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Dates : 1st to 7th June 2020

Live Workshop *

Time : 4pm to 7pm

June 1:	Introduction to Python & Building APIs with Python
June 2:	Web Scraping
June 3:	Data Analysis
June 4:	Building Web Application with Python
June 5:	Building virtual voice assistant with Python
June 6:	Building Games with Python
June 7:	Building Face detection model with Python



In association with

MLRIT
MLR Institute of Technology



CSI Vijayawada Chapter



For queries : 6301341478

Project Name:

“Computer Check for allowing in Campus through Face Detection on basis of Shifts”

The project is implemented using:

1. Introduction to Python & Building APIs with Python
2. Building Face Detection model with Python

Designed by:

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Introduction:

Mankind has observed various pandemics throughout the history where some of them were more disastrous than the others to the humans. We are observing a very tough time once again fighting an invisible enemy; the novel COVID-19 Coronavirus. Initially observed in the Wuhan province of China, now fastly spreading around the world.

COVID-19 Report:

Till, 13th June, 2020, there are 7,799,243 Coronavirus cases, with 429,870 deaths while 4,001,077 has been recovered.

In India till, 13th June, 2020, there are total 317,368 Coronavirus cases, with 9,109 deaths while 159,597 has been recovered.

Problem Statement:

Presently nearby 3 Months the schools and colleges have been closed. Also the Government has stated that it is possible to open the schools and colleges by August 1st Week with some restrictions.

In that restrictions the one main restriction is to run the schools and colleges by 50% of the student's i.e. From 7AM to 1PM 50% of students will attend the school or college and From 1PM to 6PM the remaining 50% of students will attend the school or college. But there are some chances that morning shift person can come to evening shift without caring anything or vice versa and also it is impossible to check the every student who is coming to the campus that he is morning shift or evening shift.

By this it is hard to maintain the shifts in the School or College.

Solution:

For this problem I implemented a project named **“Computer Check for allowing in Campus through Face Detection on basis of Shifts”** which is designed used the programming languages Python and HTML.

This project will provide the information of the student who is standing in front of the camera that which shift he belongs to or unknown person.

It can be implemented at the main gate of the campus and it is continuously observed by the Security that he is allowed or not.

By this project we can maintain only 50% of the students exactly.

In an online articles they said the shifts are going to implement.

-> <https://telugu.samayam.com/education/news/degree-and-engineering-colleges-in-andhra-pradesh-are-likely-to-start-from-august-3/articleshow/76281029.cms>

Prerequisite of Software's are:

1. Python 3.7
2. Google Chrome
3. OpenCv
4. Flask
5. Numpy
6. Pillow

Commands to install the libraries for project are:

1. pip install opencv-contrib-python
2. pip install flask
3. pip install numpy
4. pip install pillow

Programming Languages used are:

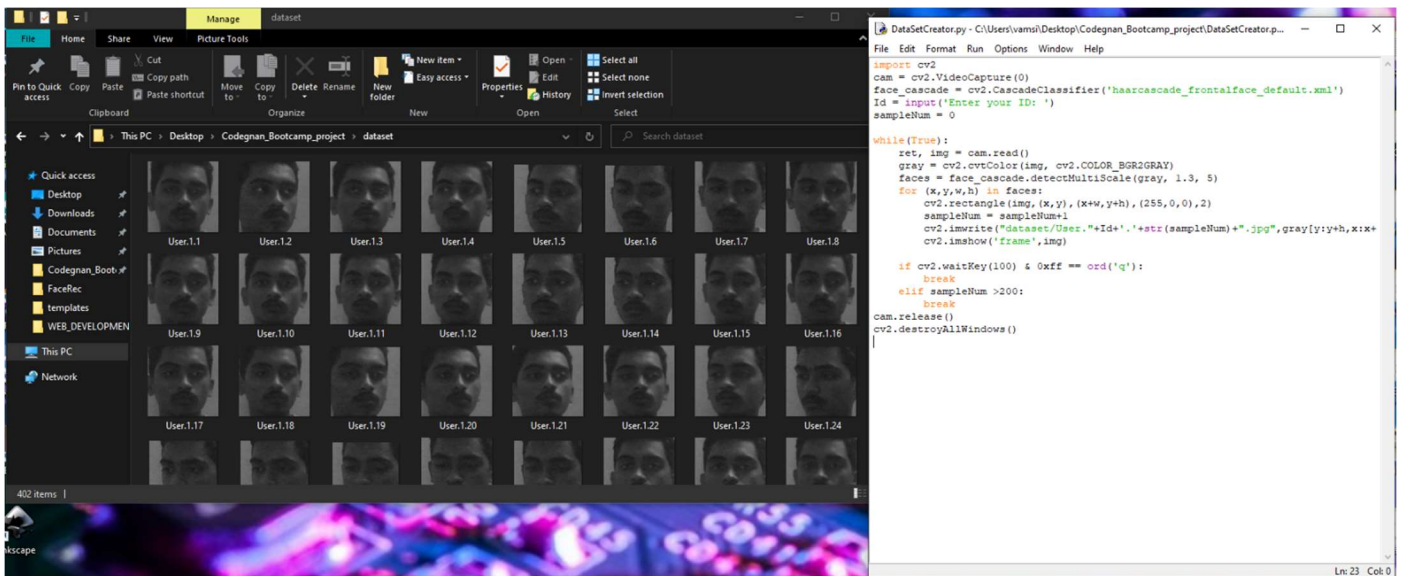
1. HTML (Front-End)
2. Python (Back-End)

