**HOME AUTOMATION SYSTEM**

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# DECLARATION

I declare that this is my own work and this Final Report does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

………………………….

Rajitha Akwaththa (IT15093660)

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.   
  
   
**Name of the Supervisor:** S**ignature of the supervisor: Date:**   
  
**Mr.** **Yashas Mallawarachchi**

**Abstract**

This section of the home automation system prototype with the main focus of having the ability to lock or unlock a door through the internet to provide improved convenience, comfort, energy, efficiency and safety and securing the network. The system consists of a central device, a server, sensors, and an application. The popularity of home automation has been increasing greatly in recent years due to considerable affordability and simplicity through smartphone and tablet connectivity. The techniques employed in home automation include those in building automation as well as the control of domestic activities, such as lighting control system, and the use of other electrical appliances. When Internet of Things also known as IOT, comes to our homes, it can be widely incorporated into making our castle smarter, safe and automated.

Once the System is implemented, Home automation system should be tested to find bugs and mismatches in the requirements. Prototype installation should be inspected and tested for bugs, functionality and ease of use. Fixing a bug or adding additional functionality to an automation system can have unforeseen consequences, which would lead to costly downfalls.

As home automation apps become more intelligent, their capabilities become almost endless, from controlling lights and locks to small appliances. Instead of having different apps for different functions, our app will be able to manage everything from one place.

And most importantly, due to the increase in energy consumption, increase population, and limited time frames, there is a grave need to conserve time, effort and energy in any way possible. Henceforth, this proposed system will be cost effective, flexible, and have the capability to control and monitor the home environment, at your fingertips.

**Acknowledgement**

I would like to express my deep sense of gratitude to my supervisor Mr.Yashas Mallawaraarchchi, who guided me throughout this project with providing the fullest support and the maximum supervision. I am very much blessed to have you as my advisor who always respected my ideas and corrected me whenever I am wrong. Without her support, it would not have been possible to complete this dissertation with much success.

Apart from him, I would like to offer my sincere gratitude to each and every person from my university and to my friends who gave me their support throughout the project.

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# Introduction

This chapter introduces the background, the structure, and the aim of the project.

## **Problem to be addressed**

Nowadays, there have been implemented different kinds of systems/equipment’s for home owners which support them in their day to day tasks. But some of them are only capable of getting a visual image of the place and it’s not capable of controlling the home from wherevers you want. Most of the home automation systems that are in the market have not focused on the area of security and most of the time they are subjecting to cyber-attacks through vulnerable points. To address the above-mentioned problem, we have decided to implement a system which consist the features of remote controlling the whole home with just one click.

## **Background Context**

In today’s society, most of the people are hectic with their day today life. They barely have time to focus on their activities regarding to their home. Specially in the mornings people are late for their work most of the time and forgetting to lock the doors when leaving. Since a third world country like Sri Lanka is having poor people around the country, sometimes they are willing to get something from someone illegally to get some money to live. Thieves have become major problem to the country. If the government bodies are lazy to take actions on this matter we ourselves need to take care about this problem individually from our side.

In modern day, people are showing a major interact with the technological things and they are happy to merge with the new technology to make their lifestyle easier. This project has the features of interacting with the people that have average technological knowledge. Simply it can be used by anyone who is cable to use a smart phone.

## **Research Gap**

Home automation system is consisting with the features of locking and unlocking doors and windows after recognizing the face of the person who is trying to take the access. Nowadays, mobility and mobile information technology have become a most essential part in human culture and civilization. The increasing capabilities of current mobile phones have turned them into portable information, communication and navigation devices, thereby putting the vast information available on the internet into a local context.

This research is to connect image processing with the machines in order to perform the task of locking and unlocking doors and windows. Integration between the lock and the camera that identifies the right person who have access to home build as a small network that lock acts according to the signals send from the micro-controller with the recognition take by the face detection camera.

