menerangkan bahwa program pengolahan citra untuk analisis persentase penyempitan pembuluh pada pasien penyakit jantung koroner yang dibuat oleh Agung Satrio Nugroho mahasiswa Program Studi Magister Teknik Elektro Universitas Islam Sultan Agung Semarang dapat digunakan untuk menganalisis penyempitan pembuluh pada pasien penyakit jantung koroner.

Demikian surat keterangan ini saya buat untuk dapat dipergunakan sebagaimana mestinya.

Semarang, 17 Januari 2020

Yang menyatakan



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```

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

% Last Modified by GUIDE v2.5 25-Nov-2017 16:55:12

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                  'gui_Singleton',  gui_Singleton, ...
                  'gui_OpeningFcn', @GUI_Soft_OpeningFcn, ...
                  'gui_OutputFcn',  @GUI_Soft_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

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% --- Executes just before GUI_Soft is made visible.
function GUI_Soft_OpeningFcn(hObject, ~, 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 GUI_Soft (see VARARGIN)

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

% Update handles structure
guidata(hObject, handles);

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

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

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

% -----
----
function uipushtool1_ClickedCallback(~, ~, handles)
% hObject    handle to uipushtool1 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)

[filename,path]=uigetfile('*.bmp','load data'); % menampilkan
standard dialog box (open file)
if isequal(filename,0) % jika filename kosong (cancel poses) maka
kembali
    return
end
%% load image
img=imread(fullfile(path,filename)); % membaca file data

if size(img,3)==3 % jika citra warna maka ubah ke gray
    img=rgb2gray(img);
end
% menampilkan citra
axes(handles.axes1)

```

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imshow(img)
setappdata(handles.figure1,'img',img) % simpan data figure

% -----
----
function uipushtool2_ClickedCallback(hObject, eventdata, handles)
% hObject    handle to uipushtool2 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
%% Proses Crop
img=getappdata(handles.figure1,'img'); % load data figure
% menampilkan citra input
axes(handles.axes1)
imshow(img,[])
% proses cropping
h = impoly(gca);
wait(h);
mask = createMask(h); % simpan mask (crop)
img(~mask) = 255; % mengubah nilai mask menjadi 255
imgi=mask; % simpan citra baru hasil masking
% segmentasi mask
[r,c]=find(imgi);
imgc=img(min(r):max(r),min(c):max(c));
imgcc=im2bw(imgc,1); % mengubah citra ke biner
af=sum(~imgcc(:)); %hitung luasan objeck
imshow(imgc) % tampilkan hasil crop
xlabel('crop image')
% simpan data figure
setappdata(handles.figure1,'imgc',imgc)
setappdata(handles.figure1,'mask',mask)
setappdata(handles.figure1,'imgcc',imgcc)
setappdata(handles.figure1,'af',af)
setappdata(handles.figure1,'r',r)
setappdata(handles.figure1,'c',c)
% -----
----
function uipushtool3_ClickedCallback(~, eventdata, handles)
% hObject    handle to uipushtool3 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
% proses denoise
imgc=getappdata(handles.figure1,'imgc'); % load data hasil
cropping
imgf= filter2(fspecial('average',5),imgc,'valid')/255; % denoise
(filter rerata dg ukuran kernel 5 x 5 px)
imgf= imadjust(imgf); % menaikkan kontras
% menampilkan citra
imshow(imgf)
setappdata(handles.figure1,'imgf',imgf) % simpan data figure

% -----
----

```

```

function uipushtool4_ClickedCallback(hObject, eventdata, handles)
% hObject    handle to uipushtool4 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
%% Proses Deteksi Stenosis
% load data figure
imgf=getappdata(handles.figure1,'imgf');
mask=getappdata(handles.figure1,'mask');
imgcc=getappdata(handles.figure1,'imgcc');
img=getappdata(handles.figure1,'img');
af=getappdata(handles.figure1,'af');
c=getappdata(handles.figure1,'c');
r=getappdata(handles.figure1,'r');
imge=im2bw(imgf,0.5); % ubah hasil denoise ke biner
imgb=double(imgcc)+(double(imresize(imge,size(imgcc)))); % jumlah
dari objek mask dengan nilai biner hasil denoise
imgb(imgb~=1)=0; % nilai hasil penjumlahan yang tidak sama dengan
0 diberi nilai 0
as=sum(imgb(:)); % jumlah nilai dari imgb (ukuran 100 dari
pembuluh)
pr=as/af*100; % hitung % dari stenosis
% proses pewarnaan
imgc=img;
imgd=img;
imgc(min(r):max(r),min(c):max(c))=double(img(min(r):max(r),min(c):
max(c))).*double(imresize(imge,size(imgcc))); % warna pembuluh
imgd(mask) = 100; % warna stenosis
% komposisi warna
imgi(:,:,1)=imgd; % R
imgi(:,:,2)=imgc; % G
imgi(:,:,3)=img; % B
% tampilkan citra
imshow(imgi)
% simpan data figure
setappdata(handles.figure1,'imgb',imgb)
setappdata(handles.figure1,'pr',pr)

% --- 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)
%imgb=getappdata(handles.figure1,'imgb');
%% menampilkan hasil prosentase stenosis
pr=getappdata(handles.figure1,'pr'); % load data figure %
stenosis
if pr>=75
    warndlg('Perlu Pemasangan Ring')
elseif pr>=40 && pr<75
    warndlg('Perlu Pemberian Obat')
elseif pr<40
    warndlg('Normal')

end

```

```

persentase_penyempitan=[num2str(pr,4) , ' %'];
imshow(imgb)
set(handles.edit1,'string',persentase_penyempitan)% menampilkan
hasil pada edit 1

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 uipushtool5_ClickedCallback(hObject, eventdata, handles)
% hObject    handle to uipushtool5 (see GCBO)
% eventdata  reserved - to be defined in a future version of
MATLAB
% handles    structure with handles and user data (see GUIDATA)
h = imdistline % tool distance (hitung jarak)

```