



PES UNIVERSITY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Title: Image Processing and Data Visualization Using MATLAB		
Course code: -UE19CS257B		
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PROJECT REPORT

Problem Statement: ATTENDANCE CALCULATOR

Objectives:

Given any image, it detects all the faces present in the image by drawing a box around the face of every person. Calculates the number of people present in a given image and displays the attendance percentage in the GUI.

Description:

This ATTENDANCE CALCULATOR using MATLAB program helps count number of persons in a meeting hall or classroom at a time .

This program logic can be extended to use in Air Conditioning Regulation Systems also , which depends on number of persons in a room to maintain temperature .It can also be used in Metro stations, trains and elevators where there is a restriction on Number of people allowed during these pandemic times.

If we try to count a large number of people in a hall manually , it is a tedious and time consuming task and probably also make a mistake .With the help of this program, you can get the number of people instantly and more accurately using image processing .

Steps for executing the code :

- Enter the file name and the maximum class strength in the respective fields provided for input in the UI.
- Click on the 'Count Now' pushbutton which processes the image and detects the faces in the image by drawing a box around the face of every person.

- It displays the total number of people detected in the image and also the percentage occupancy
- It also displays a 'Covid Alert' message if the occupancy is greater than the threshold limit already set, else displays the message 'Stay Safe'.

New Concept Learnt(Explanation):

- `detector=vision.CascadeObjectDetector`

Sets up your cascade object detector using the constructor :

It creates a system object detector that detects objects using the Viola-Jones algorithm. Its Classification Model property controls the type of object to detect. By default, the detector is configured to detect faces.

CascadeObjectDetector creates a detector configured to detect objects defined by the input character vector, model .

- Call the step method with the input image I, the cascade object detector object, detector, points PTS and any optional properties. See the syntax below for using the step method. Use the step syntax with input image I, the selected cascade object detector object, and any optional properties to perform detection.

`BBOX = step (detector, I)`

It returns BBOX, an M-by-4 matrix defining M bounding boxes containing the detected objects. This method performs multi-scale object detection on the input image I. Each row of the output matrix BBOX contains a four-element vector (x, y, width and height) that specifies in pixels, the upper-left corner and size of a bounding box. Input image I must be a grayscale or true colour (RGB) image.

- `insertObjectAnnotation(I,'rectangle',Position,Label)` .
It inserts rectangles and corresponding labels at the location indicated by the position matrix. The position input must be an M-by-4 matrix, where each row (M) specifies a rectangle as a four-element vector (x, y, width and height). The elements x and y indicate the upper-left corner of the rectangle, and the width and height specify the size.
- to create and provide inputs using GUI .

Learning Outcome:

We enhanced our understanding in many concepts of MATLAB, especially in the area of Image Processing . Also we became familiar about 'Computer Vision Toolbox' and 'Image Processing Toolbox'.

Also, this algorithm can be put to use for many real life applications such as - limiting the occupancy of lift, elevators metros and shops for the enforcement of occupancy restrictions during this pandemic times.

It can also be used in Smart AC's to moderate the temperature depending on the percentage occupancy of the room or hall.

Code:

```
function varargout = M2(varargin)
% M2 MATLAB code for M2.fig
%   M2, by itself, creates a new M2 or raises the existing
%   singleton*.
%
%   H = M2 returns the handle to a new M2 or the handle to
%   the existing singleton*.
%
%   M2('CALLBACK',hObject,eventData,handles,...) calls the local
%   function named CALLBACK in M2.M with the given input arguments.
%
%   M2('Property','Value',...) creates a new M2 or raises the
%   existing singleton*. Starting from the left, property value pairs are
%   applied to the GUI before M2_OpeningFcn gets called. An
%   unrecognized property name or invalid value makes property application
%   stop. All inputs are passed to M2_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 M2

% Last Modified by GUIDE v2.5 18-Apr-2021 18:27:56

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',    mfilename, ...
    'gui_Singleton', gui_Singleton, ...
    'gui_OpeningFcn', @M2_OpeningFcn, ...
    'gui_OutputFcn', @M2_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 M2 is made visible.
```

```
function M2_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 M2 (see VARARGIN)
```

```
% Choose default command line output for M2
```

```
handles.output = hObject;
```

```
% Update handles structure
```

```
guidata(hObject, handles);
```

```
axes(handles.axes1);
```

```
imshow('blank.jpg');
```

```
set(handles.text4,'string','Percentage : 0 %');
```

```
set(handles.text5,'ForegroundColor','green');
```

```
set(handles.text5,'string','Attendance Calculator');
```

```
set(handles.text6,'string','No of Students : 0');
```

```
% UIWAIT makes M2 wait for user response (see UIRESUME)
```

```
% uiwait(handles.figure1);
```

