UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF SECURITY DOOR WITH FINGERPRINT DETECTION WITH APP

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Telecommunications) with Honours.

by

LOGA A/L TACHINA MOORTHY

B071710852

960128-02-5361

FACULTY OF ELECTRICAL AND ELECTRONIC ENGINEERING

TECHNOLOGY

2020

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: Development of Security Door with Finger Print Detection with app

Sesi Pengajian: 2019

Saya **LOGA A/L TACHINA MOORTHY** mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.

2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.

3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.

4. **Sila tandakan (X)

☐ SULIT*

Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972.

☐ TERHAD* Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan.

☒ TIDAK TERHAD

Yang benar,   Disahkan oleh penyelia:

.................*Loga*...............................   ....

LOGA A/L TACHINA MOORTHY   TS. FAKHRULLAH BIN IDRIS

Alamat Tetap: Cop Rasmi Penyelia

NO 974, LORONG ANGGERIK KIRI 2,

TAMAN BANDAR SUNGGALA,

71050 PORT DICKSON,

NEGERI SEMBILAN.

Tarikh: 14.02.2021   Tarikh: 17/2/2021

---

*Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini

DECLARATION

I hereby, declared this report entitled Development of Security door with fingerprint Detection with app is the results of my own research except as cited in references.

Signature: ....*Loga* ....
Author :   LOGA A/L TACHINA MOORTHY
Date: 14.02.2021

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

iv

APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

Signature: ....

Supervisor :   TS. FAKHRULLAH BIN IDRIS

ABSTRAK

Jaringan peranti yang bersambung yang berkembang, sering disebut secara kolektif sebagai Internet of Things (IoT), tunduk pada banyak kelemahan keselamatan yang berpotensi. Tujuan makalah ini adalah untuk mengembangkan prototaip pintu keselamatan menggunakan aplikasi dengan cap jari. Sistem ini mencadangkan kunci pintar ke homestay yang membolehkan pengguna mengganti kunci pintu mereka dengan telefon pintar. Sistem ini juga memperlihatkan keselamatan pengguna kerana mereka biasanya memberi manfaat 24/7 untuk sistem kunci pintu untuk membenarkan orang yang diluluskan sahaja memasuki homestay. Sistem ini terdiri daripada mikrokontroler berasaskan ESP32 Arduino sebagai otak prototaip ini yang menghubungkan pintu keselamatan sebagai sensor untuk membuka dan menutup pintu. Bahagian pengaturcaraan, ia mewujudkan penukaran dari pembacaan analog sensor ke digital. Aplikasi ini dapat mengimbas cap jari kami untuk disahkan untuk dipadankan dengan selamat dengan kata laluan yang tersimpan di Arduino agar pintu terbuka. Rangka kerja bolt pengimbas berasaskan cap jari yang diprogramkan ini akan memberi pelanggan kaedah yang lebih selamat dan minimum untuk mengunci-membuka pintu. Sistem automasi kunci pintu keselamatan menjanjikan langkah berani ke masa depan di mana kunci pintu mekanikal akan diganti dengan kunci pintu elektronik. Kesimpulannya sistem ini akan dapat memenuhi homestay dengan pintu keselamatan menggunakan aplikasi dengan cap jari untuk memberikan keamanan yang tinggi.

ABSTRACT

The growing network of connected devices, often collectively referred to as the Internet of Things (IoT), is subject to a vast array of potential security vulnerabilities. The aim of this paper is to develop a prototype of security door using app with fingerprint. The system proposed a smart lock to homestay that let users replace their door key with smartphone. The system also displays the user safe as they used to be give 24/7 benefit for door lock system to allow only approved persons to access the homestay. This system consists no as brain of this prototype which interface the security door as a sensor to open and close the door. Programming part, it creates conversion from analog reading of sensor to digital. The app can be scan our fingerprint to verified for secure matched with the stored password in Arduino for the door gets open. This programmed fingerprint-based scanner bolt framework will give client more secure and minimal effort method for locking-opening door. The security door lock automation system promises a bold step to the future where mechanical door locks will be substituted by electronic door locks. In conclusion this system will able to fulfill the homestay with security door using app with fingerprint to provide high security.

