UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SMART DOOR MONITORING SYSTEM USING ARDUINO AND MAGNETIC SENSOR

This report submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Computer Engineering Technology (Computer Systems) with Honours

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Computer Engineering Technology (Computer Systems) with Honours. The member of the supervisory is as follow :

…….

(Project Supervisor)

…….

(Project Co-Supervisor)

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ABSTRACT

This project was designed and implemented the Smart Door Monitoring System using Arduino and Magnetic Sensor. It comprises of integration between Arduino Uno Board, Programming Controller, and Global System Mobile (GSM) for mobile communication. This project consists of Security Door Access and Security System using a GSM Controller. This combination of technology will produce a the security for doors called Smart Door Monitoring System using Arduino and Magnetic Sensor. Smart Door is an integration of various systems at home which is coordinated by Smart Door controller and controlled by users using Short Messaging Service (SMS) notification, while security system is an electrical device that sets of an alarm when someone tries to break in and the GSM Module send a notification to the users. This project can be divided into two main parts which are hardware and software development. The hardware development includes the Arduino Uno Board connection with the GSM Module on the circuit and this circuit was implemented on the door. This system is controlled by users using SMS via Smartphones.

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ABSTRAK

Projek ini adalah ditujukan untuk merekabentuk dan melaksanakan Sistem Pemantauan Pintu Pintar. Ia terdiri daripadai ntegrasi antara Papan Arduino Uno, Pengaturcaraan Pengawal, dan Sistem Global Mobile (GSM) untuk komunikasi mudahalih. Projek ini terdiri daripada Keselamatan Akses Pintu dan Sistem Keselamatan Menggunakan Pengawal GSM. Kombinasi teknologi ini akan menghasilkan keselamatan untuk pintu yang dikenali sebagai Sistem Pemantauan Pintu Pintar. Pintu Pintar adalah integrasi pelbagai sistem di rumah yang diselaraskan oleh pengawal Pintu Pintar dan dikawal oleh pengguna menggunakan Sistem Pesanan Ringkas (SMS). Sistem keselamatan adalah alat elektrik, dimana penggera akan berbunyi apabila seseorang cuba untuk memecah masuk dan Modul GSM menghantar notifikasi mesej. Projek ini boleh dibahagikan kepada dua bahagian utama iaitu perkakasan dan pembangunan perisian. Pembangunan perkakasan termasuk berkaitan Papan Arduino Uno dengan Modul GSM di litar dan litar ini akan dilaksanakan di pintu. Sistem ini dikawal oleh pengguna menggunakan telefon pintar untuk menghantar SMS.

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DEDICATIONS

To my respectful and beloved parents Mr.Othman Bin Haji Yahya and Mrs.Siti Aishah Binti Siman, my course mates, 4 BETC KOHORT 2.

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LIST OF SYMBOLS AND ABBREVIATIONS

CCTV	=	Closed - CircuitTelevision
SIM	=	Subcriber Identity Module
GSM	=	Global System for Mbile
SMS	=	Short Message Service
MMS	=	Multimedia Messaging Service
WI - FI	=	Wireless Internet Free Internet
USB	=	Universal Serial Bus
OS	=	Operating System
GB	=	Giga Byte
mA	=	Mili Ampere
A	=	Ampere
HDMI	=	High Definition Multimedia Interface
HDMI OUT	=	High Definition Multimedia Interface
RCA	=	Root Cause Analysis
GPU	=	Graphics Processing Unit
MHz	=	Mega Hertz
GPIO	=	General Purpose Input / Output
SDRAM	=	Synchronous Dynamic Random Access Memory
SMSC	=	Short Message Service Centre
PIR	=	Short Message Service Centre

