# SE 3910

Home Security system

Kishan Polekar

Monis Ahmed Khan

Manthan Kale

**BACKGROUND**

A home security system is basically installed in each home to prevent against possible theft. There are many homes that have primitive systems installed and a few of the modern homes are being equipped with high-end technologies. Some homes still use simple locks and keys. Security is paramount in houses today, and to achieve this, many latest technologies like facial recognition, fingerprint scanner, pin codes, etc. have been developed.

The main motive of this project is to eliminate the slightest error in home security that might occur due to software or hardware present in today's systems. We can achieve this by improving existing software, implementing new ideas, and installing new devices with advanced code that will enable the owner to feel safe in his/her adobe.

Nowadays, homes have to be self-sustainable in terms of security. The main things that are involved in  security planning for any new home include analysing the cost of installation of new hardware and software, predicting the time taken to install the system, analysing the customer's needs and deciding the level of security needed, surveying existing systems, and finally installing a complete product that satisfies the customer's needs.

**TEAM PROFILE**

We are three members in our team. We are from India and are currently studying at UCM. All three of us are majoring in computer science with Monis and Manthan having a minor in Software Development and Kishan with the minor of Data Science. Kishan and Manthan are currently seniors and Monis is a junior. We have worked on many different projects together that including projects in Java, Python and client-side programming languages. Our goal in this project gives our best and make this project as good as our other previous projects.

In this project different section has been divided to work on for each team member. Kishan will be working on the introduction and background of the project which includes all the objectives and solutions for the project. Manthan will be working on the problems that might occur while implementing the project and the plans of action that is the tools and resources that are required to make this home security system. At last Monis will be working on the work of all the team members and the challenges that are faced and might occur while making this security system.

In addition to this, Monis is good at explaining short paragraphs, so he will be handling the team members and the conclusion part of the presentation. Manthan is good at note taking so he will take down points that have to be explained in the class. Kishan will be handling most of the talking and explaining since he is good at communication.

**STATEMENT OF PROBLEM -**

What's wrong with the current system present?
Is it efficient?
Is it reliable?
Or the most important of all: Is it smart?

We as humans can make mistakes all the time. Can we make something that can think of security by itself? Be smart enough and reduce human effort. That's what technology is for right?

Considering traditional homes in mind, we don't have many security measures in our houses. Just basic doors with a key lock, door chain and one additional lock to secure the door. That's pretty much it. What possibly can go wrong?

Locks can possibly wear out, keys can get lost, copies can be made, windows can be left open, anyways windows aren't too secure after all.
Nowadays in advanced homes in urban areas, we see a lot of technological advancements related to security and safety. Biometric access, heat sensors, advanced fire alarm system but still there can be glitches.
So, what can we do to make sure we create something that is smart enough to handle all the problems stated above?

## OBJECTIVES (PROPOSED SOLUTION) -

The first and foremost objective of this project will be to define the specific roles of each user in the house. There can be a maximum of two owners who will have an "all-access pass" for the home security. They will be able to decide when to allow someone in or when to deny a person, who to add as a guest/visitor, etc. They will be able to change the central PIN of the security system, and also make changes in any fingerprints. The new system that will be installed will have at least the following features:
a.    Biometric scanner; including but not limited to facial recognition, fingerprint scanner.
b.    Central PIN which can be used to open all entrances of the house.
c.    Heat sensor cameras with thermal and night vision.
d.    Live Tracking: Centralized monitoring system that will record activities in the house on a regular basis and upload that data into a database.

The system is designed such that there will be a main entrance in the house which will have a board. The board will be equipped with a camera, which will scan a face. All the cameras in the house will be equipped with thermal and night vision for enhanced security. The board will also have a PIN entering system and a fingerprint scanner. This can be used in the case face detection fails or there is a guest user in the house. The owner will be notified and asked if that person is to be allowed in the house.

There will be three levels of users: owner, visitor, and servants. The owner will have access to all rooms regardless, the visitors cannot access certain rooms, and the servants will also have limited access to the house. All this will be specified by the owner. If any new body is detected at the entrance, the owner will have a link to add that person as a "trusted" individual. This person's roles and accesses will be defined by the owner, saved to the database on the cloud, and remembered the next time this person tries to enter the house. If the owner decides not to add the person or fails to add him/her within the next 24 hours, the link will expire and the owner will be asked again the next time.

There will be three things going on in the house at all times: a facial recognition software running to detect any new faces, a thermal sensing technology that will look for any human, and a live tracking facility that will keep uploading feeds to the server online. These feeds will

contain the daily activity, movement patterns of people in the house, new faces that were not saved, etc. If anything unusual is detected, the owner will be notified immediately.

There will also be a vacation mode in the security system. This can be enabled by the owner whenever they are going out for more than a couple of days. This will lock down the house after checking everyone has left. In vacation mode, if anyone tries to enter the house, the owner will be notified and asked if the person is to be allowed. Suppose a pest control service was requested, the house will open only those rooms which the owner specifies, keep them open, and lock down the house once again. In case there is a break in during non-vacation time, the owner will be notified immediately, an alarm will sound, and the nearest police station will also be called. The house will not be locked down, but the unusual person's biometrics will be stored. This will be done to prevent the burglar from being locked down in the house and causing harm to the residents. In case of a break in during vacation time, the house will lock down along with all the above being executed. In case of fire, the nearest fire department will also be notified in addition to the sprinklers being activated.

Finally, the system is self-sustainable. Meaning, it will update itself in pieces (not all parts of the system at the same time to ensure a monitoring is active at all times), will notify the owner about any faults either in hardware or software, and ask the user to update the system time to time and also in case of any failures.

## PLAN OF ACTION - (Tools and resources)

The tools and resources can be expensive for these kinds of projects but it's better to be safe than sorry.

The tools that we can use to make it happens includes cameras with thermal detection and night vision, software controlled physical locks, 24-hour cellular, and internet facility. And finally, a database to keep track of everything. A live feed will be up all the time and it will store information on this database.

## CHALLENGES -

In this home security model, it is very difficult to maintain all the things and equipment that are being used to secure the house. There are many challenges that can occur while living in a home with all the good security features in it.

The first issue that this system can face is the software or the system error. In this, the facial or the biometrics can make a mistake in recognizing the person. It could misunderstand the same looking person or it could not recognize the right person. Therefore this biometric system should be updated from time to time to reduce the chances of error and alternative security step should be present in order to avoid such errors.

The second challenge that needs consideration in maintaining such a big security system is the cost. In this security system, many cameras are required to cover every part of the house, and a lot of biometrics and recognition devices are needed to implement this security system. Generally, all this equipment requires a lot of money to install and to maintain time to time. The cameras need to be changed if there is any fault in it. Plus to store all the recordings and the data, many storage devices are needed which costs a lot.

**REFERENCES -**

https://www.researchgate.net/profile/Mohammed_Mynuddin/publication/293173717_Design_and_Implementation_of_Smart_Home_Security_System/links/56b610a608ae5ad360598bfb/Design-and-Implementation-of-Smart-Home-Security-System.pdf?origin=publication_detail