UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF HIGH SECURITY LOCKER SYSTEM FOR SAFETY PURPOSE USING ANDROID MOBILE APPLICATION

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation & Robotics) with Honours.

by

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APPROVAL

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ABSTRAK

Teknologi tanpa wayar kini menjadi isu utama dalam pembangunan gaya hidup yang selamat dan moden, terutama dalam penggunaan kawalan akses. Teknologi bluetooth, yang digunkan untuk berinteraksi rangkaian tanpa wayar dengan peranti lain yang membolehkan bluetooth dalam jarak jauh yang lebih pendek menggunakan isyarat tanpa wayar, memberikan pengguna lebih selesa untuk digunakan. Di samping itu, memegang banyak kunci adalah beban individu dan meningkatkan peluang kehilangan kunci. Projek ini bertujuan untuk mengatasi masalah ini dengan menyediakan kawalan akses yang selamat yang mampu dikawal tanpa dan wayar tanpa kunci untuk loker peribadi. Di samping itu, pengguna tidak perlu bimbang tentang keselamatan seperti perkara penting atau dokumen. Proses membuka kunci loker bermula apabila pengguna membuka aplikasi yang dimuat turun dari telefon Android. Selain itu, untuk mengunci loker, ia bergantung pada rangkaian bluetooth dan kata laluan yang telah ditetapkan. Oleh itu, aplikasi telah dimulakan, bluetooth akan cuba menyambung ke Arduino UNO melalui modul bluetooth dari telefon bimbit android. Sekiranya salah satu daripada spesifikasi sistem loker tidak diisi, hasil teks yang memberitahu kata laluan tidak betul akan muncul. Sebenarnya, apabila kata laluan yang salah telah ditekan sebanyak 3 kali, penggera telah diberi bunyi selama beberapa saat untuk memberi amaran kepada orang bahawa ada yang mencuba untuk memasuki loker. Ini untuk memastikan pengguna mempunyai sambungan untuk membuka kunci loker. Walaupun, analisis telah menentukan bahawa untuk memerhatikan kepekaan dalam menghantar isyarat dari telefon mudah alih Android ke modul Bluetooth di dua lokasi dalaman dan luaran yang berlainan. Sistem keselamatan fungsi perkakasan dan perisian dikawal sepenuhnya oleh mikropengawal UNO Arduino.

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ABSTRACT

Wireless technologies are now a major issue in the development of a secure and modern lifestyle, particularly in the application of access control. Bluetooth technology, set up to interact wireless network with the other Bluetooth enabled devices in a shorter distance range using wireless signal, provides users with greater comfort and meaningful use. In addition, holding a lot of keys is a burden on the individual person and increases the chances of losing or breaking keys. This project is aimed to overcome this problem by providing a secure access control capable of wirelessly controlled without key for private lockers. Additionally, users do not need to worry about the safety of important things or documents. The locker unlocking process begins when the user opens the application downloaded from the Android mobiles. Furthermore, to unlocking or locking the locker it depends on range of Bluetooth and the password that has been set. Since the application has started, Bluetooth will attempt to connect to the Arduino UNO through Bluetooth module from the android mobile phone. In Arduino UNO, the Bluetooth module will receive the connection and enable the system. If one of the locker system specification not filled, text result that tells the password is incorrect will appear. In fact, once the incorrect password has been pressed 3 times, the alarm will be energized for a few seconds to alert people that someone is wrong to try to enter the Locker. This is to ensure that the user has a connection to unlock the locker. Although, an analysis has determine that to observe the delays in transmitting the signal from the Android mobile to the Bluetooth module at two different indoor and outdoor of the office locations and the performance of the system. The security system of hardware and software function is fully controlled by an Arduino UNO microcontroller.

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DEDICATION

Specially dedicated to my beloved parents, family and friends, who strongly encouraged and supported me throughout my learning journey.

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LIST OF ABBREVIATIONS

SIG	Special Interest Group
UHF	Ultra High Frequency
ISM	Industrial Scientific and Medical
PC	Personal Computer
VDC	Voltage
RDX	Research Department Explosive
PWM	Pulse Width Modulation
USB	Universal Serial Bus
ICSP	In Circuit Serial Programming
AC	Alternative Current
DC	Direct Current
RPM	Rotations Per Minute
LED	Light Emitting Diode
GSM	Global System for Mobile communication
LDR	Light Dependent Resistor
PIR	Passive Infrared Sensor
CPU	Central Processing Unit
IOS	Internetwork Operating System
IDE	Integrated Development Environment

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ADT	Android Development Tools
SDIC	Spatial Data Interest Community
GND	Ground
VCC	Power
TX	Transmitter
RX	Receiver
TXD	Transmit Data
RXD	Receive Data

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CHAPTER 1

INTRODUCTION

1.1 Project Background

This report discusses the "development of high security locker system for safety purpose using android mobile application" project. This project aims to design an android application and produce lockers that use the password based system and ensure the safety of the users. In addition, it will also facilitate users as well as avoid the occurrence of theft and loss cases. The objective and scope of this project is briefly described, how the project can be implemented. Android application will serve to empower the locker can be opened by entering a password. The user can control this application in the wake of entering the right password by utilizing just the Bluetooth association without WIFI. This project is one of the applications of Bluetooth innovation.

1.2 Problem Statement

Before this project was carried out a problem analysis was discussed and studied, among the problems faced by consumers. Therefore the loss of valuables in their lockers when abandoned as incomplete lockers with security features could be invaluable as the valuables in the lockers not safe. Previously users also needed to deal with locking lock problems they lost and this made them difficult to open their lockers and had to ask for help to open the lockers. With the project "development of high

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security locker system for safety purpose using android mobile application" this can reduce the problem faced by consumers. Furthermore, the meaning of high as mentioned in title is determined that most of previous research are using password based keypad system while when compare with password based android mobile application it will be more privacy and secure. Using the latest technology, this project uses the smartphone Bluetooth that used the android operating system.

1.3 Project Objective

There are several objectives that will be achieved in this study

i. To design an android mobile application that is able to access locker to be connected to Arduino with security password
ii. To develop a high security locker system via Bluetooth using Arduino UNO Microcontroller
iii. To test and analyze by comparing the signal strength between a model with Android mobile devices through Bluetooth connection.

1.4 Work Scope

The project developed is to help people to control their locker, arduino controller will be created by using android mobile application. It also provided password security system. Although, this project is split into two parts: development of hardware and software. Hardware device consisting of servo motor as a main component and the software is to design an android mobile application.

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1) Arduino uno as a controller of the system.
2) Android mobile application systems as system security
3) Build a project that can be used in the office
4) Hardware of the locker will be controlled using the servo motor.
5) Using bluetooth module for transparent wireless serial connection setup between android mobile to lock the locker.
6) Bluetooth connection with android mobile device range about 10-100 meters depending on the Bluetooth device class.

Figure 1.1 Type of Safety Lockers

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1.5 Summary

This study will produce new keyless security locker by using new technologies to the consumers. This will be very reliable to any private security lockers. This project will be a low cost, easy to build and reliability for controlling the security locker in certain distance. The project has two main scopes: software development and hardware development, which will be further clarified in the section on methodology.

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