Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF LAUNDRY NOTIFICATION SYSTEM WITH IOT

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Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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A project report submitted
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I declare that this project report entitled "Development of Laundry Notification System With IoT" is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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DEDICATION

Alhamdulillah, praise to the Almighty Allah S.W.T. Every challenging work, needs efforts as well as guidance of elders especially those who were very close to our heart.

My humble effort I dedicate to my sweet and loving:

My Parents,

Mr Rasdin Bin Mat and Mrs Amnah Binti Awang Amat,

My Siblings,

Fatin Zakiah/Fatin Ira Fhatira/Fatin Atiqah/Muhammad Aiman/Fatin Rabiatul Adawiyah,

My fellow friends.

4 BEEC,

My Supervisor,

Mrs Nurliyana Binti Abd Mutalib

ABSTRACT

This project presents the Development of Laundry Notification System with IoT which gives a solution to users to get the notification via the Blynk application. A notification is a way to send alarms or other kinds of information to users but in this project, the system that is implemented is a laundry notification system. This system can notify the user if the machine that they used stop spinning. The purpose of this project is to allow laundry users to get notifications from anywhere by using the Blynk application. This system consists of a Blynk application on a smartphone that has been connected wirelessly using the ESP8266 NodeMCU acting as a microcontroller in which the buzzer and led have been connected to it. DC motor connected to 2-channel relay module through normally open and common pins. The notification will be sent at an accurate time if the connection to the internet is strong otherwise, it would take a few seconds to send the notification. Based on the survey form, most of the laundry users agreed to implement this development at the laundromats. As a result of this developed project, it can achieve the desired output. This development was being one of the convenient and user-friendly as it introduced a better improvement to the Laundromats.

ABSTRAK

Projek ini memperkenalkan Pembangunan Sistem Pemberitahuan Dobi dengan IoT yang memberi penyelesaian kepada pengguna untuk mendapatkan pemberitahuan melalui aplikasi Blynk. Pemberitahuan ialah satu cara untuk menghantar penggera atau jenis maklumat lain kepada pengguna tetapi dalam projek ini, sistem yang dilaksanakan ialah sistem pemberitahuan dobi. Sistem ini boleh memberitahu pengguna jika mesin yang mereka gunakan berhenti berputar. Tujuan projek ini adalah untuk membolehkan pengguna dobi mendapat pemberitahuan dari mana-mana sahaja dengan menggunakan aplikasi Blynk. Sistem ini terdiri daripada aplikasi Blynk pada telefon pintar yang telah disambungkan secara wayarles menggunakan ESP8266 NodeMCU yang bertindak sebagai mikropengawal di mana buzzer dan led telah disambungkan kepadanya. Motor DC disambungkan kepada modul geganti 2 saluran melalui pin *normally open* dan *common*. Pemberitahuan akan dihantar pada masa yang tepat jika sambungan ke Internet kuat jika tidak, ia akan mengambil masa beberapa saat untuk menghantar pemberitahuan. Berdasarkan borang kaji selidik, kebanyakan pengguna dobi bersetuju untuk melaksanakan pembangunan ini di kedai dobi. Hasil daripada projek yang dibangunkan ini, ia dapat mencapai output yang diinginkan. Pembangunan ini menjadi salah satu yang mudah dan mesra pengguna kerana ia memperkenalkan peningkatan yang lebih baik kepada Kedai Dobi.

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V	-	Voltage
A	-	Ampere
mA	-	MiliAmpere
MHz	-	Megahertz

LIST OF ABBREVIATIONS

LED	-	Light-Emitting Diode
IoT	-	Internet of Things
SOC	-	System on Chip
TCP/IP	-	Transmission Control Protocol/Internet Protocol
UWP	-	Universal Windows Phone
WIP	-	Windows Information protection
OEM	-	Original Equipment Manufacturers
OTP	-	One-Time Password
RFID	-	Radio Frequency Identification
ARM	-	Advanced RISC Machine
API	-	Application Programme Interfaces
USB	-	Universal Serial Bus
SPI	-	Serial Peripheral Interface
I2C	-	Inter-Integrated Circuit
SRAM	-	Static Random-Access Memory
PWM	-	Pulse Width Modulation
GPIO	-	General Purpose Input/Output
GSM	-	Global System for Mobile
ICSP	-	In Circuit Serial Programming
FSR	-	Force Sensing Resistors
KB	-	Kilobytes
MB	-	Megabytes
GB	-	Gigabytes
AC	-	Alternating Current
DC	-	Direct Current

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

In this chapter the overview of the project briefly discussed. This chapter also will briefly explain about the project background, problem statement, objective, scope of the project. To understand more details about the project can be obtained from this chapter.

