A Novel Approach for House Lock Monitoring System using IOT and AI Technologies

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***Abstract**: Now a day's security is very important for everyone. Home security is essential, In order to provide security for home we proposed This system will perform the detection and recognition rapidly in real time. Firstly, the system needs a face authentication for the user to be able to enter the home when it is locked. When an unauthenticated tries to enter the house the face will be captured and checks with the saved images in the database and, it unlocks the door if match found otherwise it will send a message to the house owner's mobile phone.*

Keywords: House lock, security, IOT, AI Technologies, Face recognition, Image.

1. INTRODUCTION

Home security has become a solemn issue in the society. Anyone can be harassed in its own house. Older security systems can't tackle some situations like hacking, break down in the system. Unwanted persons like thieves, will try to intrude in the home any time they want. Also we know that the gadgets now days are not that secured and hence can be easily hacked. Even intruders have found their way to take over these gadgets. So to avoid such situations, we have to develop the system in such way that no one should get an intrusion to the system. The use of IoT will enhance some security level as well as it will help in accessing and controlling the system remotely. Therefore we are trying to develop a face recognizable automated door unlocking system using an IoT.

A home security system means to protect your home and keep safe valuables, and to keep your family safe from potential break-ins by burglars and thief. In the United States, there is a home related burglary that takes place every 13 seconds, 4 burglaries a minute, 240 an hour and nearly 6,000 a day! some of the statistics are 88% of all burglaries are residential in nature, 77% of all crimes are property crimes, 38% of all robberies are committed with guns, identity theft is the fastest growing crime in the U.S.,Canada and UK. 3 out of 4 homes in the U.S. Will be broken within the next 20 years. The core concept of Face detection is to give computer an ability to find human faces in a video or an image seamlessly. Over the years numerous algorithms have been proposed and developed to improve the face detection efficiency.

Human brains can instantly recognize and detect faces but when it comes to computers there is always a challenge. Face detection systems are affected by extreme lightening, pose variation, and large variation in faces. Face Recognition is used widely in Biometrics scanner and security system. Especially in biometrics faces of an individual are matched to the existing ones in the database. Important facial features are extracted in the first stage of an algorithms, there are modifications done in feature extractions and algorithms to improvise the efficiency of the detection. Computers and Embedded systems which detect faces are widely used in variety of applications like identity verification. Criminal identification, security systems. Surveillance is one of the important aspects in various fields such as banking sectors, military areas, or personal security. Due to exponential rise in burglary and theft activities, surveillance systems are proving to be a great source of security. Due to ever increasing technology people are relying on advanced technologies for their security purposes. Security systems such as CCTV have proven to be hugely popular for security purposes due to their cost efficient nature and easy maintenance. Surveillance is very helpful for law enforcement to investigate/prevent criminal activities,

for recognizing and monitoring threats. Also, surveillance systems have always been playing a vital role in dealing with the burglary cases. These CCTV systems tend to monitor activities continuously.

This results in high power consumption and memory wastage. Moreover, it does not give alert on any suspicious activities detected. At present, human work is greatly reduced by machines in every possible way. Mostly, computers and robots play a major role in our day to day life. In recent times, almost all the military organizations take the help of military robots to carry many risky jobs. In general, a robot is a combination of mechanical and electronics prototype designed by humans to perform a specific task. Robots have huge applications in military and industrial area, such as, for lifting heavy weights and performing same task several times efficiently without any committing any errors unlike humans. In recent years, the Indian border military forces are facing a huge destruction due to the attacks of neighboring countries. In many situations, our soldiers need to venture into enemy's base which is a risky job. Such dangerous jobs could be avoided by using robots. Face detection based security systems evolution creates the optimized security system which restricts the entry of unknown. There were so many new technical instruments like door intercoms but the security was still the question of matter as it is not that much compact and have no storage. So to improve the existing security and reduce the risks we come with this advance PCA algorithm for face detection based security. This project has been implemented by using OpenCV software. OpenCV(Open Computer Vision) is used for the image processing. It is the field of informatics which teaches the computers to see. It is a way computers gather and interpret visual information from the surrounding environment and aims to have SMART way for signal management which will ultimately be a cost effective solution.

2. Literature Survey

"Authentication is one of the significant issues in the area of information system. This project proposes a method for automatic door access system using face recognition technique by using python programming and from open cv library cascade method" *proposed by International research journal of engineering and Technology.*

"There is an automatic extraction of vector representation of line features from remotely sensed images. His research interest includes remote sensing image processing, pattern recognition, computer" *A.H EL-Hardy from computer science and engineering, Egypt.*

"We proposed robust security based on face recognition system.In particular,we develop this system to giving access into a home for authenticated users.The classifier is trained by using a new adaptive learning method. The training data are initially collected from social networks. The accuracy of the classifiers incrementally improved as the user starts using the system" *A smart security with face recognition trungnguyen, barath Lakshmanan and weihua sheng.*

"Face Recognition technology emulates the capabilities of human eye to detect faces. This is done by smart computing that creates"faced bunch" that consists of 70 nodal points. Features are extracted from the face and saved as templates. These templates are compared to the face detected" By ishits gupta and varsha patil.