vii

DEDICATION

I dedicate this project report to my beloved parents and friends. A special thanks to my mother Mrs. Sumathi a/p Rengganathan and father Mr. Tachina Moorthy who both always being support my ideas and give encourage to do this project. I also being grateful to thanks my friends Mr Dhevan , Mr Kishen and Mr Suraien who always been backbone to develop this project. Lastly to my supervisor Ts. Fakhrullah bin Idris who give lot of ideas and share her knowledge on doing report also prototype.

ACKNOWLEDGEMENTS

I would like to express my sincere acknowledgement to my supervisor Ts. Fakhrullah bin Idris from the Department of Electronic and Computer Engineering Technology from Faculty of Engineering Technology, University Technical Malaysia Melaka (UTeM) for their guidance, advices and suggestion during the whole period of this project. I would like to thank everyone who is involved in this project either directly or indirectly for their helps and cooperation, and also to my family. Without their support I would not have been able to finish my final year project.

TABLE OF CONTENTS

LIST OF TABLES

xiv

LIST OF FIGURES

xvi

CHAPTER 1

INTRODUCTION

1.0   Background

The Industrial Internet of Things (IIoT) or Industry 4.0 are both names dedicated to the use of IoT technologies in work settings in this modernization generation. The idea is the same as for home IoT electronic apps, except in this project the goal is to work with different type of sensors, wireless networks and big data to measure with using internet of thing. Home controllers is suitable for the android operating system because it commonly used in mobile phones and tablets for this generation.

This project is about a security door with app using fingerprint to homestay. This software app can be monitor the functioning of a security door system. The program for android app was created that scan fingerprint to access a secure control system to Monitor the door opening and closure situated at a distance from the individual. The app built on the phone would inform the door of obtaining the orders from smartphone and transfer these instructions to micro-controller to regulate of opening and closure of door.

1.1   Problem Statement

The issue of this project is to solve homestay owner a better solution of replacing key management for their customer to access homestay. The homestay owner actually have

many keys on their hands to open the specific door if the user lost the key might be a big problem. They also even forgotten to take along keys and the worst part is they have forgotten to unlock the door because they are reckless. An secure and effective system must be in action to support users particularly guests to lock the door. This security app system features a proper device where the customer can easily access. In addition, it is low cost and offers the user more secure. Work as a homestay management is particularly busy with routine job. So, they are very hard to monitor thier customer and safety. This device is built to help their job in order to provide high security in homestay.

In order to overcome the homestay problem, security door using apps and fingerprint need to implement for future project design introduced by (Kirbas, 2017). It can be authorized control of Wi-Fi-based door locking mechanisms from a certain control center via internet connectivity and the monitoring of input and output operations. Homestay management should be implemented this design to achieve more tourism and secure device control by this app. This project has been carried out especially for homestay management to monitoring the database tourism that has access the security door using app and fingerprint.

1.2   Objectives

When analyzing the previously mentioned problem statements, the main objectives are:

i.   To design security door using apps and fingerprint and to develop a secure management mobile app to homestay.

ii.   Alternative way to implement mechanical door lock mechanisms to reduce the usage of key for homestay.

iii.   To implement the prototype and study its performance towards the app.

1.3   Scope of the project

The research would concentrate on develop the security door using fingerprint with app for homestay so as to access the door. Wi-Fi must be synchronized to a mobile phone and an order must be identified to connect to the controller. The project will have implementing software and hardware work. To work with this project, the right to implement software needs to be identified first. In fact, how the fingerprint authentication door for the app works and is integrated for hardware and software components.

The microcontroller Arduino would be merged with the Wi-Fi module. The Wi-Fi module would be a medium for transmitting data to the mobile device that acts as a network input. In this system, user will input fingerprint in the app to scan fingerprint and register details which is connected to the door latch through the microcontroller. After scanning the print, the system runs its database and looks for a match. If any match is found, the door opens and thus the door gets unlocked.

