VIT-AP UNIVERSITY

TITLE OF PROJECT

FACE RECOGNIZER USING RASPBERRY PI

A

ENGINEERING CLINICS REPORT

SUBMITTED TO

VITAP UNIVERSITY

OF B.TECH IN

COMPUTER SCIENCE AND ENGINEERING

UNDER THE GUIDANCE OF:

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ABSTRACT

Facial recognition is one of the most important image analytics technologies. It is a real challenge to create an automated device that matches the human capacity to recognize faces. While humans are very effective at identifying known faces, when dealing with a lot of unfamiliar faces, they are not as well qualified.

Even there many other process to be done such as biometric. But be going to use this. This type security can be used in so many places

- Unlocking phones
- Airports and border control
- Finding missing persons
- Banking
- Security check for a very importance places such as parliaments
- in schools and college or office whether there is a I-card check is required

And there we are going to use this for entering to mess rather than mess-card check. So we are going to prepare a project on this.

In our project we do face recogniser using PUTTY and VCN VIEWER software platform. In hardware we have used raspberry pi, raspberry pi camera, SD-card c-type cod and LAN cable. We are using SD-card to store the database into it. We have connected all hardware devices to laptop. Then we moves to open the PUTTY then VNC then we connect the virtual desktop to network(WIFI) then open the camera to go with the recognition process. When a person comes in front of the camera it check the person from the database storage whether it match with the memory or not. If it match with the memory then it will show the name of the person. But if it don't match with the person face it will show no match as it will display as unknown.

INTRODUCTION

Facial recognition is a way of identifying or confirming an individual's identity using their face. Facial recognition systems can be used to identify people in photos, videos, or in real-time.

Facial recognition is a category of biometric security. Other forms of biometric software include voice recognition, fingerprint recognition, and eye retina or iris recognition. The technology is mostly used for security and law enforcement, though there is increasing interest in other areas of use.

The principal use of face recognition technology continues to be security solutions. Facial recognition is recognized as one of the most accurate and easy ways for establishing individual identity across a wide range of sectors.

We have prepared our project with the help of Raspberry pi Using python, we make a face recognition system.

While humans can recognize faces without much effort, facial recognition is a challenging pattern recognition problem in computing. Facial recognition systems attempt to identify a human face, which is three-dimensional and changes in appearance with lighting and facial expression, based on its two-dimensional image. To accomplish this computational task, facial recognition systems perform four steps. First face detection is used to segment the face from the image background. In the second step the segmented face image is aligned to account for face pose, image size and photographic properties, such as illumination and grayscale. The purpose of the alignment process is to enable the accurate localization of facial features in the third step, the facial feature extraction. Features such as eyes, nose and mouth are pinpointed and measured in the image to represent the face. The so established feature vector of the face is then, in the fourth step, matched against a database of faces.

PROBLEM FACED

It takes much time take for mess card for which we get late for our class during lunch especial , without mess card we are not even allowed to enter the mess.

It becomes much difficult to go to room and take for our card whenever we forget, because at that time its much difficult to get of the lift.

Even we are having problem with entering to hostel because they are checking for hostel card so that no day-scholar enter to take lunch, which are not allowed.