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

```
function varargout = M2_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)
facedetector = vision.CascadeObjectDetector;
global f;%Image file name
global g;%Total strength

image = imread(f);                                %store that frame in 'image'
bbox = step(facedetector, image);                  % position of face in 'bbox'
(x, y, width and height)
insert_object = insertObjectAnnotation(image, 'Rectangle',bbox,'Student');    %
Draw the bounding box around the detected face.
imshow(insert_object);
no_rows = size(bbox,1);%No of faces
global int prct;
prct=int8((no_rows/str2double(g))*100);
% get the number of rows (which will be equal to number of people)
set(handles.text4,'string',strcat('Percentage : ',string(prct),' %'));
    %display the value of X in GUI
set(handles.text6,'string',strcat('No of Students : ',string(no_rows)));
    %display the value of X in GUI
axes(handles.axes1)
if(prct>40)
    set(handles.text5,'string','Covid Alert!!');
    set(handles.text5,'ForegroundColor','red');
else
    set(handles.text5,'string','Stay Safe!!');
    set(handles.text5,'ForegroundColor','blue');
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
global f;
f=get(hObject,'String');

```

```
% --- 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
global g;
g=get(hObject,'String');
```

```
% --- 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
```

Output Screenshots :

Image Processing(Kartik)

Percentage :70 %

No of Students :28

Count Now

i.jpg

40

Covid Alert!!

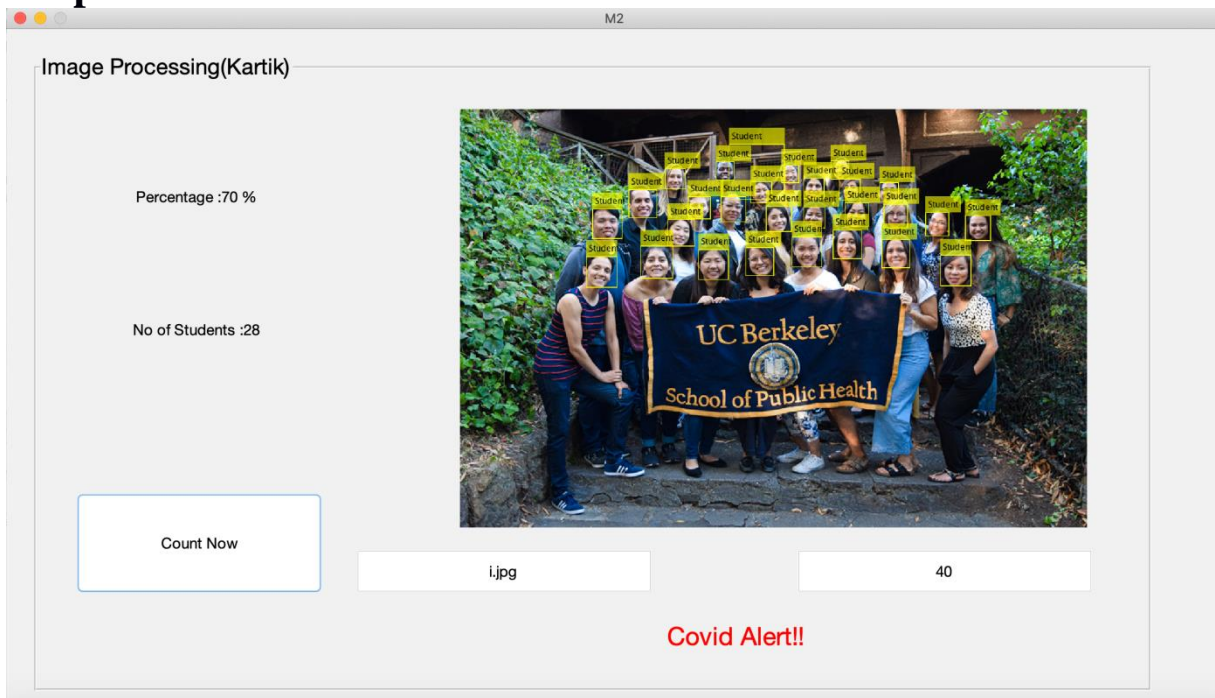


Image Processing(Kartik)