The Homestay program has significant potential as a community-based stuff for tourism to develop like a valued commodity for tourism with a unique nature of its own. Therefore, local and international tourists homestay has strength and uniqueness lies to people with traditional culture. The growing number of new members who register and join app as new user. Moreover, for sustainable development and secure management entrance for homestay to indicate good room management system.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Literature review is an essential part before beginning any project because it provides all required data related to the project. Based on that, the correct direction in developing the project can be performed proficiently. In this chapter, topic that will be explained are security Door system, Fingerprint sensor, Apps for homestay that going to be implemented form previous work.

2.1 Overview of security door with app using fingerprint

In general, The System Operating Android is commonly used in mobile phones and tablets, to controls the home for ideal. This project introduces development of security door with app using fingerprint to homestay to control the system operation of security door. Beside that, scan fingerprint to access a secure control system was designed using software of Android app . The user can access the door form a distance to Open and shut the door. App built on the phone would inform the door of receiving the commands from the android phone to transfer these commands to the micro-controller controlling door.

The concept is applied in order to have safer securities because users do not need to remember passwords and do not need any sort of keys or cards that sometimes get lost. If

someone's fingerprint is allowed to access a door in the network, he / she wouldn't face any sort of delays. Fingerprint identification is one of the simplest devices, because one person's fingerprint never fits another. Therefore, unauthorized entry can be limited by designing a lock that will save one or more authorized users' fingerprints and unlock the device when a match is identified. Modern portable devices such as cell phones and laptops will quickly guess the effectiveness and reliability of fingerprint scanner from its use.

2.2   Previous Related Work

Previous related work is basically about the researcher who have did similarly with the project which had plan. There are several researchers around the world had did almost the similar project, but there are differences in the equipment and method they have equipped to do the project. In order to complete this part had to select most similar article and summarize it. The article which chosen at are all listed at reference

2.2.1   Wifi Based and time Limited Secure Control System

According to (Kirbas, 2017) The proposed system provides for the authorized control of Wi-Fi-based door locking mechanisms from a certain control center via internet connectivity and the monitoring of input and output operations. A safe random key-token system has been developed to allow data sharing transfers more accessible over the Internet. Thus, when a user name and key information is accessed via a smartphone, tablet or device capable of connecting to a wireless network, central system monitoring of door locks and monitoring of input / output operations are given within the parameters of user permissions, including user name and secure key details.

This work based on Wi-Fi and web-based time and user-restricted remote-control application. Mobile devices is envisaged as a user interface such smartphone. In addition, a web-based control mechanism is used regardless of the operating system running on the intelligent devices. This is intended to be independent of the hardware and operating system. It acts as a server authorization service on the Internet, and it is decided whether or not users will be able to log in, taking into account user authority and time constraints. A low-cost minicomputer (Raspberry Pi 3) with a web server software is linked to a locking door mechanism and user's access through this computer's internet connection is controlled.
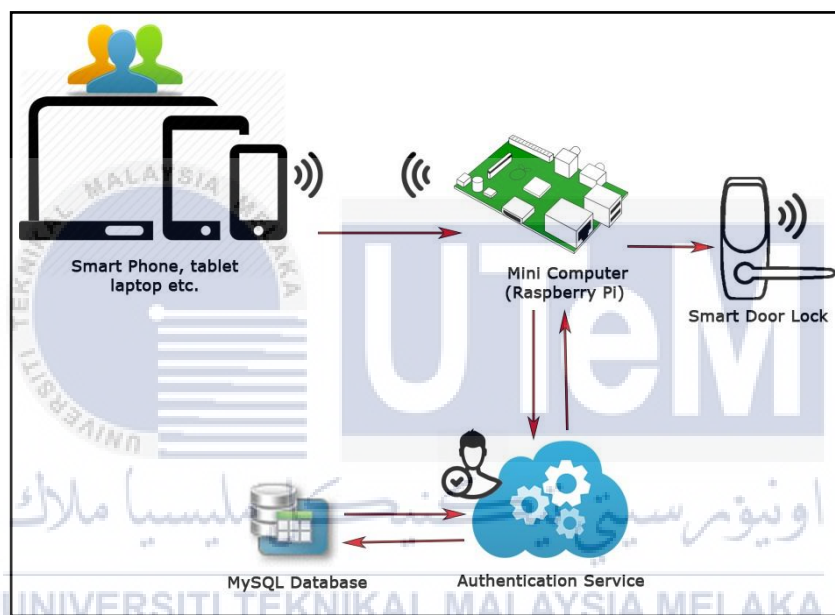

