

# Smart Home Security System

Fatema Phaltanwala<sup>1</sup>, Shruti Banawadikar<sup>2</sup>, Sourabh Burse<sup>3</sup>, Kedar Bhutada<sup>4</sup>

<sup>1,2,3,4</sup> Student, Dept. of IT Engineering, Trinity College of Engineering And Research, Maharashtra, India

\*\*\*

**Abstract** - Technology has drastically upgraded home security system with use of internet of things, artificial intelligence, machine learning algorithm and web crawling. These technologies when combined together will build a system that shall help in making life easier and increase the security by notifying users about any unusual movement in their premises. The user will have access to live streaming and will be notified about any intrusion via call or text message, so that he can take measures accordingly. The system will consist of a camera which will capture the image of the intruder. This image is then compared with the dataset present in the database if it matches then it is a family member or else it is an intruder or an outsider whose details will be fetched using web crawling, and those details will then be sent to the user for further action.

**Key Words:** Internet of Things (Iot), Live Streaming, Face Recognition, Notification, Home Security

## 1. INTRODUCTION

Earth is in its transition phase backed by increased demand for machinery and technology. Inventions are a daily score around the globe which leads to easier life with increasing demand in engineering science. Technology is center to humans in this 21st century for our day to day life. Our focus is on the safety and security of ourselves and earned valuables.

Personal safety is priority of people and valuables. For safety and security we have systems like CCTV camera for surveillance monitored by people in opulent societies which takes time and man-power. . The need to secure property or restrict entrance in special areas by controlling access to them has always been extremely important for life safety and personal assets, as well as those of the organizations [1].

Primitive surveillance was done through man-power which eventually progressed to CCTV, having multiple benefits. Our basic idea is dual purpose, which is to capture details of any entry in the premises via infrared camera and live video streaming. It shall notify the user regarding the intrusion along with the details such as name and image of the intruder.

We take measures to prevent and protect our home and other important places from any incident like theft, fire, etc. While we are away for some reasons we expect that our house and belongings are safe. Most of the times we come to know about the incident after the damage has

been done. We need to find a way to take care of what is happening around our property. We thus propose the required system which will be placed in user's property and an application on fingertips which will make it easier for the user to manage and take care of their belongings.

The motivation to propose this system is that, a lot of times, we come to know about the incident after it has taken place. One of the recent incidents is that in spite of a CCTV being present in the society premises, one of the houses in my society was robbed by the thieves when the family was away and they came to know about the incident after returning home from the vacations.

Due to the various loopholes in the previous systems like unauthorized access and not getting notified instantly, we are motivated to develop this system through which we can come to know what is happening in and around the premises and would notify me via mail, SMS or notification as soon as the system detects any unwanted activity.

## 2. RELATED WORK

When you are not at home and a thief (i.e. intruder) enters at your home then this framework will give a caution through the burglary action. At a point when the thief movement is beginning at your home then the PIR sensor (i.e. movement detectors) is connected with the framework and sensed the action happened at home [2]. That offers flag to Raspberry pi which is computational circuit which processes the information inside it. With the help of raspberry pi it can offer flag to another segment. Camera is used to monitor action of your home. Camera captures the picture and is sent back to the raspberry pi with the goal of sending email to the owner whose mail id was already put away inside it. The email is sent through IMAP (Internet message get to convention). The raspberry pi is connected to the Internet through either RJ45 or the WIFI module. Let us consider owner is outside the state or nation, still user get the alarm for robbery in the form of email. So, he or she can educate his or her neighbors or advise the police that house is stuck in an unfortunate situation.

When any sort of human movement is sensed near the entrance of owner's house the system sends alerts or raises an alarm optionally upon the user's discretion. For crucial scenario an alert message is sent to the involved security personnel that are additionally engineered into the system. All the electrical appliances inside the home can be controlled and managed with the help of TI-CC3200

Launchpad board which comes with an embedded micro-controller and an on board Wi-Fi shield<sup>[3]</sup>. On the opposite hand if the owner identifies that the person getting into his home is not an intruder but a guest then he can make arrangements such as switching on appliances inside the house, that are connected and controlled by the micro-controller. The user himself can by virtue of the system make arrangements inside the house then manually having to switch on the electrical appliances. A survey of the main research work on implementing the facial recognition in embedded systems or in special hardware using Field Programmable Gate Array (FPGA) systems for real-time applications as is the case with the access control is done in <sup>[4]</sup>.

### 3. SYSTEM ARCHITECTURE

Smart intrusion detection system is the contemporary urban concept which is absolutely necessary for residents of a system to have a quality life <sup>[5]</sup>. With continuous surveillance, the smart home security system detects and captures the details of an intruder. The system compares the captured image with the datasets provided in the database. This is the first stage of Image Processing where images are tested with the proposed algorithm known as preprocessing. This is followed by extracting face component features like eyes, nose, mouth, etc from human face image called Feature Extraction.

with the captured image. But if the image does not match, it is run through the Saved database and relevant information is fetched and sent to the user's device.