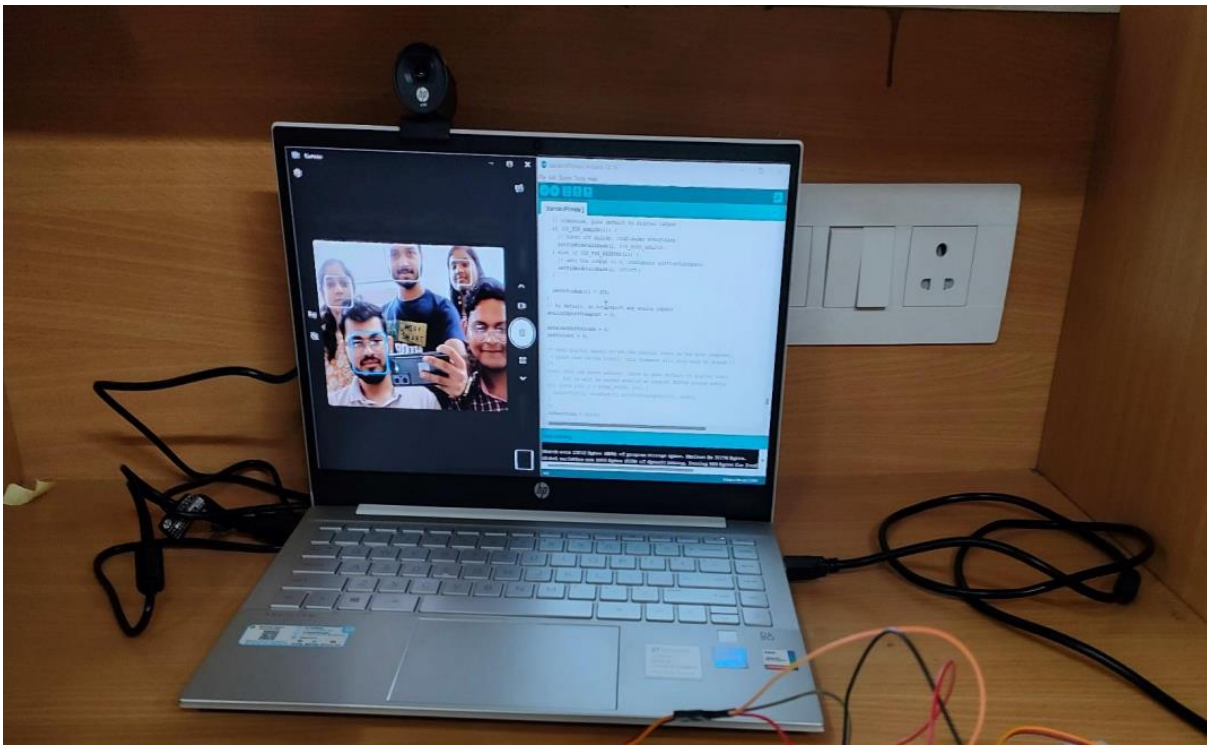
For both I-card checking in the front of hostel before entering and mess card check while entering the mess, it takes much time to take our lunch and get to the classes which are just after the lunch hour.

And its many a times that while going classes in the morning we forget to take our i-cards or mess cards, which trouble us.

To resolve this problem we need a system which will recognise faster and we wont get late for classes.

AIM-

- Checking time for the mess card is reduced the process is fast now
- There is no problem if we forget to bring mess card



OBJECTIVE

We choice this because it is faster and more convenient compared to other biometric technologies like fingerprints or retina scans. There are also fewer touchpoints in facial recognition compared to entering passwords or PINs. It supports multifactor authentication for additional security verification.

It has some advantages-

Facial recognition is a technology that can benefit society, including increasing safety and security, preventing crimes, and reducing human interaction. Here are some pros of facial recognition:

Helps find missing people

Protects businesses against theft

Improves medical treatment

Strengthens security measures

Makes shopping more efficient

Reduces the number of touchpoints

Improves photo organization

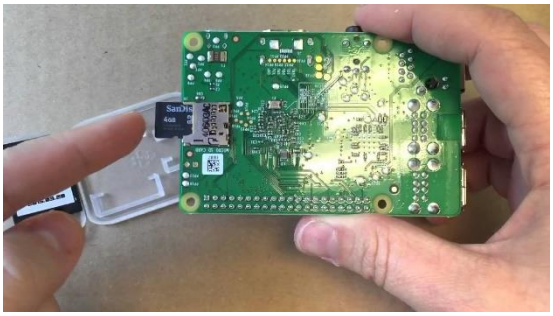
Detection refers to the process of locating a face in an input image. So, each face is placed into a bounding box. To complete this stage, the facial recognition algorithms are first trained to learn what a face looks like on various data entries.

Analysis refers to mapping out the features for each face. This is done by measuring the distance between the eyes, the nose, and the mouse, as well as identifying the shape of the chin. Those distances are then combined and converted into a unique set of numbers — the so-called faceprint.

Recognition refers to actually determining a person's identity in the input photo. In some applications, this stage is replaced with categorization. In such cases, the algorithms do not confirm a person's identity but label the person as belonging to one of the distinct groups, for example, by gender or age.