Figure 2.1: Communication system

2.2.2 Internet of things for Apps

The large variety of application can execute through smartphones have become widespread. Internet of Things (IoT) in order to make sure the vision of the, joint tasks where every devices communicate with each other, it is necessary that to

extend and adapt their functionalities apps on the moving based on their environment through this devices. Propose "hybrid Apps", the concept of smartphone "Apps" designed to understand smart functionalities for IoT devices through small embedded systems.

Researchers (Yunge et al.,2015) points out that an App is built on the device, which includes a specific functionality with a customize code generator. This Software helps users to set up and customize their smart world. MicroApps are known as the custom code is created for all smart devices that research findings involved devices. The IoT devices wirelessly sent the code generated through smartphone. Generated microApp is integrated code interpreter capable of installing and executing the setup for all IoT devices.
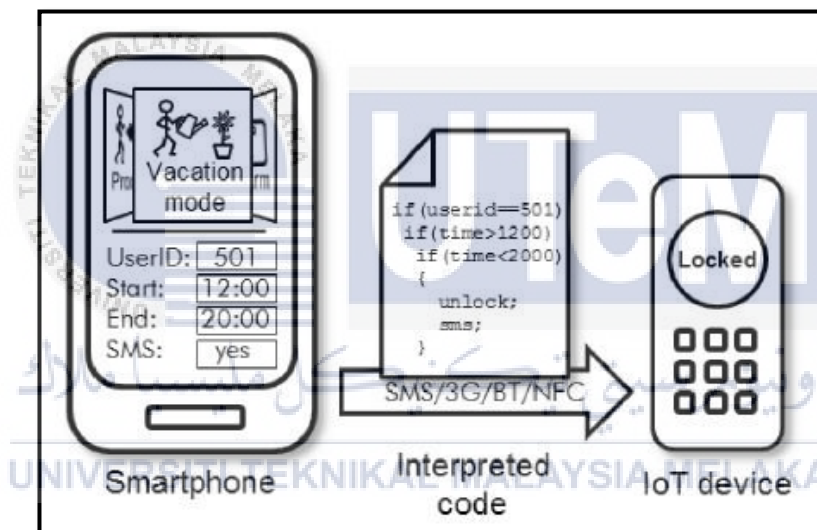

Figure 2.2: A smart computer programming through smartphone

2.2.3 Home Security Using Raspberry pi3 for Smart Door System

At this moment in time, latest technologies are being adopted to serve vital research providing a security system for houses purpose. Remote monitor and

control for the home appliances is used to provide wireless network for the technologies. The authors (Hussein et al.,2017) describe raspberry pi technology based on the security door lock system. Which determined to notify the owner by provide an alarming system through pi-lids , cameras and keypad are being utilized.

However, user-id also given to recognizing guests. In this way, only those who get permission to open the doors are the allowed persons. The device does operate by notifying owner through take pictures for the guest by a code and camera pi located in the doors. This article aims to say monitoring control system and a door access consist of different stages:

• Detection of pi user by keypad and webcam

• User-id file

• Verification

• Information

• Request to process according

A low-cost authentication system makes home automation system more secure and cost efficient based on face recognition and Raspberry pi3 system. This make change in the society to go down the percentage of crimes in technology. Securing home used RFID and NFC.