



# INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact Factor: 6.078

(Volume 7, Issue 3 - V7I3-1593)

Available online at: <https://www.ijariit.com>

## Intrusion detection through face detection

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### ABSTRACT

*The aim of this paper is to develop a security system for remote employing a small computer. Surveillance is becoming a requirement in any public or private area to cope up with increasing number of threats ranging from burglary, robbery to terrorist activities. The normal methods for monitoring are commonly confined within the use of CCTV cameras. Technology takes a neighbourhood of our lifestyle; it also became a confidant of our privacy like the surveillance camera which is out there everywhere and its presence has prevented many cases of robberies and crimes. IP cameras are key devices for a video closed-circuit television. This paper introduces a price effective, power efficient and low-profile IP camera.*

**Keywords**— Face Detection, Python, Tkinter, Open-CV, Haar-Cascade

### 1. INTRODUCTION

Security is that the first attention in everywhere, whenever and for everybody. everyone who wishes to be his home and repair buildings in safety. Video surveillance systems are effective and important for security management. Combining traditional cameras and network video technology together, IP camera can compress the delivery live from a Phone employing a PC people can remotely browse and watch the protected area activity. Hence IP camera are key devices of the closed-circuit television.

The IP cam System mentioned this project Uses MAC address Based security so no other pc can use this application. It'll Only unlock if the MAC address is Correct. The System also uses a PIN based Security so nobody can enter the System without the PIN. This project uses an Android device as a camera and A PC which will see what the android devices camera captures. The Instruction on the way to setup is given within the application itself. This live camera feed comes with Face detection. The

application also provides Recording Feature and a tab to ascertain all the Recorded Footage. This Recording Feature Doesn't Use Face detection because it would make the Footage laggy as it'll records and processes Faces at the same time.

For this technique to figure Internet Connection may be a Must. This Surveillance it alleged to be used when no one's Home or when the Office room is empty. If ran 24/7 the pc must get on and therefore the android device battery will drain fast. So, running this technique 24/7 isn't Possible as sometime is required for the device to charge and also the Devices health will degrade overtime. This Project Requires Internet connection.

### 2. MOTIVES BEHIND THIS PROJECT.

#### i. Security

“At the top of the day, the goals are simple: safety and security” Everyone's Priority is to be safe and secure. That's what this technique is about. you'll have an eye fixed on an area once you yourself aren't there. Security cameras aren't limited to the protection of a home, they will also allow you to see in on your kids while you're at work. Often times families with a group of working parents find themselves during a predicament when their child gets out of faculty within the mid-afternoon. With a camera security system, a parent can always sign up on their children from work by using the remote monitoring feature of the system.

#### ii. Business Security

Smaller organization are more susceptible to employee theft. this is often because often, there are fewer safeguards in situ. Video Surveillance can Prevent Employee theft. Video Surveillance can help prevent Shoplifting & The Presence of an honest security system including security cameras shows your customer that you simply care about their safety and security and may improve their overall perception of your business. Continuous real-time monitoring – IP remote surveillance

allows authorized employee to watch critical business areas continuously.

### iii. To Lower the danger of Vandalism

Whether you're a home or a business owner, vandalism may be a constant threat. Vandalism are often anything from graffiti to destroying windows or the other sort of intentional property damage. This makes security cameras one among the simplest tools for fighting Vandalism

## 3. THEORITICAL WORKING

This Project is meant to supply surety to its users on security

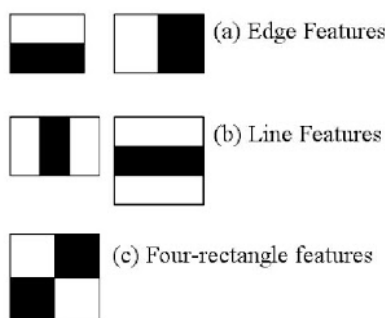
### 3.1. Working

This project when booted for the primary time asks for a Username and asks to line a password. This password can't be changed for the nonce . After Inputting The username and password the appliance goes to subsequent page where it asks for the inserted PIN & checks users MAC address. We used "getmac" an external library to fetch users MAC address. If the MAC address or the PIN aren't correct, user won't get access to the dashboard

On the dashboard user will see time and his username and a couple of options "Camera" and "Record". Time module used for displaying time. Selecting Camera will ask users IP address and Port Number . which may be fetched with the utilization of "Help" option Given there. assistance is nothing but a guide. On proper IP address and Port Number the phones camera are often accessed via users pc. This Camera shows love Face detection , Open-Cv is employed for Face detection and a pre trained Haar-cascade is employed to enhance face detection. Selecting Record will show 2 more options 1st "Record" & 2nd "Recorded". Selecting Record will open a frame where it asks user to input IP Address and Port Number which may be fetched (Procedure is different from Camera One). Selecting Recorded will show a frame where all the recordings are available . There's also an choice to open the file location where the Recording are saved. Recording are saved with "date-time" because the recordings name

### 3.2. Haar Features

A **Haar feature** is basically calculations that are performed on adjacent rectangular regions at a selected location in a detection Window or a Frame. This calculation involves summing the pixel intensities in each region and calculating the differences between the sums. Here are some samples of Haar features below.