Percentage :35 %

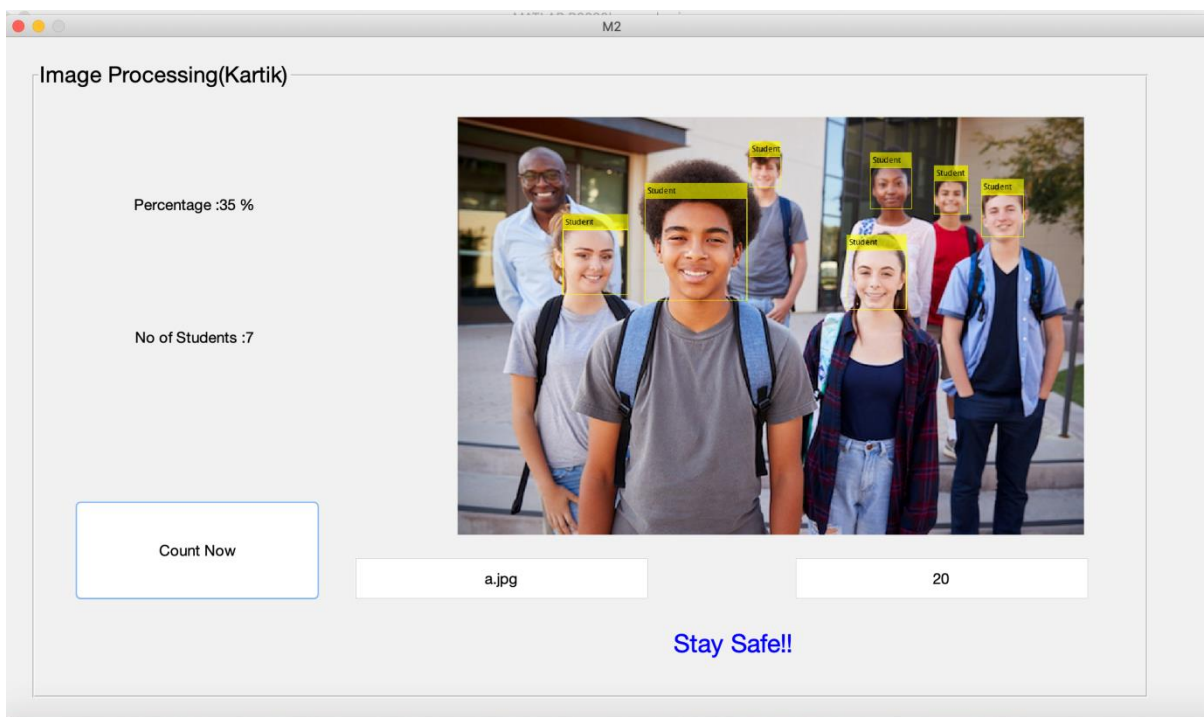
No of Students :7

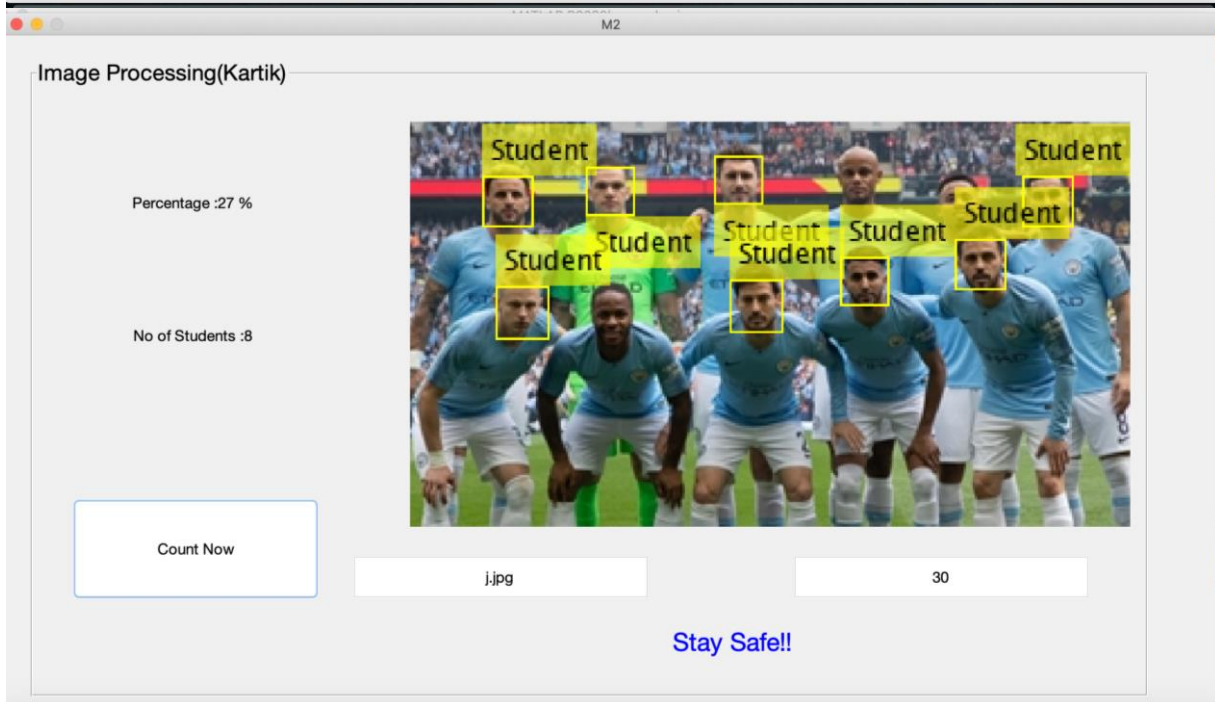