As the system is dependent on the user's discretion and judging ability of the situation (whether it is a guest or an intruder entering his house) the use of a camera connected to the microcontroller might help the user in taking decisions whether to activate the security system or welcome the guest <sup>[6][7]</sup>.

The user is asked if the intruder is known to him. If the user recognizes and says yes, another prompt is sent asking the user whether or not he wants the save this image. Based on his reply, the image is either saved to the database or dumped in the recycle bin. But if the user fails to identify the intruder then a final alert is issued and sent on the user's device.

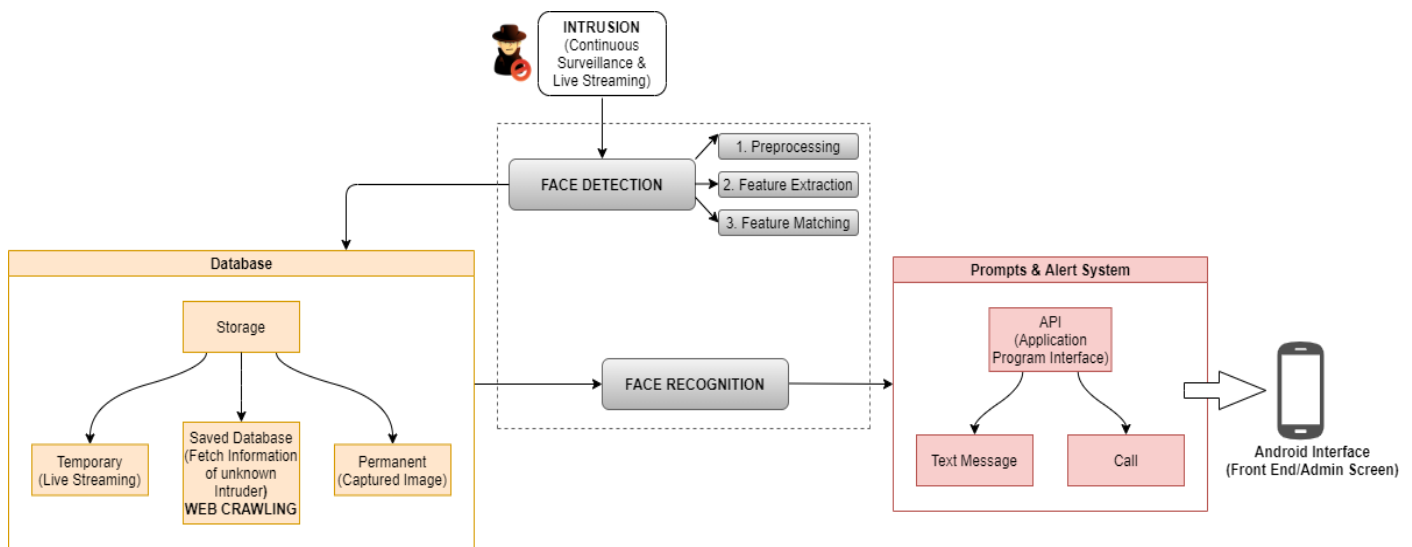


Fig -1: System Architecture

### 4. HARDWARE REQUIREMENTS

1. Orange Pi PC
2. Camera – Logitech C310 HD Webcam (Black)
3. Dot projector
4. Battery – Deli green 4S 25A 12V PCM/PCB/BMS for lithium battery pack LiFePO4 Battery Pack UPS
5. GSM Module – SIM800C Development Board GSM GPRS Module Support Message Bluetooth TTS

Then we have the feature matching process where based on matching strategies, correspondence is established between feature points, and then based on the number of correct correspondences, together with the total number of matches the likelihood of the similarity between the faces is detected. If the image matches the datasets then it should notify specifying the name of the intruder along

