UNIVERSITI TEKNIKAL MALAYSIA MELAKA

I-SAJADAH WITH SMART MONITORING SYSTEM

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 and Robotics) with Honours.

by

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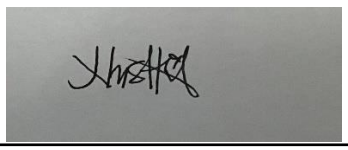

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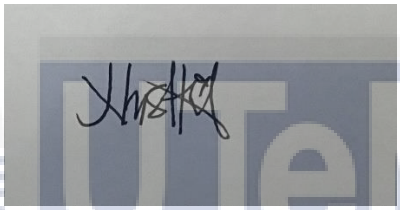

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APPROVAL

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

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ABSTRAK

Abstrak - Sistem pemantauan adalah alat pintar terbaik dalam membantu manusia untuk menjalankan kehidupan seharian secara sistematik. Ia bertanggungjawab dalam mengendalikan sistem dan teknologi yang digunakan oleh banyak perkara seperti perkakasan, rangkaian dan komunikasi serta aplikasi dan sistem operasi. Dengan penggunaan sistem pemantauan ini memungkinkan ke arah pengamatan secara proaktif dan mudah untuk mengambil maklumat data yang diperlukan. Selain itu, sistem pemantauan ini membantu dalam mengendalikan penggunaan sumber dengan lebih cekap dan efisien. Di dalam kes ini, i-sajadah dengan Sistem Pemantauan Pintar adalah salah satu projek yang menggaplikasi sistem pemantauan di dalamnya. Penambahbaikan projek ini adalah dengan mencadangkan penggunaan sistem pemantauan yang lebih mesra pengguna dan efisien. Peranti ini terdiri daripada modul 'Real Time Clock' (RTC) untuk membantu pengguna mengingati tarikh dan masa yang diambil ketika menjalankan inbadah solat. Sistem ini mempunyai bateri tersendiri yang dipasang pada modul tersebut. Ciri ini yang terdapat di dalam modul RTC akan terus berfungsi walaupun ketiadaan kuasa bateri luaran. Projek i-sajadah dengan Sistem Pemantauan Pintar ini secara automatik akan menunjukkan solat (Subh, Zuhr, Asr', Maghrib dan Isya') tanpa pengguna perlu menetapkannya secara manual. Peranti ini terdiri daripada sistem Blynk, aplikasi Wi-Fi, komponen deria dan mikropengawal Arduino. Secara ringkasnya, inovasi i-sajadah dengan Sistem Pemantauan Pintar ini menyediakan sistem yang lebih cekap dalam memantau solat harian kita secara efisien.

ABSTRACT

Abstract - Monitoring system is an intelligence tool introduced to help humans in conducting their daily life. It is responsible in controlling the system and technology used by many things such as hardware, networks and communications modules, as well as applications and operating system. By applying the monitoring system, it allows for proactive regular observation and easy for capturing data information accordingly. Other than that, the monitoring feature helps in recognizing valuable and efficient usage of resources. Therefore, the continuation of the *i-sajadah* project with Smart Monitoring System is where the application of the monitoring system is implemented in it. The improvement of this project is to propose a more user- friendly and efficient usage of the current system. This device consists of the Real Time Clock (RTC) module to help user in remembering the system date and time when completed each prayer. In this case, the system consists of its own battery attached to the module, where this RTC module will kept running even without the absence of external power. Therefore, the project of i-sajadah with Smart Monitoring System will automatically display the prayer (Subh, Zuhr, Asr', Maghrib and Isya') without the necessity of the user needs to set it manually. This device consists of the Blynk system, Wi-Fi application, sensory components and Arduino microcontroller. In a nutshell, the innovation of the i-sajadah with Smart Monitoring System provides more efficient system in monitoring our daily prayer routines.

DEDICATION

I would like to dedicate this thesis particularly to several very important persons in my life. Firstly, I dedicated this work to my beloved parents. I would not be the person I am today if it was not for them. Next, I would like to express my gratitude to my Supervisor, Mr. Ahmad Idil Bin Abdul Rahman along with my Co-Supervisor, Mr. Johar Akbar Bin Mohamat Gani who have been very helpful and continually provide their knowledge and support for me to complete my Bachelor Degree Project.

To my friends who continually shared their words of advice and encouragement until the completion of my report and project as well. And finally, I dedicated this work to the Almighty Allah S.W.T. for His guidance, strength, power of mind, faith and skills as well as for giving and nurturing me with healthy life and good condition.

