UNIVERSITI TEKNIKAL MALAYSIA MELAKA

INGENIOUS PRAYER MAT WITH SMART RAKA'AH NOTIFICATION DEVICE

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical and Electronic Engineering Technology (Automation Industry and Robotic) with Honours.

by

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ABSTRAK

Abstrak - Semua umat Islam wajib melaksanakan dan mempelajari solat lima kali sehari. Setiap keluarga mempunyai kaedah mereka sendiri bagi mengajar anak-anak mereka untuk berlatih dan melakukan solat terutamanya pada usia muda. Walaubagaimanapun, ibu bapa pada masa kini mengalami kesukaran ketika melatih anak-anak mereka dalam solat kerana anak-anak kini mempunyai banyak alasan seperti malas dan berbohong tentang rutin solat mereka. Sebagai ibu bapa, mereka perlu melakukan sesuatu untuk memastikan anak-anak mereka melakukan solat sebagai kewajipan dalam lima rukun Islam. Masalah utama ketika melakukan solah adalah kemungkinan untuk melupakan jumlah rakaah yang telah selesai. Masalah ini sering terjadi terutamanya apabila melakukan solat rakaah seperti Zohor , Asar dan Isyak. Kanak-kanak yang tidak berpengalaman akan keliru dengan bilangan raka'ah yang mereka sudah siap sempurnakan solat seperti orang dewasa. Oleh itu, Sejadah bersama Peranti Pemberitahuan Raka'ah Pintar dicadangkan sebagai peranti pintar untuk memberitahu pengguna mengenai bilangan sebenar raka'ah serta ibu bapa boleh mendapat pemberitahuan pada telefon pintar mereka untuk memberitahu jika anak-anak mereka telah selesai menyempurnakan solat mereka dengan sewajarnya . Peranti ini terdiri daripada komponen deria,pengawal mikro, sistem penunjuk dan aplikasi perisian

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percuma. Sebagai hasil, inovasi Sejadah bersama Peranti Pemberitahuan Raka'ah Pintar mempunyai prospek untuk digunakan sebagai alat mesra pengguna untuk menguntungkan semua umat Islam khususnya seisi keluarga.

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ABSTRACT

Abstract - All Muslims are obliged to perform and learn solah five times per day. Each family has their own method to teach their children to practice and perform solah especially in the early age. However, parents nowadays have the difficulty when training their children in solah as children are now have many excuses such as lazy and lying about their solah routine. As parents, they should do something to make sure their children perform the solah as obligated in the five Islamic pillars. The main problem when performing solah is the possibility to forget the number of raka'ah that have been completed. This problem often happened especially when performing for raka'ah prayers such as Zuhr, Asr and Isya'. Inexperienced children would be confuse how many number of raka'ah that they already completed when performs as well as the elders. Therefore, the Ingenious Prayer Mat with Smart Raka'ah Notification Device is proposed as a smart device to notify users on the exact number of raka'ah as well as parents can get notification on their smartphone to notify if their children has completed their solah accordingly. This device consists of sensory components, microcontroller, an indicator system and a freeware application. As a result, the innovation of Ingenious Prayer Mat With Smart Raka'ah Notification Device has prospect to be used as a user friendly device for the beneficial of all Muslims especially families.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

IDE - Integrated Development Environment

TTL - Transistor-transistor Logic

SCL - Silicon Controlled Rectifier

FET - Field Effect Transistor

VCC - Voltage Common Collector

GND - Ground

SDA - Send Data

SCL - Serial Clock

RST - Reset

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I2C - Inter-Integrated Circuit

μ - Micro

Ω - Ohm

IEC - International Electrotechnical Commission

NEMA- National Electrical Manufacturers Association

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter consists of the project background, problem statement, objective, scope, and expected result and objective that will be explained further throughout this project.

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1.2 Background

Performing solah five times a day is the second pillar of Islam where compulsory to all Muslims. Every routine in a solah should be implemented so that the solah can be performed perfectly with regard to the Islamic principles. However, when performing solah it is possible for the Muslim to lose focus and this has been proven throughout the behavioural study that has been conducted. There is a possibility to doubt the number of raka'ah that has already been completed in the solah, especially during performed the four raka'ah prayers.