3. Existing Methodology

Now a day's security is requirement at top of the line resources. The locked house monitoring system (LHMS), is a state-of-the-art application developed by AP Police which leverages technology for reducing burglaries by thieves and other property offenders. The service would be available for android mobile phone users. The service of the CCTV surveillance will be provided by police when your are away from home. Who needs the service of LHMS have to make a request in the application. Then police men will install a temporary Wi-Fi modem and a wireless motion recording camera unit to your home when you're away.

Disadvantages:

- In LHMS there is no face recognition system.
- No Security for houses.
- At time the devices all are fixed for houses is not possible.

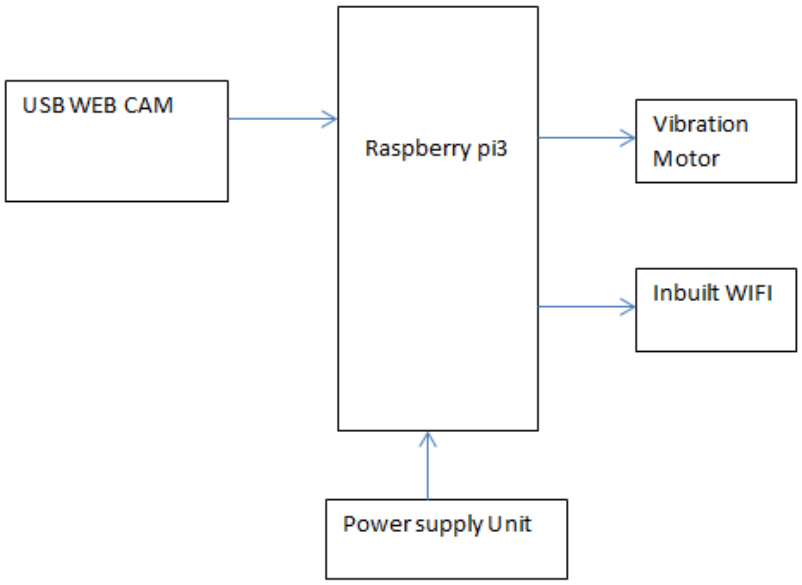
4. Proposed Approach

Face recognition system will identify the person digital image from a camera source. When it matches the person digital image in the data base,If third person want to enter in home then he/she have to use manual lock. When third person uses manual lock then authorized person should get the message.

Advantages:

- Auto Machine.
- Spees of scan.
- High accurate rate.

5. Methodology of proposed system



USB WEB camera is attached to Raspberry pi for live face recognition purpose. If captured face is matched with predefined stored data base, automatically vibration motor will on for door open demonstration purpose. If captured image is not in trained database, a warning message will be forwarded to owner mobile android app through internet of Technology using inbuilt WIFI module.

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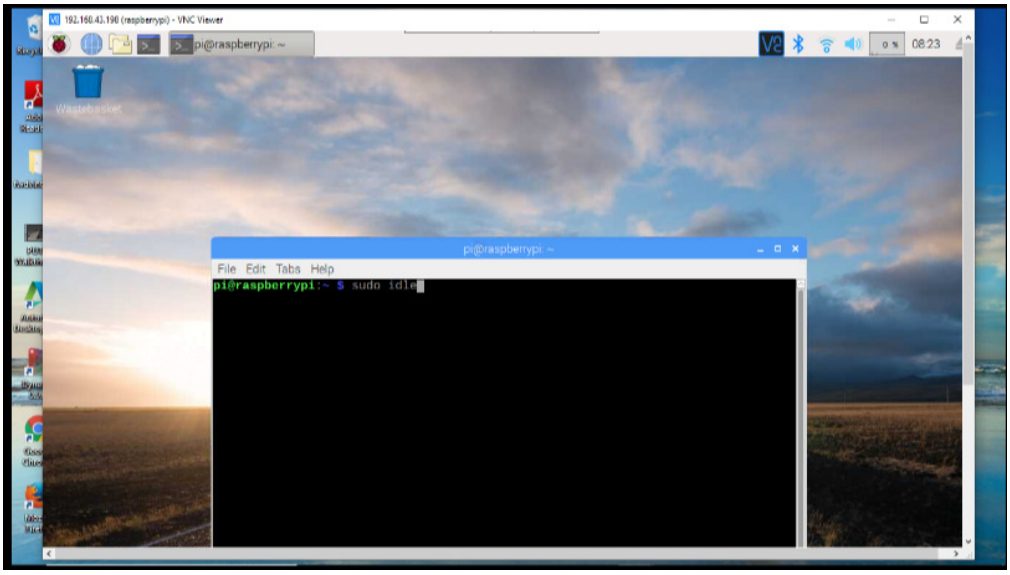
6. Implementation

Raspberry pi:

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries The original model became far more popular than anticipated selling outside of its target market for uses such as robotics. Peripherals are not included with the Raspberry Pi. Some accessories however have been included in several official and unofficial bundles.

