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DEVELOPMENT OF WATER VOLUME FLOWRATE MONITORING SYSYEM USING ARDUINO AND IOT

WAN FARIZ BIN W HASBOLLAH
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DEVELOPMENT OF WATER VOLUME FLOWRATE MONITORING SYSTEM USING ARDUINO AND IoT

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

By

WAN FARIZ BIN W HASBOLLAH

B071511040

941004106027

FACULTY OF ENGINEERING TECHNOLOGY

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211 Blok 4,

Jalan Cangkul 19/3 Seksyen 19,

40300 Shah Alam,

Selangor

Tarikh:

Disahkan oleh penyelia:

.....

En Fakhrullah Bin Idris

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APPROVAL

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

…….

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ABSTRAK

Umat Islam setiap hari perlu bersedia untuk menunaikan solat lima waktu dan biasanya mereka akan menggunakan sepuluh hingga dua belas liter air semasa wuduk. Sistem pemantauan kadar aliran isi padu air akan mengurangkan penggunaan air semasa proses wuduk dengan menggunakan kitaran semula air wuduk setelah selesai proses wuduk. Sistem ini akan mengawal aliran dan jumlah air semasa proses wuduk. Objektif projek ini adalah untuk merekabentuk sistem wudhu dan merancang sistem yang dapat mengurangkan penggunaan air semasa proses wuduk dengan menggunakan semula kitaran air wuduk selepas menyelesaikan proses wuduk. Arduino Uno akan digunakan sebagai pengawal untuk mengawal pam air. Pam air akan mengawal aliran air apabila sensor inframerah mengesan pengguna pada tab wuduk dan sensor ultrasonik akan berfungsi untuk memeriksa jumlah air dalam tab penyimpanan dan di tab wuduk sama ada air itu cukup atau tidak kepada pengguna untuk digunakan untuk proses wuduk dan Node MCU berfungsi untuk menyimpan data dan menghubungkan ke aplikasi Blynk untuk monitor sistem ini. Hasil dan analisis data mengenai jumlah dan kadar air semasa proses wuduk akan dijelaskan dalam laporan ini.

ABSTRACT

Everyday Muslims need to prepare for their five daily prayers and usually they will use ten to twelve litres of water during ablution. Development of water volume flowrate monitoring system using Arduino and IoT would reduce water consumption during ablution process by reusing *post ablution water* in ablution tub after finish the ablution process. This system will control the flow and the volume of water during the ablution process. The objective of this project is to design and develop a prototype system in ablution system and to design a system that can reduce water consumption during ablution process by reusing *post ablution water* after finish the ablution process. Arduino Uno will be used as controller to control the water pump. The water pump will control the flow of the water when infrared adjustable sensor detects the user at ablution tub and ultrasonic sensor will be function to check the water volume in storage and ablution tub either the water is enough or not to user to use for ablution process and the data is stored at Node MCU and link to apps Blynk to monitoring this system. The result and analysis of data about volume and flowrate of water during ablution process will be described in this report.

DEDICATION

First and foremost, a special thanks to my father and mother which is Mr. Wan Hasbollah Bin Wan Ishak and Mrs. Zakirah Binti Hussain and my fellow friends who are giving me the support and encouragement in order to finish this project in time. Thank you for my supervisor which is Mr Fakhrullah bin Idris who is giving me an advice and a guidance to complete the tasks.

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CHAPTER ONE

INTRODUCTION

Everyday living Muslim is obliged to perform five-time prayers daily and Muslims are also obliged to take "wudhu" or ablution before performing their prayer. During the ablution taking process, they will usually be using about ten to twelve litters of water, where the user did not realize that they waste a lot of water at the time they change the step of ablution. This project could be eco-friendly system that can help people to save the natural resources. The background, objectives, problem statement and scopes of the project will be discussed in this chapter.

1.0 Background

According to the Quran, ablution or also known as "wudhu" is a ritual washing which is a compulsory activity for Muslim to ensure cleanliness before the Muslim perform prayer. As stated by Al Bukhari, Prophet Muhammad Peace Be upon Him (PBUH) said "cleanliness is half of faith". Every Muslim is obliged to wear clean clothes and must be clean before performing their prayer. In general, ablution is followed by washing on certain body part and has a rules and manner when performing the ablution.

Water is something that is so cheap and in Malaysia lots of us take it for granted. The rise of numbers in human population leads towards the lack of water supply due to a variety of activities such as the activities of the logging that affect the watershed. Fast development in Malaysia additionally makes rainwater not be able to be assimilated into the ground rather keep on flowing into the river. This has caused the reduction of the

amount's groundwater, which at that point influences the clean water supplies. Therefore, the need of system that can make Muslim minimize water consumption when they go to take wudhu' without water spillage and eco-friendly which is can make water conservation to human.

1.1 Problem Statement of the Project

Accuracy of measurement and monitoring can improve the efficiency of liquid usage. In case, water consumption during ablution is one of the examples where fluid volume and flow monitoring can be implemented. The idea for providing this development of water volume flowrate monitoring system come from the problem of excessive wastage of water and to see the real rate of water production, whether it is accurate or not by the actual use of water. During the ablution process, user did not realize they already waste a lot of water than they should use at the time change the step of ablution. Even though the price of water is cheap, we should never waste the water because at the end of the day, we will going to preserve this life-sustaining resource and with expanding of the human populace and contamination that has been communicated as a decrease in water resources. Hence, this system will minimize the water consumption during ablution process by reusing *post ablution water* in ablution tub after ablution process finish and ablution *grey water* can be channel out properly to outside of the ablution tub.

1.2 Objective of the Project

The objective of this Development of Water Volume Flowrate Monitoring System using Arduino and IoT project are:

i. To design and develop a prototype water volume and flowrate system in ablution system.
ii. To reduce water consumption during ablution process by reusing *post ablution water* after finish the ablution process.
iii. To provide analysis of data about volume and flow rate during ablution process.

1.3 Scope of the Project

The focus of this system is concentrated in ablution to measure the flow and volume of water that will be used during performing ablution ritual. The Arduino microcontroller will be used as controller to control the 12V water pump and to control volume using ultrasonic sensor. The 12V water pump will control the flow of the water when sensor is detecting user at the ablution tub. The sensor that will be used to detect user is infrared adjustable sensor. Furthermore, water filter will be used to filter the *post ablution water* to storage again after finish ablution process. The system includes a hardware and software to design a system that can be minimize water consumption when performing ablution by reusing *post ablution water* in the ablution tub after finish ablution process. Ablution *grey water* can be channel out properly to outside of the ablution tub.

1.4 Conclusion / Summary

This chapter introduce how this system will development the water volume flow rate monitoring system by using Arduino and IoT is chosen. In general, everyday Muslim is obliged to perform five-time prayers daily where Muslims are also obliged to take "wudhu" or ablution before performing their prayer. However, they tend to use around ten to twelve litres of water in order to take wudhu. During the ablution, user did not realize that they waste a lot of water, especially during the time when they change the step of ablution. So that, this project will design a system development of water volume flow rate monitoring system using Arduino and IoT that can make eco-friendly system and this system also will design that can minimize the water consumption while performing ablution by reusing *post ablution water* in the ablution tub after completed the ablution process and ablution *grey water* can be channel out properly to outside of the ablution tub.

1.5 Thesis Outlines

This report is consisting of five chapters. All these chapters will be discussing regarding the application of this project, which is about the development of water volume flowrate monitoring system using Arduino and IoT.

i. Chapter 1 (Introduction): The overview of this project which consist of introduction, objective, problem statement, scope of the project and thesis outlines of this project.