DTMF Quad-band Alternative SIM900A with Glue Stick

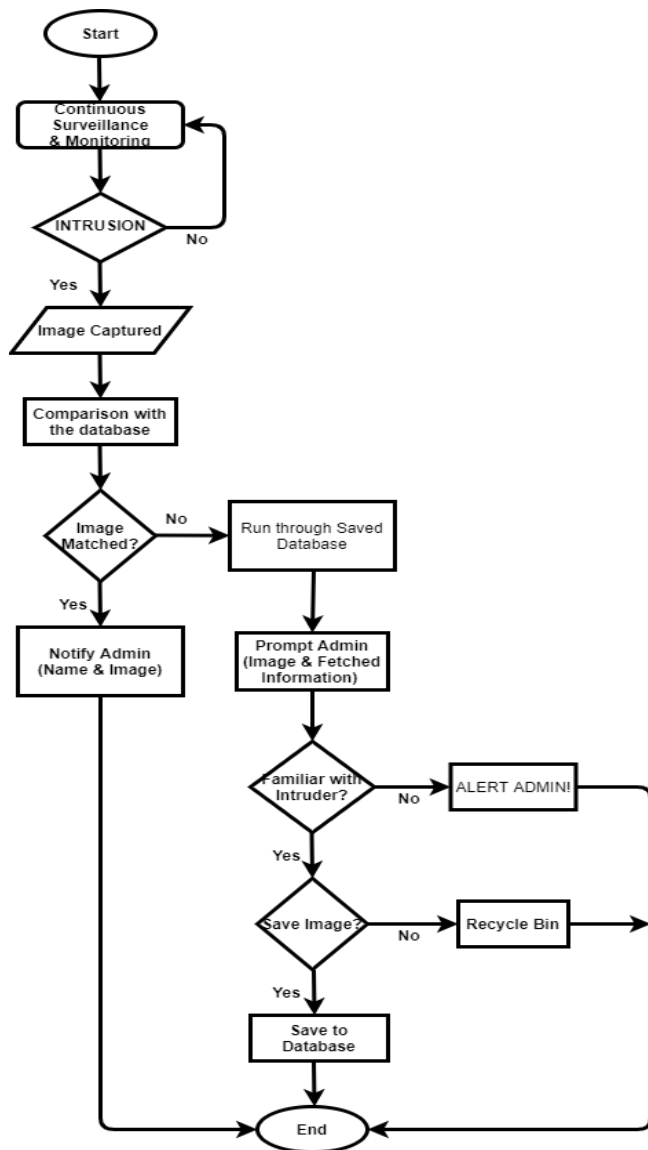


Fig -2: Block diagram of Working

## 5. ADVANTAGES

1. Battery backup will run the system in case of power loss.
2. GSM and Wi-Fi module for notification will be alternatives.
3. Image processing will make sure the images sent are clear.
4. Infrared cameras will capture images even at dreary situations.
5. Detect intruder immediately.

## 6. APPLICATIONS

1. Attendance system
2. Home and office security
3. Theft control using image capturing and processing mechanisms
4. Border security

## 7. CONCLUSION & FUTURE SCOPE

We have built a system that would notify the user about any intrusion and the user shall also have access to live streaming. The system includes use of IoT to define high security standards. Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet [8].

The system sends a notification using wired or wireless technique to the owner upon detection of an intruder, thus the owner can take necessary actions regarding the intrusion. The biggest advantage of the system is that the user can seek surveillance from everywhere in the world and can respond according to the situations [9]. This system is built keeping in mind the convenience and comfort of the user; it also saves energy efficiently and enables complete security.

Thus in the future an addition to our system, we shall be using web crawling and web scraping. Such that the image capture of the intruder, if not present in our database will be searched on the social networking sites using web crawling. Using web scraping we shall extract the intruder's details such as name, and notify the user about the intruder via the SMS or email or call.

## ACKNOWLEDGEMENT

We are sincerely grateful towards Prof. Supriya Madane for her expert guidance under whose supervision we have written this paper. We would like to take this opportunity to express our heartfelt gratitude.

## REFERENCES

- [1] Alexandru Agape Mihai Postolache, "Internet-enabled Access Control System using a Mobile Application." (published on 2018).
- [2] S. Tanwar, P. Patel, K. Patel, S. Tyagi, N.Kumar, M. S. Obaidat, "An advanced Internet of Thing based Security Alert System for Smart Home", IEEE July 2017.
- [3] Ravi Kishore Kodali, Vishal Jain, Suvadeep Bose and Lakshmi Boppana, "IoT Based Smart Security and Home Automation System", International Conference on Computing, Communication and Automation, 2016.
- [4] Q. Al-Shebani, P. Premaratne, P. Vial, "Embedded Door Access Control Systems Based on Face Recognition: A Survey", Proceedings of the 7th International

Conference on Signal Processing and Communication Systems (ICSPCS), Gold Coast, 2013.

- [5] Prof. Rakhi Bhardwaj, Kiran Bera, OnkarJadhav, Prachi Gaikwad, Tamanna Gupta, "Intrusion Detection through Image Processing and getting Notified Via SMS and Live Streaming", International Research Journal of Engineering and Technology (IRJET), December 2018.
- [6] O. N. C. S. A. P. B. Sahani, M, "Circuit, power and computing technologies (iccpct), 2015 international conference on," pp. 1-6, March 2015.
- [7] T. Ming Zhao, Chua, "Automatic face and gesture recognition, 2008. fg '08. 8th ieee international conference on," pp. 1-6, September 2008.
- [8] M. N. N. A. Asghar, M.H., "Principle application and vision in internet of things (iot)," in Communication Technologies (GCCT), 2015 Global Conference on, may 2015.
- [9] S. Sruthy, G. N. Sudhish, "WiFi Enabled Home Security Surveillance System using Raspberry Pi and IoT Module", Proceedings of IEEE International Conference On Signal Processing, Informatics, Communication And Energy Systems (SPICES), Kollam, 2017.