1.1 Background

Laundry was formerly considered a man's duty in ancient Rome. The river serves as the primary washing machine for the locals. A riverbed and a pile of boulders were no longer sufficient for many people as culture evolved, population rose, and cities became thriving urban centres. Large wooden washtubs and dolly-tubs or possing-tubs, towering tubs in which garments were thrashed and mixed with a plunger, were prevalent as a result of this. Washing during this time period may be quite physically taxing, and it was frequently done on an irregular basis by impoverished slaves and washerwomen in a gruelling procedure. When the Industrial Revolution begins, washing begins to acquire some additional distinguishing traits. Indeed, the popular washboard, which is sometimes credited to the Scandinavians, was substantially refined in 19th-century America as a result of technical improvements that enhanced the original stiff wooden frame with materials such as fluted metal sheets and rubber. The washboard's modest size, portability, and effectiveness swiftly elevated it to household necessity status. Its simplicity, as well as soap's rising accessibility and cost.

The process of washing garments and other materials is known as laundry. Various areas of inquiry are interested in the ways in which different civilizations have coped with this basic human desire. Laundry has been a part of history since humans first started wearing clothes, therefore the techniques by which different civilizations have dealt with this fundamental human necessity are of interest to a variety of academic areas. Laundry labour has traditionally been extremely gendered, with women performing the majority of the work in most nations. As the Industrial Revolution advanced, laundry labour became more mechanised. The first electric-powered washing machine debuted in 1908, while the first automated washing machines debuted in 1951. The washing machine, along with a slew of other laundry equipment designed to make life easier and improve the quality of laundry, such as electric dryers, irons, and a variety of clotheslines and other hanging systems, is still a mainstay in many modern homes.

The majority of workaholics nowadays do not have enough time to do their laundry at home. Some of them may do the laundry on weekends, while others do it every day, which consumes more energy and leaves the individuals exhausted. To address this issue, several businessmen opened a laundry shop to assist people with their laundry. It not only has a washer, but also a dryer. This concept is excellent and incredible since it allows individuals to save time and energy. The people always use the laundry shop and just waiting for the machine to stop spinning. Sometimes, they do not notice when their laundry has done. One of the alternatives to ease the customers is develop the development of a laundry notification system which is it will attempt to solve the problem of alerting the user about the state of their laundry. The detail of this development will discuss in the problem statement.

1.2 Problem Statement

People nowadays are very workaholics and less doing the house chores especially teenagers. Most of them just throwing filthy clothes on the floor, picking them a few days later, and dumping them into the washing machine is as simple as that. Doing laundry at home is a fantastic alternative for most people, there are instances when you won't be able to do so due to a variety of factors, including tight work schedules that leave individuals too exhausted to do anything else. Apart from that, while doing our own laundry at a laundry shop might be a smart way to save energy, it can also be rather time-consuming. In Malaysia, there are many laundromats, but there is no notification system that is implemented in the laundry shop to notify customers when their washer or dryer is finished. They may be unaware of the exact time when their washing machine is done. Besides, some individuals will refuse to move the clothes or other belongings out of the washing machine or dryer since it would cause more problems. This development is one of the methods to alert users about the status of their washing machine by applying the Blynk application. Every laundromat has a Wi-Fi connection, but it is just used to spend people's time scrolling the social media or replying to the text while waiting for their washer or dryer done. This development also can make changes to the system at all the laundromats. The Blynk application was created with the Internet of Things in mind. It has the ability to manage hardware remotely. The NodeMCU will be able to connect to the internet and this is due to the fact that the NodeMCU will require an Ethernet or Wi-Fi connection to communicate.

1.3 Project Objective

The aim of this project is to develop a laundry notification system with IoT. There are three objectives as listed below:

- To implement a laundry notification system that can be accessed by using the Blynk application.
- To analyse the maximum distance range between the Blynk application and the washing machine module.
- To Identify the effective development of the notification system on laundromats users.

1.4 Scope of Project

The target of this project is to create an IoT-based laundry notification system. In general, this project combines IoT technologies with the Blynk application to provide the notification via smartphone to ease the laundry user. Before using the laundry service, the laundry's users need to enter their information into the Blynk application either to sign up or log in by using the Wi-Fi provided which is usually available at all the laundromats displayed on the wall. This development is important especially for people who are kind of less sensitive to time. This will affect the next user to use the machine on time without wasting their time waiting for the owner to take out the clothes from the machine. This concept might potentially be utilized to make it easier for users to be alerted at their laundry with user-friendly systems. According to (Sanmorino and Fajri, 2018), there are a variety of devices that may be used to create a notification system, including smartphones. The effectiveness of work that can be accomplished by smartphone users is impacted by the notification system.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The purpose of the literature review is to study and review the kind of projects that had been done by the engineers, students, and researchers. This chapter will cover the fundamental study related to the development of the laundry notification system with IoT. All the information and study based on the journals, articles, and websites that are written by other researchers can analyse and discuss to result in the desired outcome of this project. Therefore, this chapter is essential to study components, features and analyse the reliability that is used in the projects.