The Raspberry pi is a mini computer which is designed in a single board with all the essential components required for running an operating system. The Raspberry pi is a device which uses the Broadcom controller chip which is a SoC (System on Chip). This SoC has the powerful ARM11 processor which runs on 700 MHz at its core. This minicomputer comes without a display unit, but it can be used with HDTV display or normal NTSC or PAL standard TV screen. It has an Ethernet port which allows it to be connected to a network. Operating systems from Mac, Windows and Linux can be loaded in the Raspberry pi. The capability of this inexpensive board to load operating systems from Linux and accessibility of the board through a LAN network makes it a perfect choice for tiny dedicated web servers. Several generations of Raspberry Pis have been released.



OPENCV:

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.

The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc. OpenCV has more than 47 thousand people of user community and estimated number of downloads exceeding 14 million. The library is used extensively in companies, research groups and by governmental bodies.

Along with well-established companies like Google, Yahoo, Microsoft, Intel, IBM, Sony, Honda, Toyota that employ the library, there are many startups such as Applied Minds, VideoSurf, and Zeitera, that make extensive use of OpenCV.

OpenCV's deployed uses span the range from stitching streetview images together, detecting intrusions in surveillance video in Israel, monitoring mine equipment in China, helping robots navigate and pick up objects at Willow Garage, detection of swimming pool drowning accidents in Europe, running interactive art in Spain and New York, checking runways for debris in Turkey, inspecting labels on products in factories around the world on to rapid face detection in Japan.

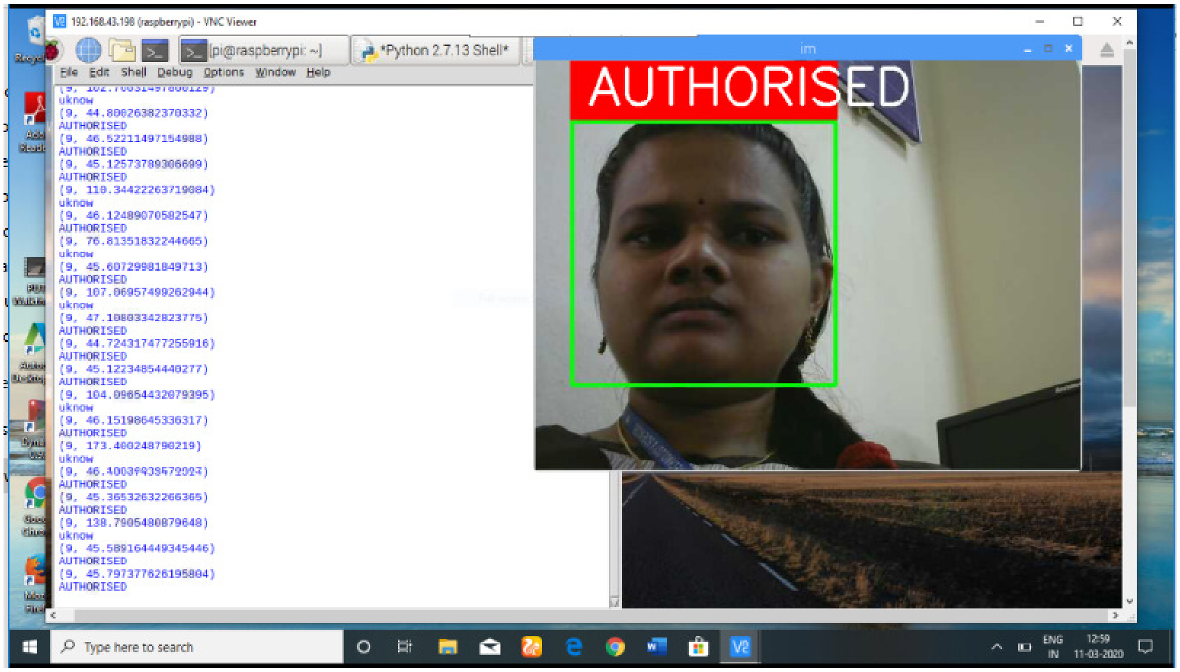
It has C++, Python, Java and MATLAB interfaces and supports Windows, Linux, Android and Mac OS. OpenCV leans mostly towards real-time vision applications and takes advantage of MMX and SSE instructions when available. A fullfeatured CUDAand OpenCL interfaces are being actively developed right now. There are over