## **Research Questions**

* What mechanism can use to detect the face when user try to access the door?

There should be a mechanism to detect the face of the person since the face is the authentication method to access the door lock. And if the face doesn’t recognize by the camera, the lock shouldn't be accessible

* What mechanism can use to provide the security for the network?

Cryptographic encryption method can be used to secure the data travels through the network. So, intruders won't be able to intercept the data and study the network traffic to exploit the system.

# Body of the report

## **Addressing the Literature**

Access control of the home will be consisting of two main parts. Two parts can be categorized as

* Door access control
* Windows access control

Above section of the home automation system[1] going to be more important to the people who are always forgetting and feeling nervous after going away from home. This Design Document will cover the functions of the access control system.

Since the system is controlled by the user by a mobile application and a web interface, user has to access everything via cloud/Internet. Many of the home automation are willing to fail because of the data breach. Proposed home automation system will provide an assurance regarding the security breaches.

Security [2] will become the most critical part when it comes to connected devices. As a solution to the security of the data that transmit through the system an encryption method is using, so that unauthorizes personnel will not be able to access the critical information that passes through the internet.

## **Methodology**

This part of the document explains how the proposed system going to be designed and implemented. Functionalities and the flow will be explained clearly with the tools and technologies which are going to be used in order to achieve the objectives of the proposed system.

People are forgetting to lock the doors and windows sometimes. And only remembers after they travel a distance that they can’t return home just to lock the doors and windows. Below shown features can be provided to cover up the above functionality by using the proposed web application,

- Interface to control doors

- Interface to control windows

To fulfill the above requirements in the web application, there has to be a circuit that connects app and the appliances. After the camera attached to the system recognize the face circuit that connected to the door lock with a servo motor device will operate the door lock. Only one click in the web app would be needed in order to lock the door. A Wi-Fi module will handle the communication between android app and the Arduino.

### **Access Control operation –**

Access control sub component helps user to remotely lock doors and windows whenever user needs. User will also be able to check the current status of the door/window (Lock/Unlock). If an intruder tries to unlock a door/window user will receive a notification on his/her mobile.

User ->

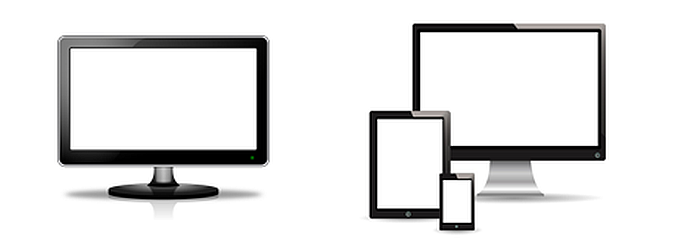
* Command to lock/unlock the door/window
* Request for the status of the door/window

Web/Mobile Application ->

* Notify Micro controller to lock/unlock the door/window
* Request for the status of the door/window from the sensor application.

### **Securing the Network Traffic -**

Data travels through the unsafe network is encrypting using Tiny Encryption Algorithm.



H247bsf0@

Lock the door

Lock the door

Encrypt

Decrypt

*Figure 2.2.2*

## **Research Findings**

Main target is to implement a system which is capable to unlock and lock doors while all the other features can be done with a highly secured manner with using an encryption method. Before engaged in developing the system that we have proposed, we went through articles, web resources and research papers to get some knowledge about the products/equipment’s which have already proposed or developed.

We have found out that the most of the products have limited functionality.

# Results & Discussion

This section concludes the results that were achieved from the research project and the new approaches that were found to address further researches in the undergraduate context.

## **Evidence**

## **Discussion**

# Conclusion

In this final thesis document, I have presented an implemented secured home automation system which is capable of unlocking and locking doors and windows with some other additional features. Our system can be easily installed by any person who has an average knowledge if information technology and it is cheap, effective and understandable since it is built using wireless network consist of sensors.

# References

# Glossary

# Appendices