### 3.3. Tools

There were Many Tools that have made this project run successfully.

#### i. Open-Cv

OpenCV (Open-Source Computer Vision Library) is an open-source computer vision and machine learning software

library. It was built to supply a standard infrastructure for computer vision applications and to accelerate the utilization of machine perception within the commercial products. It is a BSD-licensed product, OpenCV makes it easy for businesses to use and edit the code. OpenCV library has more than 2500 optimized algorithms, which incorporates a group of both classic and state-of-the-art computer vision and machine learning algorithms.

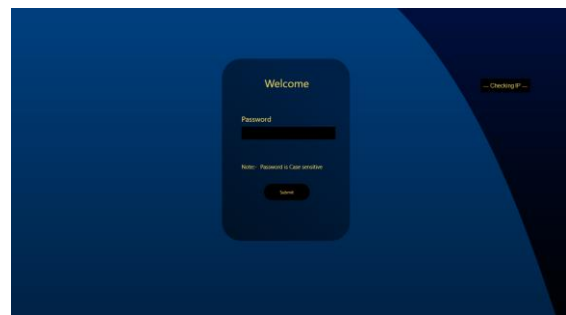
#### ii. Haar-Cascade

Face detection using Haar cascade a machine learning based approach where a cascade function is trained using multiple sets of input data. Many pre-trained cascade classifiers like face, eyes, body , etc are available in OpenCV. This Project uses face classifier Object Detection using Haar feature-based cascade classifiers is an efficient method for object detection. It is a machine learning based approach where a cascade function is trained from a group of positive and negative images and these images can be used to detect object in other images. OpenCV provides a training method or pretrained models, that can be read using the cv::Cascade Classifier::load method. The pretrained models are located within the data folder within the OpenCV installation

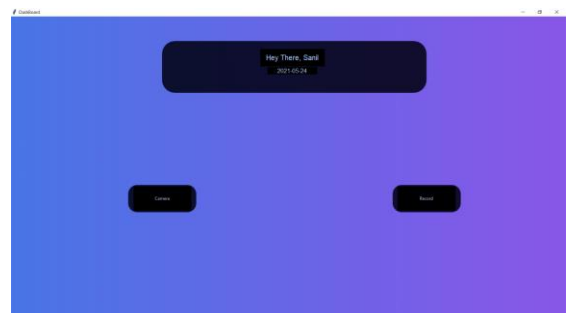
#### iii. Visual Studio Code

Visual Studio Code is a lightweight feature rich source code editor. It is available for Windows, macOS and Linux. Visual Studio code is equipped with built-in support for Scripts like JavaScript, TypeScript and Node.js and features a rich ecosystem of extension for other languages (such as C++, C#, Java, Python, PHP, Go)

## 4. PRACTICAL WORKING

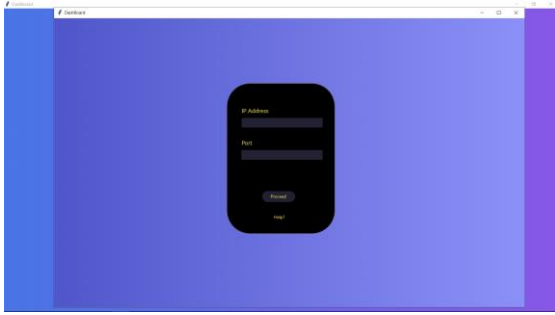


If the MAC address check fails. The Application Execution will be terminated. If the PIN check fails the app won't Go to Its Dashboard. When Both conditions MAC address as well as PIN check Succeed, The App will Go to its Dashboard. (PIN is set when the app is launched for the First Time) Assuming both the MAC address and The PIN are Correct. Let's go to the Dashboard

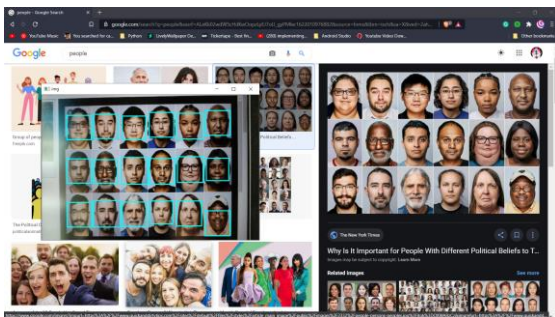


Dashboard has a greeting message ,time ,2 buttons (1<sup>st</sup> for Live Camera and 2<sup>nd</sup> for Recording) when Clicked on Camera it asks