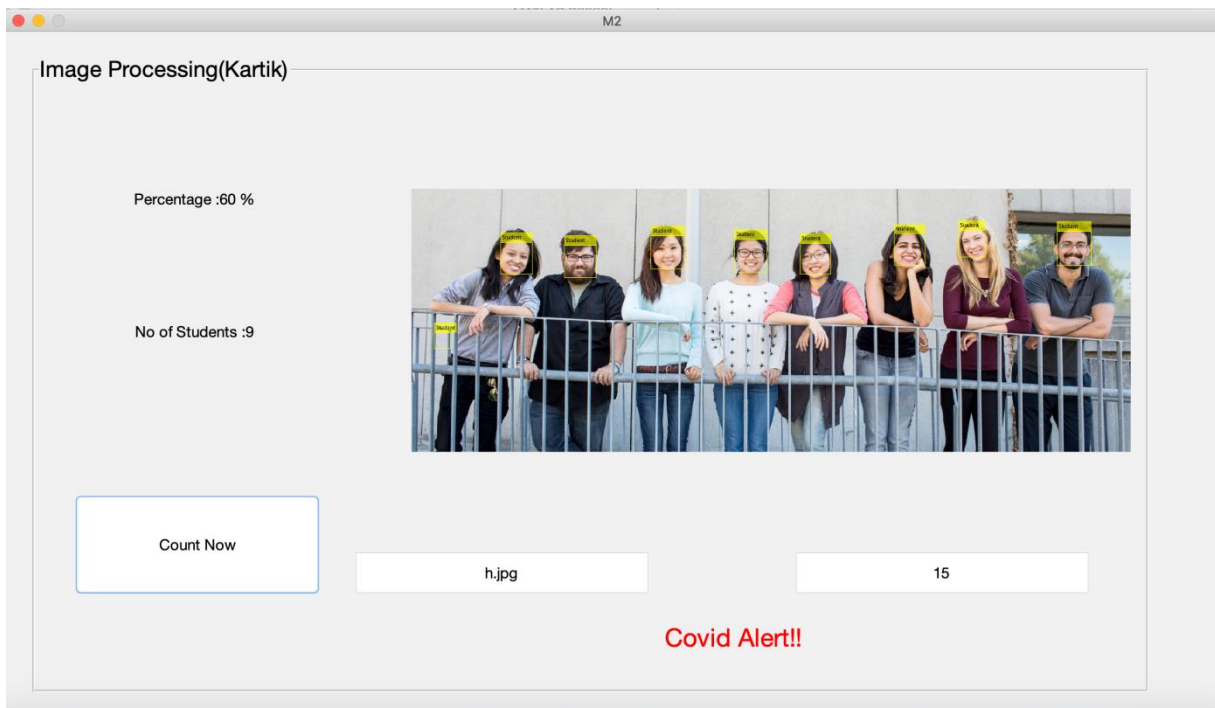
Count Now

a.jpg

20

Stay Safe!!





Name and Signature of the Faculty :
Prof. Revathi G P