Project File Consists of:

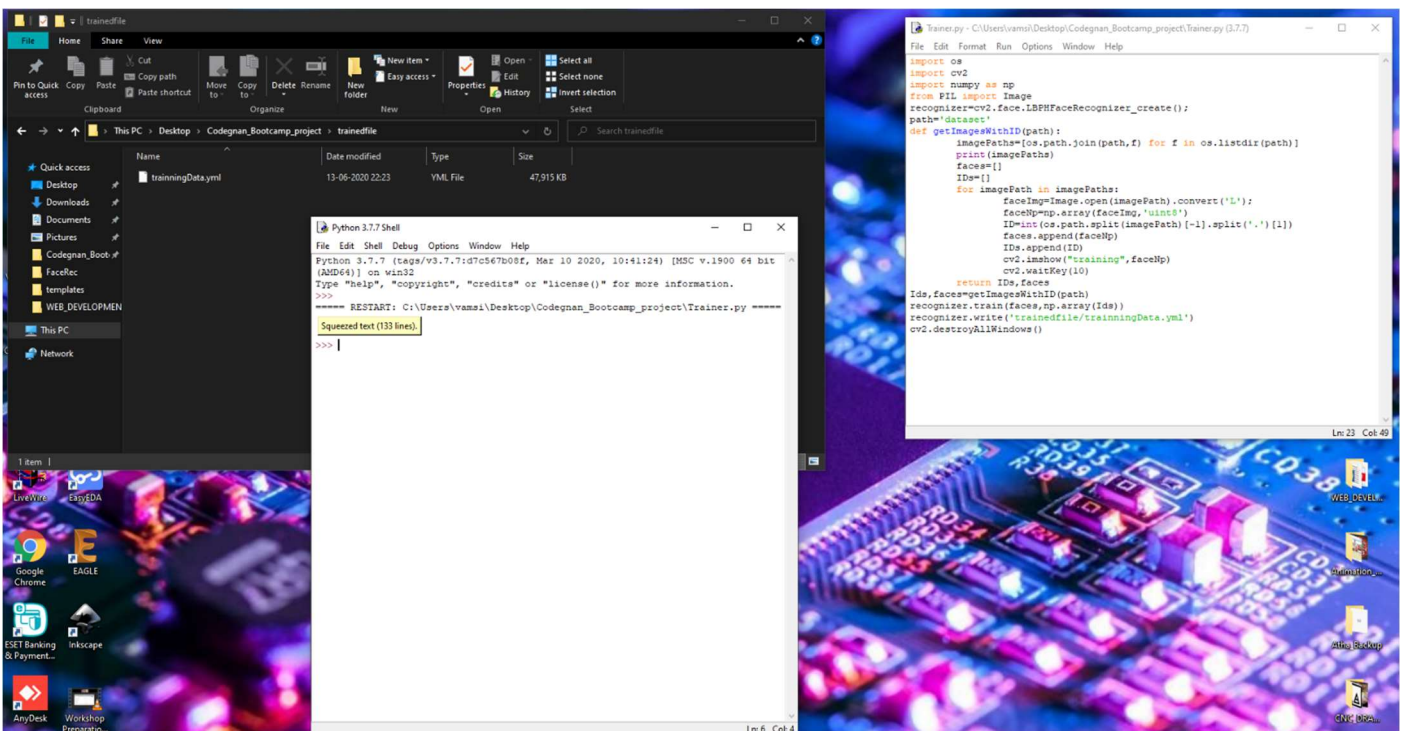
1. Codegnan_Bootcamp_Project (Folder)
 - A. dataset(Folder)
 1. User.1.1.jpg
 - .
 - .
 201. User.1.201.jpg
 202. User.2.1.jpg
 - .
 - .
 402. User.2.201.jpg
 - B. templates (Folder)
 1. index.html
 - C. trainedfile (Folder)
 1. trainingData.yml
 - D. DataSetCreator.py
 - E. Haarcascade_frontalface_default.xml
 - F. stream.py
 - G. Trainer.py