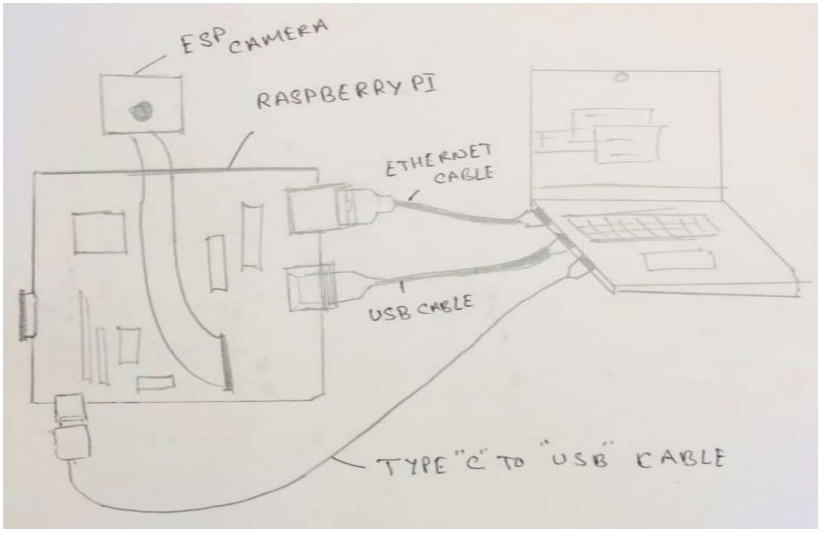
PROCEDURE and DISCUSSION

- We connect the raspberry pi camera to raspberry pi and SD-card is inserted to raspberry pi to store database to be used for execution.



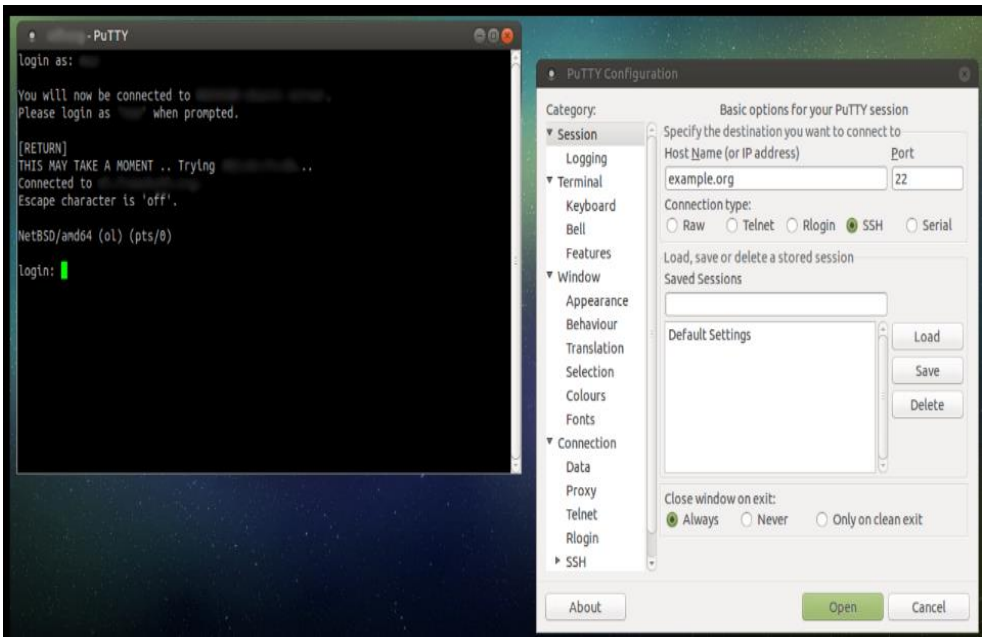
- C type USB code is connected to raspberry pi to computer for suppling power. And USB code to computer for network connection for raspberry pi to run.

- Using Lan cable to connect to raspberry pi to computer for operating the procedure in raspberry pi.