500 algorithms and about 10 times as many functions that compose or support those algorithms. OpenCV is written natively in C++ and has a templated interface that works seamlessly with STL containers. OpenCV is becoming widely known in computer vision field for its library that mainly built for computer vision computation. Another notable feature is the library is cross-platform, which is usable in Windows, Linux and MacOS. Such high portability reduces burdens and works if port of system is needed. Nowadays, OpenCV has huge collection of popular computer vision computation algorithm, and optical flow is one of them.

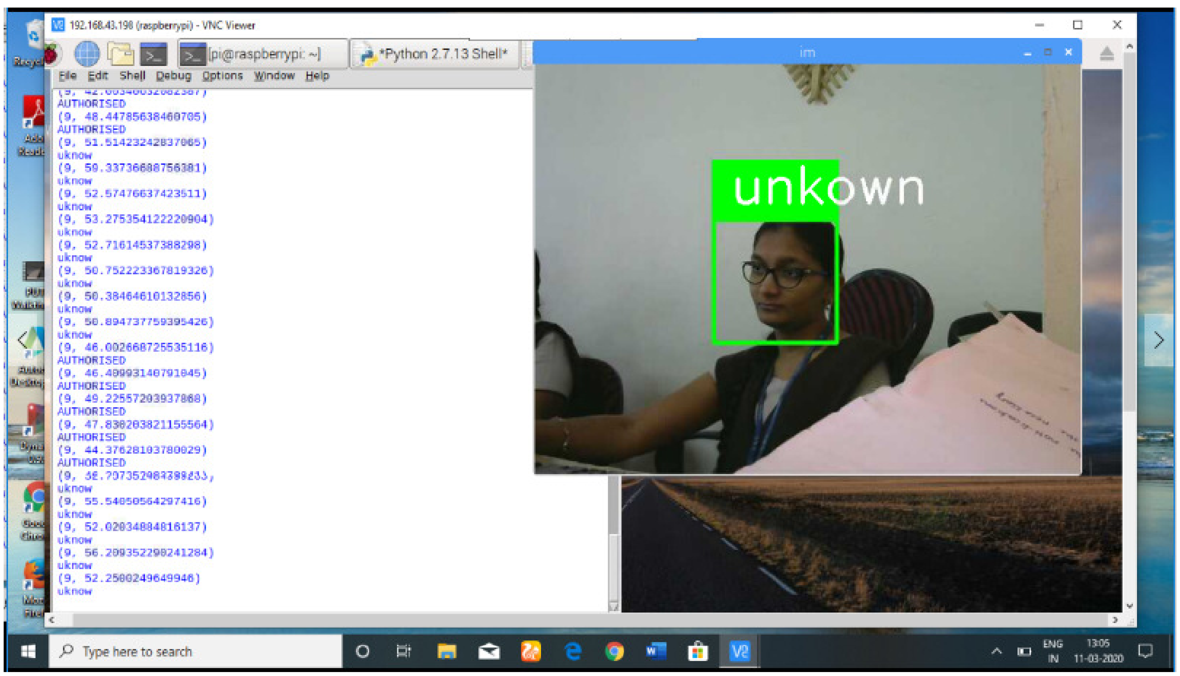
7. Working Procedure

The cameras are placed along the lane or at traffic signal. The video captured by the camera is divided into frames. Each frame is processed for the detection of vehicles. The total number of vehicles are counted. Each vehicle is given one second for movement and the base time for yellow signal is three seconds. The total time allocated for the lane is equal to the sum of number of vehicles in each lane and base time. The vehicles can move during green signal and has to stop during red signal. Yellow signal is a warning signal which helps to warn the drivers that they have stop in three seconds.

8. Results



Checking authorised person



Checking unknown person

9. Conclusion & Future Directions

In this paper, a method for estimating the traffic using OpenCV is presented. This is done by using the camera images captured. Each image is processed check with the database image. This system is very useful for the householders who need security for their houses, banks and the most valuable things which we kept that places also useful this product. The "smart face recognition security based on raspberry pi" is basically based on embeded security system; the applications of this project are not limited as the each application gives rise to the new applications.
There are many future scopes regarding this project such as follows: -

1. If the condition improved, we can implement this system by using multimedia GSM module, in future.
2. To achieve more sound security, we can use the iris scan method.
3. To improve the system performance, we can use the advance versions of the raspberry pi module as per requirement.
4. If needed, we can make this system to be used in the air services.
5. If user needs to operate this system through android application, it is possible.

10. REFERENCES

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