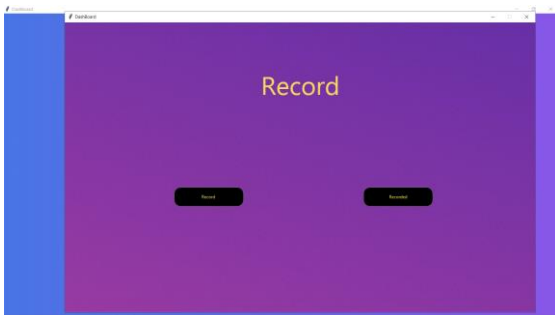
for IP Address and Port number. (How to Obtain the IP address and Port number? It is answered with the “Help?” Button)



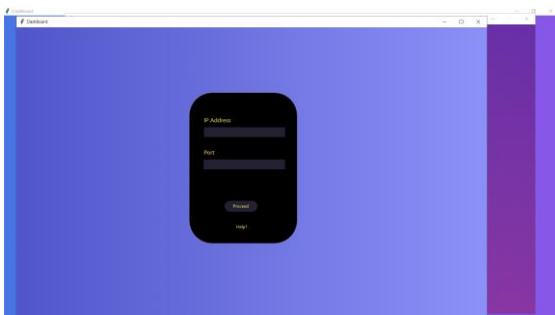
The Window where IP address and Port Number is Entered. If the entered IP and Port Number are Proper, You'll see the Screen as the Below Screen Shoot



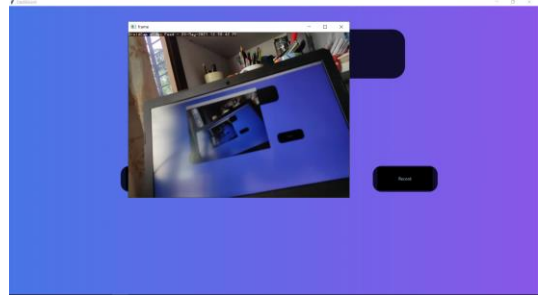
The "img" frame shows the detected faces. All the detected faces are surrounded by the blue triangle. Haar-Cascade classifier was used to face detection



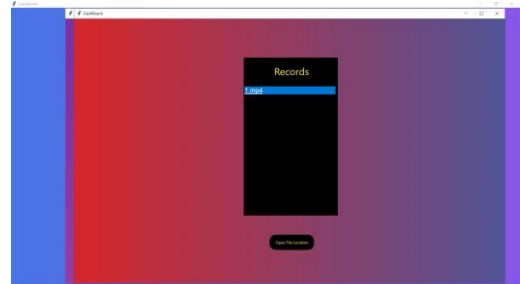
This is the screen that will be displayed one Clicked on recording Button. This Frame has 2 options Record and Recorded. Record Button will also ask for IP address and Port Number. While the “Recorded” Button shows a list of Videos Recorded By this Application.



This is the frame that will be displayed once the “Record” Button is clicked. With Correct IP Address and Port Number this will start recording. (Again, How to Obtain the IP address and Port number? it answered with the “Help?” Button. Method is Different from Camera One)



This frame just shows the things that are being recorded



This is the screen that shows the list of Videos Recorded by the app. The Button “Open File Location” opens the path where recorded videos are saved

## 5. CONCLUSION

In recent years face detection has achieved considerable attention from researchers in bio-metrics, pattern recognition, and computer vision groups. There is countless security, and forensic applications requiring the use of face recognition technologies. As you can see, face detection system is very important in our day-to-day life. Among the entire sorts of biometric, face detection and recognition system is the most accurate. In this article, we have presented a survey of face detection techniques. It is exciting to see face detection techniques be increasingly used in real-world applications and products. Applications and challenges of face detection also discussed which motivated us to do research in face detection. The most straightforward future direction is to further improve the face detection in presence of some problems like face occlusion and non-uniform illumination. Current research focuses in field of face detection and recognition is the detection of faces in presence of occlusion and non-uniform illumination. A lot of work has been done in face detection, but not in presence of problem of presence of occlusion and non-uniform illumination. If it happens, it will help a lot to face recognition, face expression recognition etc. Currently many companies providing facial biometric in mobile phone for purpose of access. In future it will be used for payments, security, healthcare, advertising, criminal identification etc.

As you can see, Security is really important in our day-to-day life. In this article, we have used face detection as well as MAC address-based Protection to improve security. MAC address was used so that only specified Systems are allowed to use this application. It is exciting to see techniques like face detection increasingly used in real-world applications and products.

## 6. REFERENCES

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- [3] Installing Open-Cv
- [4] OpenCV Brief Information
- [5] Face Detection using OpenCV