Procedure to Execute project:

1. Create a Dataset of the face using “DataSetCreator.py”



2. Train the dataset using “Trainer.py” and create yml file.



3. Open stream.py and end the ID of the dataset in the list of first_shift or second_shift.

```
recognizer = cv2.face.LBPHFaceRecognizer_create()
recognizer.read('trainedfile/trainingData.yml')
face_cascade = cv2.CascadeClassifier('haarcascade_frontalface_default.xml')
font = cv2.FONT_HERSHEY_SIMPLEX

first_shift=[1]
second_shift=[2]

id = 0
names = ['None', 'Vamsi', 'Ambica']
number=[]
nm=[]
```


4. Open the Command Prompt and enter the directory which you placed the Codegnan_Bootcamp_Project folder.

```
Command Prompt
Microsoft Windows [Version 10.0.19041.329]
(c) 2020 Microsoft Corporation. All rights reserved.

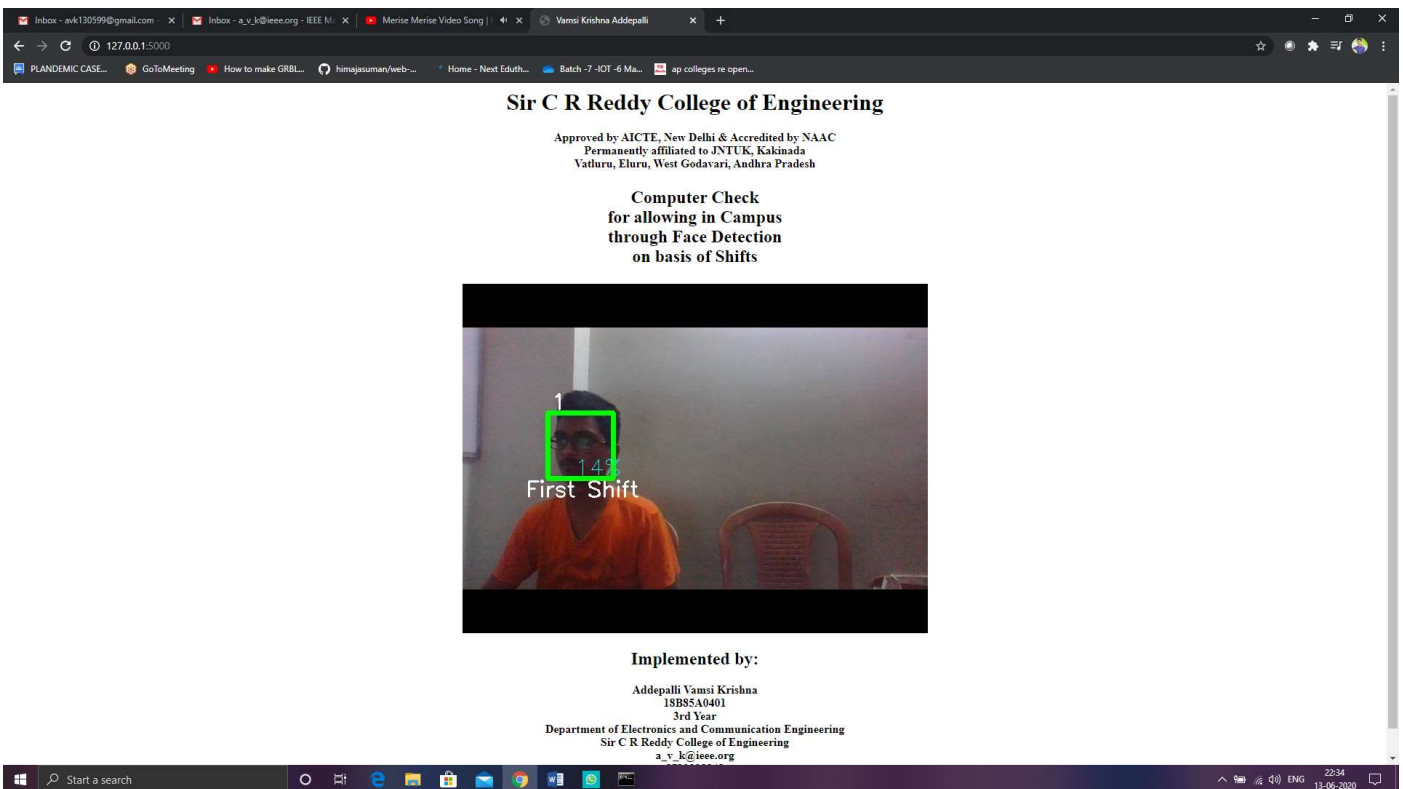
C:\Users\vamsi>cd Desktop
C:\Users\vamsi\Desktop>cd Codegnan_Bootcamp_project
C:\Users\vamsi\Desktop\Codegnan_Bootcamp_project>
```