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SD	=	Secure Digital
GPS	=	Global Positioning System
MMC	=	Multi Media Cards
SDA	=	Secure Digital Association
SDSC	=	Secure Digital Standard Capacity
SDHC	=	Secure Digital High Capacity
SDXC	=	Secure Digital Extended Capacity
SDIO	=	Secure Digital Input / Output
UHS	=	Ultra High Speed
A/V	=	Audio / Video
exFAT	=	Extended File Allocation Table
I/O	=	Input / Output
PDA	=	Personal Digital Assistant
RFID	=	Radio Frequency Identification
IrDA	=	Insurance Regulator And Development
IDE	=	Integrated Development Environment
UI	=	User Interface
IT	=	Information Technology
ADT	=	Abstract Data Type
SDK	=	Software Development Kit
VM	=	Virtual Machine
ASDK	=	Agent Software Development Kit

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OS X	=	Operating System For Mac
AVR	=	Advanced Virtual RISC
ICSP	=	In-Circuit Serial Programming
PWM	=	Pulse Width Modulation
FTDI	=	Future Technology Device International
KB	=	Kilo Byte
EEPROM	=	Electrically Erasable Programmable Read-Only Memory
SRAM	=	Static Random Access Memory
SPI	=	Serial Peripheral Interface
RX	=	Receiver
TX	=	Transmitter
MOS	=	Metal Oxide Semiconductor
MISO	=	Multiple Input Single Output
CMOS	=	Complementary Metal Oxide Semiconductor
AVR	=	Automatic Voltage Regulation
RISC	=	Reduced Instruction Set Computer
PIC	=	Peripheral Interface Controller
UART	=	Universal Asynchronous Receiver/Transmitter
GPRS	=	Global Packet Radio Service.
IMEI	=	International Mobile Equipment Identifier

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CHAPTER 1
INTRODUCTION

1.0 Introduction

All home security systems work on the same basic principle of securing entry points, like doors and windows, as well as interior space containing valuables like art, computers, guns, and coin collections. Regardless of the size of your home, or the number of doors and windows or interior rooms a homeowner decides to protect, the only real difference is in the number of security components deployed throughout the home and monitored by the control panel. The most basic definition of any security system is found in its name. It is literally a means or method by which something is secured through a system of interworking components and devices. Home security systems work on the simple concept of securing entry points into a home with sensors that communicate with a control panel or command center installed in a convenient location somewhere in the home.

1.1 Project Background

These days with increasing risk of robber cases and new ways of burglary safety and security of any living or working place is one of the most primary concerns. These forces the security system manufacturers to use modern technology have enhanced safety as well as security. One of the most primary concerns safety and security of any living or working place. CCTV surveillance which is major part of security systems are very costly and many of these systems do not trigger any alarm if intrusion or fire is detected. Thus a cost-effective and fast-reactive security system is needed.

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This project to implement the Smart Door Monitoring System using Arduino and Magnetic Sensor. The system is used for monitoring doors. When the system is activated, the monitored doors will be reported to the smartphone, it is possible or sent to the smartphone using GSM Module. The users also can send notification (SMS) via smartphone to activate or deactivate the monitoring system. Hence, the design explained in this paper is a prototype of such system which consists of a microcontroller unit which is Arduino Uno board, a GSM module SIM900 and Magnetic Sensor. Furthermore, the Arduino Uno is used in processing and controlling the system which receives and processes the data from every sensor. The GSM unit acts as an interface between Arduino and user's smartphone and is responsible for communicating between them so the user to control the system from anywhere to switch on/off (activated or deactivated) the system and to receive the alert messages. The system detects the status of the door and generate pulses which are captured by the Arduino.

Gupta (2015) states that the pulse received by microcontroller when an alarm is triggered and a notification is established to mobile station through a GSM module thus it will send alert notification when door is open. The proximity sensors can be attached to doors. The sensor will detect if the status of door is open or close, it will generate pulses to be read by Arduino and then the procedure similar to that of magnetic sensor is followed, establishing the connection to mobile station through a GSM module and thus it send the alert notifcation to the owner.

1.2 Problem Statement

Nowadays, the current security system that are used for monitoring system which based on the simple features and also present the security weakness which need some modification or renew system to avoid the unauthorized person to enter or access the home. However, current generation security systems lack such a feature which could enable home owners to get portable and remote access to relevant information about the security of their homes. The current system are possible to

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