The difficulty for a person to remember which raka'ah is currently being performed mostly occurs to the elderly, especially those who are diagnosed with mild cognitive impairment and memory weakness diseases, such as low-stage dementia, mild amnesia, and level-1 Alzheimer [1]. The difficulty may also occur to children who just start learning to perform solah. Moreover, since the person must repeat the raka'ah a number of times, and sometimes recites long verse surah from the Quran at the first two raka'ah, it sometimes becomes a shortcoming for the person to remember which raka'ah is being performed. Under these circumstances, once forgotten, the person must go back and perform additional raka'ah to ensure that at least the exact number of raka'ah has been performed in a solah.

However, there is another problem that involves prayer which is the method of educating parents in monitoring the children to perform solah occasionally. A problem oftenly occurs when parents have to constrain their lazy child to pray and this causes them no other way than to punish their children as a sign of warning to them. Actually, teenagers who have moral problems and tantrums found to be caused by lack of a perfect education from the family [2]. If parents do not show good behaviour or not emphasizing their children to perform solah, it will give least impact to the child that they demotivated to pray.

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In the United States statistics, 44% of young adults engage in daily prayer, compared with 62% of those ages 40 and above [3]. It shows that young adults around the world are less religious by several measures. This situation explains that they are not ordinarily to perform daily prayers since childhood. Based on the statistics, it shows that young adults attend religious services less than elders across groups by religion. Table

1.0 shows the number of young adults and elders across several religions who attend religious services.

Table 1. 1: Number of young adults and elders across several religions who attend religious services [3]

Religious	Younger adults attend less	Older adults attend less	No significant difference
Overall	53	3	46
Christians	35	1	41
Muslims	15	0	26
Unaffiliated	10	1	16
Hindus	1	0	0
Buddhists	1	0	2
Jews	0	0	2

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These statistics have been an alarming concern for parents around the world. Hence, the actions of parents affect the conduct of children to fulfil the mandatory requirements set by the Islamic religion. In Islam, it is obligatory for all Muslims to perform the five daily prayers and obtain the pleasure from God.

In order to assist the problem when performing prayers among children and adolescents, various solutions have been made through previous efforts and measures.

With the advancement of technology that is rapidly growing, there is definitely a way to overcome this frequent problem. For example, in the previous work, there has been pros and cons in every project implemented. The current project is to be linked to previous works to produce something relevant that affects the community. The objective of this project is to build a system that eliminates the weaknesses of previous measures to not forget the number of raka'ah that has already been completed when performing solah.

1.3 Project Overview

The Ingenious Prayer Mat with Smart Raka'ah Notification Device has been designed to cater for inexperienced children who just start learning to pray. But similar cases also applies for those having cognitive and memory weaknesses, such as level-1 Alzheimer, dementia and who mild amnesia patients who might forget how many raka'ah have been performed in a solah. The invention of Ingenious Prayer Mat with Smart Raka'ah Notification Device incorporates the effectiveness of the counter to notify the number of raka'ah, as well as the necessity to consider the position of each electronics component, convenient to cater all types of prayer rugs and users of different age and height.

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The system is integrated and built in with the sajadah or prayer mat itself by using the pressure sensor, smart display and microcontroller .The OLED (Organic Light Emitting Diodes) display is used to show the number of raka'ah to the user while the Arduino Mega will be device that connects the mat with other electronic components. A freeware application will be controlled by an open source Internet of Things (IoT) platform. This platform is equipped with Blynk application which saves time and date

data on smartphone and notify the user the number of raka'ah that has been completed in a solah. Figure 1.1 shows the overview system of this project.