5. Enter the command “python stream.py” to run the program.

```
Command Prompt - python stream.py
Microsoft Windows [Version 10.0.19041.329]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\vamsi>cd Desktop
C:\Users\vamsi\Desktop>cd Codegnan_Bootcamp_project
C:\Users\vamsi\Desktop\Codegnan_Bootcamp_project>python stream.py
* Serving Flask app "stream" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: on
* Restarting with stat
* Debugger is active!
* Debugger PIN: 105-024-931
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
```

6. Copy the highlight area of the URL and paste in the Google Chrome URL Tab.



This is the procedure to run the Project.

Program:

“DataSetCreator.py”

```
import cv2
cam = cv2.VideoCapture(0)
face_cascade = cv2.CascadeClassifier('haarcascade_frontalface_default.xml')
Id = input('Enter your ID: ')
sampleNum = 0
```

It is importing the library of “OpenCv” and in second line it is initializing the webcam in the variable “cam”. In the third line it is storing the Classifier file in the variable “face_cascade”. In the fourth line it is taking input ID number.

```
while(True):
    ret, img = cam.read()
    gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
    faces = face_cascade.detectMultiScale(gray, 1.3, 5)
    for (x,y,w,h) in faces:
        cv2.rectangle(img, (x,y), (x+w,y+h), (255,0,0), 2)
        sampleNum = sampleNum+1
        cv2.imwrite("dataset/User."+Id+'.'+str(sampleNum)+".jpg", gray[y:y+h,x:x+w])
        cv2.imshow('frame',img)

    if cv2.waitKey(100) & 0xff == ord('q'):
        break
    elif sampleNum >200:
        break
cam.release()
cv2.destroyAllWindows()
```

It is running an Infinite loop. The data of the variable “cam” is going to store in the variable named “img”. Then it is converted into grayscale. After it is going to crop the image till the face only. In that for loop it is programmed to store the datasets in the folder named “dataset”. After that if q is pressed it will immediately stop the programme and also if the dataset is taken completely then it will stop the programme.

“Trainer.py”

```
import os
import cv2
import numpy as np
from PIL import Image
recognizer=cv2.face.LBPHFaceRecognizer_create();
path='dataset'
```

It is going to import library of OpenCv, Numpy and Pillow. After that it is initializing the face recognizer of the OpenCv.

```

def getImagesWithID(path):
    imagePath=[os.path.join(path,f) for f in os.listdir(path)]
    print(imagePaths)
    faces=[]
    IDs=[]
    for imagePath in imagePaths:
        faceImg=Image.open(imagePath).convert('L');
        faceNp=np.array(faceImg,'uint8')
        ID=int(os.path.split(imagePath)[-1].split('.')[1])
        faces.append(faceNp)
        IDs.append(ID)
        cv2.imshow("training",faceNp)
        cv2.waitKey(10)
    return IDs,faces
Ids,faces=getImagesWithID(path)
recognizer.train(faces,np.array(IDs))
recognizer.write('trainedfile/trainningData.yml')
cv2.destroyAllWindows()

```

In this function convert the images of the dataset into a yml file using OpenCv.