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I also would like to owe and offer my thanks to my lovely parents respectfully for their consistent moral support and pray to achieve my success in everything I endeavour. Without them, this report will be the hardest burden to comply. Last but not least, I would like to express my appreciation to my classmates in encouraging me with valuable and kindly words, also with fully support in motivating me in completing this report with flying colours.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF SYMBOLS

D, d	-	Diameter
F	-	Force
g	-	Gravity = 9.81 m/s
I	-	Moment of inertia
1	-	Length
m	-	Mass
N	-	Rotational velocity
P	-	Pressure
Q	-	Volumetric flow-rate
r	-	Radius
T	-	Torque
Re	-	Reynold number
V	-	Velocity
w	-	Angular velocity
x	-	Displacement
z	-	Height
q	-	Angle

LIST OF ABBREVIATIONS

PCA	Principal Component Analysis
RTC	Real Time Clock
UART	Universal Asynchronous Receiver-Transmitter
OLED	Organic Light Emitting Diode
LED	Light Emitting Diode
AVR	Automatic Voice Recognation
USB	Universal Serial Bus
GSM	Global System for Mobile Communications

LIST OF PUBLICATIONS

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter consists of the project background, problem statement, objectives, scope and expected results. In this section, the project's objectives will be explained in detail as well.

1.1 Background

Nowadays, it is considered an ordinary situation for the industries to apply technology to the extent of a better or lesser degree. In many cases, the good functioning of the equipment, overall system and smooth networks will be the main key of the company to continuously operating successfully. In simple words, the consumer or customer will be the stakeholder directly offered with the new technology service.

Even if the company have the technology necessarily for their operational work, it does not mean it is functional or useful. Sometimes the extent for the fault occurrence to increase to some difficult conditions or situations may exist at any time. Due to that reason, it is essential to have a structured computer infrastructure to control the operation of it, since with that facility possible mistakes occurred will not affecting the service given to the consumers towards the end.

A good monitoring tool is the one that is considered very convenient to detect and prevent mistake or failures, that is much needed by everyone. This tool is known as the smart monitoring system. This system is accountable for controlling the technology used by the company such as software, hardware, communication and network protocols, as well as the operating system or any applications. The system also performs the analysis of their work or operation and evaluate its performance. The most important criteria of this system is the ability to check or detect the error and alert the fault caused. The capability to keep on track and smartly monitor the applications, devices, services, infrastructures and business processes, make the monitoring system to be a very good reliable system.

The development of information technology plays an essential role in various sectors of human life [1]. Nowadays, monitoring system is important and is a must have or must owned in every home, especially at residential areas. Various tools that very in need exist to be self-sufficient in real time. Since then, smart phones are currently risen in usage majorly in the sector of information technology. The capability that have been developed in the smart phones nowadays is something very useful and formerly features that can be used only by the computers are now can be done from those mobile devices. Therefore, smart phones not only can be used as a voice communication between people or human but is widely used in various usage as well. The requirement for smart phones to process its functions accordingly is executed by its operating system. Example of operating system that are used in the smart phones is the Android. A Linux-based operating system by the Android is designed for mobile devices for touch-screen purposes. Since the Android operating system is in open source, people may beneficially use the operating system and apply advantageous build features contained therein.

According to the International Journal of Scientific Research in Information System and Engineering, the new development of Android-based smart monitoring is a monitoring system consisting of two major hardware components which are home PC server and Arduino Uno microcontroller [2]. Collection of data is in multiple ways and nodes for the crave or desired space. The data is going to be analyzed in language of Arduino before the data is send to the PC or personal computer thru the LAN cable. Next, the data is sent by using the Ethernet to the remote or controller of the smart phone where it can be readily and easily monitored.

The smart monitoring system is widely used and one of the beneficial uses is for waste management monitoring. As such, the development of the smart green environment of garbage system is carried out by measuring the garbage level in real time [3]. It also gives signal to the community whenever the bin is already full, which depends on the garbage type. This system applies the ultrasonic sensor that functions to determine and measure the level of garbage inside the bin. Besides that, this system also consists of an ARM microcontroller which act as a control system, where everything will be linked to the ThingSpeak. Furthermore, the expectation towards this system is to have greener environment by smartly monitoring and controlling the garbage collection by applying Internet-of-Things features. In this case, the system will display four different types of garbage status which are domestic waste, glass, paper and plastic. This is performed via the LCD display and ThingSpeak in real time, in which the stored data beneficial for further analysis usage in the future. For an example, the system is capable to forecast the garbage peak level of fullness inside the bin.

Nowadays, Internet of Things (IoT) is very important and widely used in monitoring system. The relative low cost of Wi-Fi magnified the dependency on Internet