2.2 Previous Related Work

2.2.1 Monitoring System for a Network of Laundry Machine

Monitoring System for a Network of Laundry Machine by (Leire Murillo, 2018) stated that since the 19th century, people use the river as the main place to wash their clothes with their energy. Engineers were looking up this problem and made the evolution from riverside washing to current laundry systems using electronic components. In 1846, the first manual washing machine was patented and the features of the washing machine were built year by year such as spin-dry. In 1978, the modern washing machine was growing up with the first microchip-controlled system. Millions of people, especially housekeepers, may benefit and be made more comfortable by using modern washing machines. A smart drive machine was developed in 1998, which means that the washing machine can monitor each load, use less water, and operate with fewer moving parts.

Windows IoT is a full version with Enterprise-grade safety, according to (Leire Murillo, 2018) so it can protect the system from illegal disclosure. It also comes with a version of Windows 10 that is designed for IoT development. Windows IoT is only compatible with Universal Windows Phone (UWP) or low-power applications which have 2 GB of storage and 256 MB of RAM. Both Windows security features, such as Windows Information Protection (WIP) and powerful two-factor authentication, are supported by UWP apps. By allowing only authorized applications to operate on the computer, enterprise-grade protection prevents the system from illegal disclosure and provides higher malware resistance. Original Equipment Manufacturers (OEMs) can lock down devices with specific applications in Windows 10 to ensure that they function as intended.

The industrial PC (IPC) is the best option for this project because it satisfies the demands of the current device and adapts to new features. Even it has the same features as a commercial PC but it is one of the fantastic devices. IPCs are designed to last a long time. Instead of plastic, the frame is lined with steel or aluminium. IPCs are adaptable, which means they can run in situations that a traditional PC cannot. Air, high temperatures, and dusty environments are also potential working environments for IPC. It is possible to provide fanless and wireless systems. The absence of wires or plastic fans is advantageous in conditions where there is a lot of friction or shock. A fanless computer may be enclosed, preventing dust from entering. Industrial PCs are more expensive than commercial PCs, but they need less maintenance and it uses less energy than a commercial PC.

Industrial PC (IPC) will be equipped with Quick Response (QR) codes to make the system work. Mobile devices can read and understand QR codes. It will provide additional detail about the facility, making it easier for customers to learn about the laundry's plans or to fill out contact information to access the laundry. The details are then easily sent to the user's device. QR codes have been used as a one-time password (OTP). It makes it more

difficult to gain unauthorized access to restricted resources. QR code will verify the user's information such as the phone number, name, address, and the way to make the payment. Once the people successfully verify the information, they can use the laundry and will get the notification once the laundry service is done. In this project, the author said that they build an app called Electrolux. The first access to the program, the logging method, getting input from the user, and connecting to the database are the key differences among the new features. The app's main page will show an Electrolux logo and a button for scanning the QR code. This will open the reader, and a screen for user information will appear after the information has been verified. Those screens' design can be seen in Figure 2.1.

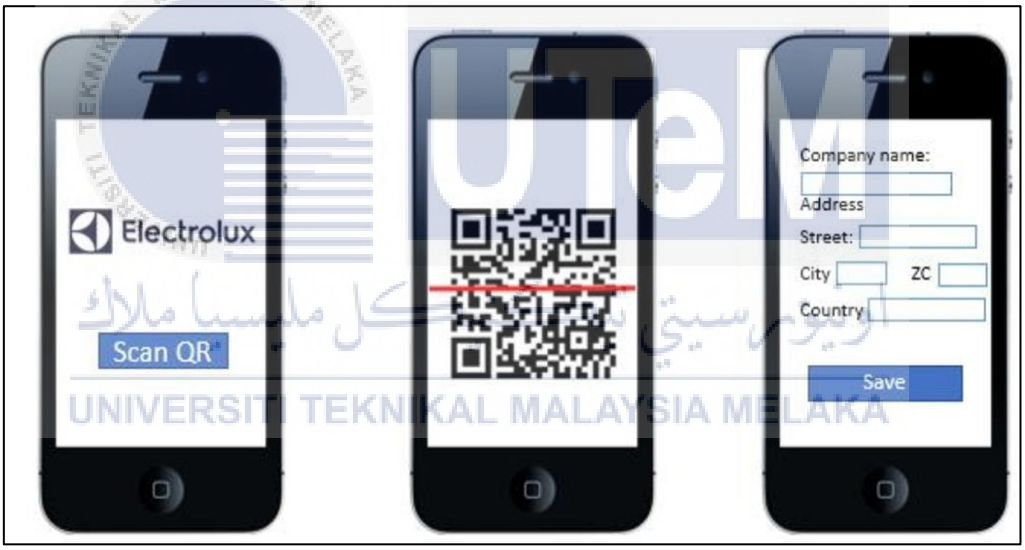

Figure 2.1:Design of the three first screens that stated by (Leire Murillo, 2018)

Two steps will be taken to verify the QR code. The first step is to know about the structure of the data gathered. The second stage not only distinguishes users so that they do not have access to each other's devices but also adds a layer of authentication. QR codes will be written on the PC for this purpose, and the PC will have access to and a verification code based on the address. This is equivalent to the parity bit of data processing, which uses the