“stream.py”

```

from flask import Flask, render_template, Response
import cv2
import sys
import numpy

```

In this it is going to import the libraries of Flask, OpenCv, and Numpy.

```

recognizer = cv2.face.LBPHFaceRecognizer_create()
recognizer.read('trainedfile/trainningData.yml')
face_cascade = cv2.CascadeClassifier('haarcascade_frontalface_default.xml')
font = cv2.FONT_HERSHEY_SIMPLEX

first_shift=[1]
second_shift=[2]

```

In this it is going to initialize the yml file and frontal face classifier file and also it is giving the font. Then it is created the two shifts list. In first shift I have placed my Database Id and in second shift I have placed my Mother Database Id.

```

def index():
    return render_template('index.html')

```

Here it is going to take the template of html which is designed for the front end.

```

def get_frame():
    camera=cv2.VideoCapture(0)

    while True:
        retval, im = camera.read()
        gray = cv2.cvtColor(im,cv2.COLOR_BGR2GRAY)

        faces = face_cascade.detectMultiScale(
            gray,
            scaleFactor = 1.1,
            minNeighbors = 1)

        for (x,y,w,h) in faces:
            cv2.rectangle(im, (x,y), (x+w, y+h), (0,255,0), 5)
            id, confidence = recognizer.predict(gray[y:y+h,x:x+w])
            if (confidence<100):
                nm.append(names[id])
                number.append(id)
                confidence = " {0}%".format(round(100 - confidence))
                if id in first_shift:
                    cv2.putText(im, 'First Shift', (x+w-120,y+h+25), font, 1, (255,255,255), 2)
                if id in second_shift:
                    cv2.putText(im, 'Second Shift', (x+w-120,y+h+25), font, 1, (255,255,255), 2)
            else:
                id = "unknown"
                confidence = " {0}%".format(round(100 - confidence))

            cv2.putText(im, str(id), (x+5,y-5), font, 1, (255,255,255), 2)
            cv2.putText(im, str(confidence), (x+5,y+h-5), font, 1, (255,255,0), 1)

            imgencode=cv2.imencode('.jpg',im)[1]
            stringData=imgencode.tostring()
            yield (b'--frame\r\n'
                b'Content-Type: text/plain\r\n\r\n'+stringData+b'\r\n')

    del (camera)

```

Here in this function it is going to initialize the camera and store the data in variable in “im” and then it is converted into gray scale for image processing and then it used Cascade classifier to detect the faces and then it start analysing the faces using yml file and start recognizing. If the face is recognized it shows the ID and which shift he is going to present First Shift or Second Shift. If it is not recognized then it shows Unknown.

```

@app.route('/calc')
def calc():
    return Response(get_frame(),mimetype='multipart/x-mixed-replace; boundary=frame')

if __name__ == '__main__':
    app.run(debug=True)

```

The calc function is used to send the data of the camera to the html page.

Result:

My face which is registered for the first shift in the database with ID No. 1

Inbox - avk130599@gmail.com x Inbox - a_v_k@ieee.org - IEEE M... x Merise Merise Video Song | x Vamsi Krishna Addepalli x +

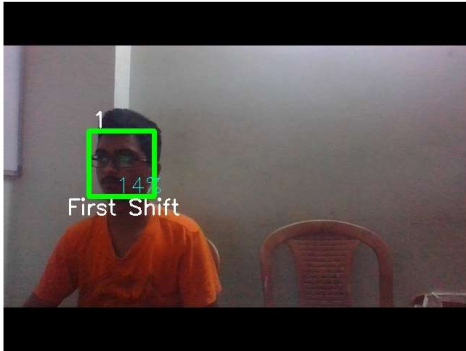
127.0.0.1:5000

PLANDEMIC CASE... GoToMeeting How to make GRBL... himajasuman/web... Home - Next Eduth... Batch -7 -IoT -5 Ma... ap colleges re open...

Sir C R Reddy College of Engineering

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Permanently affiliated to JNTUK, Kakinada
Vatluru, Eluru, West Godavari, Andhra Pradesh

**Computer Check
for allowing in Campus
through Face Detection
on basis of Shifts**



Implemented by:

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Start a search

22:34
13-06-2020

My Father face is not registered so it is showing as Unknown

Inbox - avk130599@gmail.com x National Level BootCamp all ser... x National Level Bootcamp on Pyt... x Vamsi Krishna Addepalli x +

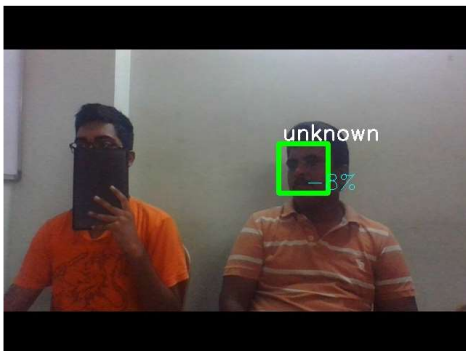
127.0.0.1:5000

PLANDEMIC CASE... GoToMeeting How to make GRBL... himajasuman/web... Home - Next Eduth... Batch -7 -IoT -5 Ma... ap colleges re open...