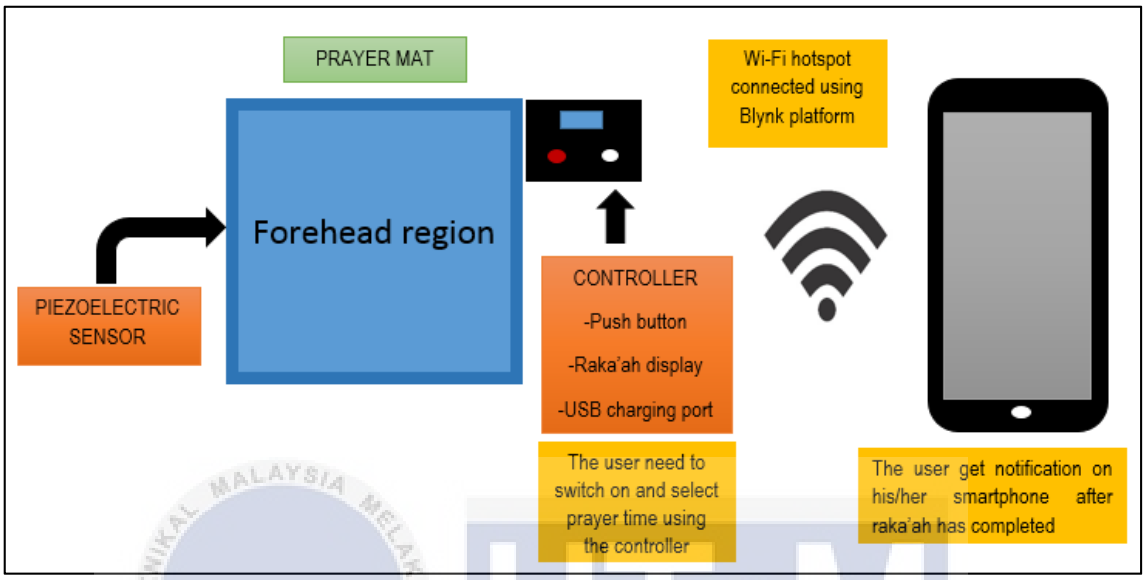

Figure 1. 1: Overview system

1.4 Problem statement

Performing solah is the second pillar of Islam. It is required to be performed by Muslims with high degree of proficiency and full of reverence. It is likely that many person can lose track of the number of raka'ah during the observation of their prayer. This can have a negative impact on their proficiency and reverence especially for children. As a parent, they want to make sure that their children completed their solah with the right number of raka'ah. This project is investigate designed in a way to investigate and provide an appropriate solution to automatically counting the number of raka'ah. It also come with an additional alert device where a parent can detect their children's solah performance through mobile devices.

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The suggested solution is based on the design of the Ingenious Prayer Mat with Smart Notification Device which counts the number of raka'ah automatically for both normal and disabled people. The proposed design needs to be reliable and cost-effective. It would be based on the use of different types of sensors along with a microcontroller that processes the sensed signals and produces the required outputs. The output from such a system is mainly the number of raka'ah that already been completed in a solah. Furthermore, it can also provide some other features which are useful to those who performing the prayer. The problem statement that produce the reason for the outcome idea for this project are basically:

i. The difficulty and doubt in remembering the number of raka'ah that has already been completed in solah which could happen to inexperience children, elderly and those who having memory weaknesses.
ii. Children's attitude problem that always leave solah without parent's knowledge.
iii. The necessity of parents to monitor their children to perform solah every time when prayer time comes five times per day.

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1.5 Objective

The objectives of the design and development of the Ingenious Prayer Mat with Smart Notification Device are as follows:

i. To produce a user friendly device to help Muslim mastery the daily raka'ah sequences when performing solah.

ii. To develop a smart monitoring device to notify the user especially parents to check the daily routine of their children when they performing their solah five times per day.

iii. To perform an analysis performance on the Ingenious Prayer Mat in term of its functionality and precision on detecting the correct daily number of raka'ah and monitoring the solah routine five times per day.

1.6 Scope

The following scope and limitation of this project are given as follows:

i. The project is for all Muslims especially families and also caters to inexperienced children, elderly and those who having memory weaknesses.

ii. The program simulation for this project will use the Arduino software and Blynk mobile application which is limited to Android and IOS users.

iii. The hardware for this project will use the NodeMCU ESP8266 IoT board with some additional electronic components and pressure sensitivity sensor.

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1.7 Report Outline

This report has five chapters. An introduction and project background at the Ingenious Prayer Mat with Smart Raka'ah Notification Device are discussed in brief in Chapter 1. The problem statement, objectives and scope of the project will also include in this chapter. Chapter 2 is about the Literature Review that presents an overview of previous works and system design of such similar projects. This chapter consist the past and current trends of similar system that are practiced consequently. Chapter 3 describes the methodology for this project which consists the parts for hardware and software