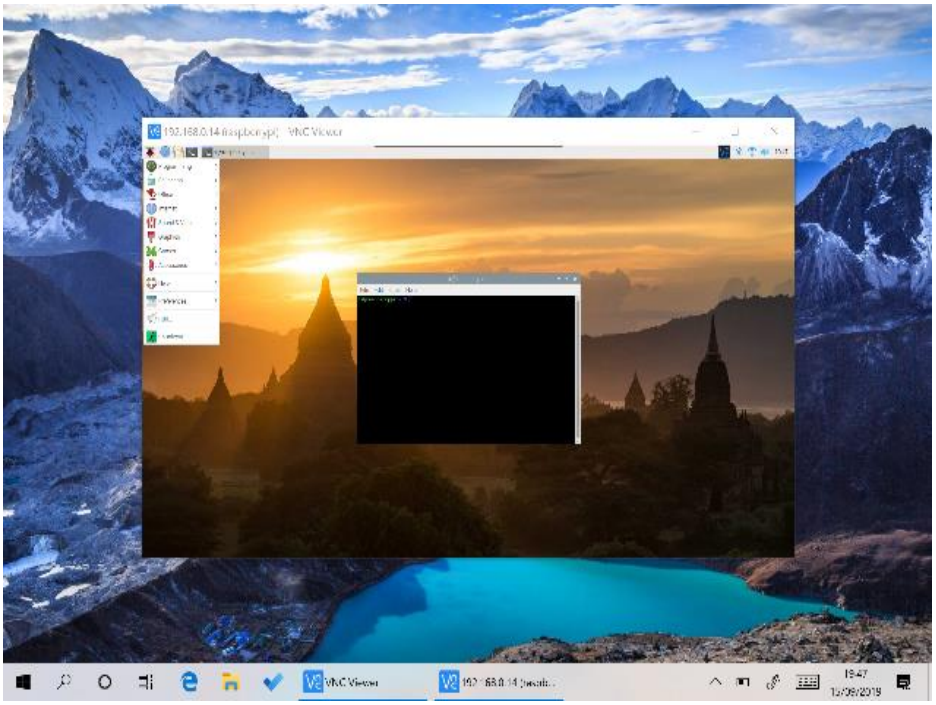


- After connection we moved to open the software platform
- Firstly we open putty, which opens a window where it ask us the hostname(which should be stored while installing the putty)

- Then it opens another windows which ask you to enter your username and password(which should be also stored while installing the putty).



- Then we open VNC which To connect from a Raspberry Pi to another machine, you only need to open VNC Viewer.. You can even create and remote into a virtual desktop.
- Then at the top there will be search bar where we have to search for the hostname of our putty.
- Then there a virtual desktop will be opened where we have to connect the network(WIFI) to use for further process.
- Then from the chrome of the virtual desktop we will open the camera



- After the camera is opened we have to face the camera the person whose pic will be stored in the database will detect the face
- If anyone whose pic wont be there in database will be showing unknow

RESULT

Face image are captured through Raspberry pi camera and stored in a database in SD card. To capture the face place yourself in front of the camera. The pi will detect the face and then starts comparing it with the given database . If the face gets detected then it will display it on the terminal screen else if not detected then unknown message will get displayed within the detected face .

CONCLUSION

Face recognition systems are part of facial image processing applications and their significance as a research area are increasing recently. Implementations of system are crime prevention, video surveillance, person verification, and similar security activities. The face recognition system implementation will be part of humanoid robot project at Atılım University. The goal is reached by face detection and recognition methods. Knowledge-Based face detection methods are used to find, locate and extract faces in acquired images. Implemented methods are skin colour and facial features. Neural network is used for face recognition. RGB colour space is used to specify skin colour values, and segmentation decreases searching time of face images. Facial components on face candidates are appeared with implementation of Log filter. Log filter shows good performance on extracting facial components under different illumination conditions. FFNN is performed to classify to solve pattern recognition problem since face recognition is a kind of pattern recognition. Classification result is accurate. Classification is also flexible and correct when extracted face image is small oriented, closed eye, and small smiled. Proposed algorithm is capable of detect multiple faces, and performance of system has acceptable good result

Future Scope

In future, our project can be executed more efficiently if used in a large scale i.e. instant of raspberry pi a bigger circuit having a more efficient processor is begin used, instant of 32gb SD-card a bigger database is used also good quality camera and good network strength is used

REFERNCE

https://smartbuilds.io/smart-cctv-camera-flask-video-streaming-opencv-raspberry-pi/

https://www.geeksforgeeks.org/python-face-recognition-using-gui/

https://towardsdatascience.com/step-by-step-face-recognition-code-implementation-from-scratch-in-python-cc95fa041120

CODES IN APPENDIX

CAMMANDS-

```
sudo apt-get update
sudo apt-get upgrade
sudo apt-get install build-essential
sudo apt-get install cmake
sudo apt-get install gfortran
sudo apt-get install git
sudo apt-get install wget
sudo apt-get install curl
sudo apt-get install graphicsmagick
sudo apt-get install libgraphicsmagick1-dev
sudo apt-get install libatlas-base-dev
sudo apt-get install libavcodec-dev
sudo apt-get install libavformat-dev
sudo apt-get install libboost-all-dev
sudo apt-get install libgtk2.0-dev
sudo apt-get install libjpeg-dev
```

sudo apt-get install liblapack-dev

sudo apt-get install libswscale-dev

sudo apt-get install pkg-config

sudo apt-get install python3-dev

sudo apt-get install python3-numpy

sudo apt-get install python3-pip

sudo apt-get install zip

sudo apt-get clean

pip3 install numpy

pip3 install scikit-image

sudo apt-get install python3-scipy

sudo apt-get install libatlas-base-dev

sudo apt-get install libjasper-dev

sudo apt-get install libqtgui4

sudo apt-get install python3-pyqt5

sudo apt install libqt4-test

pip3 install opencv-python==3.4.6.27

pip3 install face_recognition

THESE ARE NECCESARY CAMMANDS AND MANY OTHER CODES ARE PRESENT