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**Computer Check
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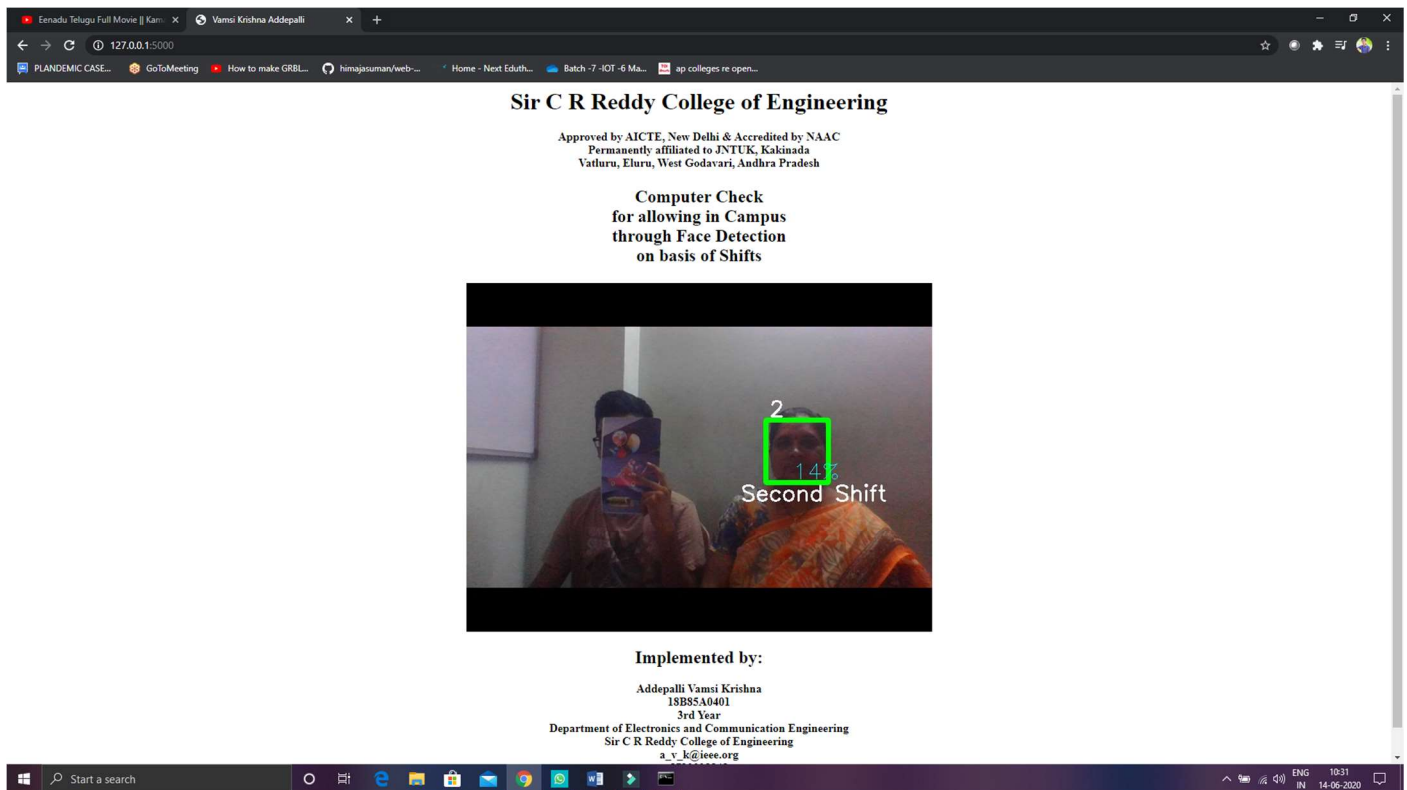
Implemented by:

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Start a search

07:04
14-06-2020

My Mother face which is registered for the second shift in the database with ID No. 2



Conclusion:

This project can be used at the entrance of the college to detect the person whether which shift he belongs to and also to detect the unknown person who is going to enter in the college.