RASPBERRY PI QUEUE MANAGEMENT SYSTEM

WITH NOTIFICATION

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RASPBERRY PI QUEUE MANAGEMENT SYSTEM

WITH NOTIFICATION

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This report is submitted in partial fulfilment of the requirements for the Bachelor of Computer Science (Software Development)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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2017

DECLARATION

I hereby declare that this project report entitled

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is written by me and is my own effort and

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Supervisor: _____ Date: 22/8/2017

DEDICATION

This project is dedicated to the memory of my grandfather Mr. Lee, a lovely grandpa whom I miss always.

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It is a genuine pleasure to express my deepest gratitude to my supervisor of this project, En. Mohd Hariz bin Naim @ Mohayat of the Faculty of Information and Communication Technology (FTMK) at Universiti Teknikal Malaysia Melaka (UTeM), for guiding me with patience and giving necessary advices throughout the project. His dedication and attention have served as a significant contributor of this project.

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ABSTRACT

Raspberry Pi Queue Management System with Notification is the title proposed in this project. The purpose of this system is to print queue number for the customers and to notify them by using Firebase Cloud Messaging (FCM) when it comes to their turn. The system is designed where the Raspberry Pi which is directly connected to the printer will generate and print a queue ticket which contain a QR code and queue number on it. Customers are required to scan the QR code on the ticket to activate the notification. Nowadays, token display system is built in the waiting area, such as in bank or post office. However, the token display machines are not necessarily being seen by all of the customers. Therefore, the system has been designed to notify the customers about their turn to be served when the counter officer calling for them. Moreover, customers are not aware of their turn after taking the queue number. This issue is currently happening especially nowadays most of the people looking at their smartphones while waiting, which lead to phenomenon where the customers missed their queue. Thus, the system is developed with the implementation of multiple native applications with the centralized database, where the customer's smartphone with the mobile application installed can act as a notification tool as well. The methodology used in this project is waterfall method. Waterfall method is a process model where the project will be developed step by step as the following: requirement analysis, system design, implementation, testing, deployment and maintenance. The output of this system is the contingency minimization of the customer who missed their queue doing something or off to somewhere. All the platforms are connected to the real-time database which is Firebase. This system is expected to improve customer experience and reduce the occurrence of customers which constantly looking at the token display system.

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ABSTRAK

Sistem Pengurusan Beratur Raspberry Pi dengan Pemberitahuan adalah tajuk bagi projek ini. Tujuan perlaksanaan projek ini adalah untuk mencetakkan tiket barisan kepada pelanggan dan apabila giliran pelanggan telah sampai, Firebase Cloud Messaging (FCM) akan memberikan notis kepada pelanggan tersebut. Sistem ini telah direka bentuk di mana mesin pencetak yang dipasangkan kepada Raspberry Pi akan menjanakan dan mencetakkan tiket barisan yang mempunyai Kod QR dan nombor barisan. Sedasawarsa ini, sistem paparan token telah dipasangkan di tempat penungguan giliran, seperti di dalam bank dan pejabat pos. Namun, bukannya mesin paparan token dapat dinampak oleh setiap pelanggan yang sedang menunggu. Rentetan itu, sistem ini telah direka bentuk untuk memberikan notis kepada pelanggan tentang giliran mereka untuk perkhidmatan. Di samping itu, pelanggan tidak memberikan perhatian tentang giliran mereka selepas mendapatkan nombor barisan. Fenomena ini masih sedang berlaku terutamanya telefon pintar merupakan alat yang tidak dapat diasingkan dari masyarakat dalam era kemajuan teknologi informasi dan komunikasi ini. Senario ini telah mengakibatkan sesetengah pelanggan telah terlepas giliran mereka. Oleh itu, sistem ini telah dibangunkan dengan implementasi beberapa aplikasi native yang mempunyai pangkalan data berpusat, di mana telefon pintar pelanggan boleh dijadikan sebagai alat pemberian notis juga. Metodologi projek ini adalah aliran kerja model waterfall. Aliran kerja model waterfall adalah sejenis model proses di mana projek akan dibangunkan mengikuti selangkah demi selangkah seperti berikut: analisis, reka bentuk, implementasi, pembangunan, pengujian dan penyelenggaraan. Output projek ini adalah meminimumkan senario di mana pelanggan yang sedang melakukan sesuatu atau berada di sesetengah tempat terlepas dengn gilirannya. Semua platform adalah disambungkan dengan pangkalan data yang tersedia dalam masa nyata, iaitu Firebase. Sistem ini dijangka untuk meningkatkan pengalaman pelanggan selain mengurangkan ketidakselesaan pelanggan yang kena selalu memandangkan ke arah mesin paparan token.

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CHAPTER I

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CHAPTER I

INTRODUCTION

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1.1 Introduction

Raspberry Pi Queue Management System with Notification is the title proposed in this project. The purpose of this system is to print a queue number for the customers and to notify them when it comes to their turn. The queue management system is designed user-friendly where the system will print a queue ticket which contain a QR code on it for the customers. Customers are required to scan the QR code on the ticket to activate the notification. When it is customer's turn, the system will send a notification to the customers' phone to notify the customers by instant messaging system. Thus, customers can away from the bank after get the queue number to settle their stuffs while at the same time waiting for their queue.

1.2 Problem Statement

- Customers not aware of their turn after taking queue number

Customers tend to do something or even away from their seat to somewhere else due to long queue to reach their turn. As a consequence, they missed their turn and have to retake the queue number.

- Token display system not necessarily being seen by all customers

The token display system has limited view of angle to be seen by the customers. Even some customers who are at their seats need to stand up to take a look at the token display especially when there is a crowd. This situation is causing an uneasy condition for those customers while waiting for their turn.

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1.3 Objective

- To notify customers about their turn for service at the counter

As many customers distracted from waiting their number, most of the customers are playing with the smartphone nowadays. The system with notification is provided with Firebase Cloud Messaging (FCM) service which will automatically inform the customers when the counter calling for them.

- To make recommendation based on bank number queuing system

Bad design of the token display system for example in the bank and post office, most of the customers mostly tend to pay more attention on the phone while waiting for their turn instead of keep constantly looking at the token display system view. Therefore, from the perspective of customers and queuing management view, in spite of focusing on certain group of people, this queuing management system with notification allow

the customers to choose whether to activate the notification or not. This will not only take care of people who looking at phone, desperately waiting for their turn, this system also thought about people with no smartphone where the QR code scanning part to activate the notification is not a necessarily for them.

1.4 Scope

- Customers with smartphones

Most of the customers look at their phone whenever there is long queue at a certain place, no matter restaurant, mall or bank. Some customers who are so pay attention to their phone tend to miss out their turn. This situation will need them to retake the queue number. This will bring difficulties and bad user experience to the customers. With this system, even customers look at phone, they will still be reminded by the messaging automated by the system.

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1.5 Project Significance

This project will develop a system that will bring convenient for the customers that need to queue, for example bank and post office. This system will prevent the customers from missing their turn in the queue. This will indirectly improve customer flow and efficiency of the line.

1.6 Expected Output

The customers are able to receive instant messaging notification that is sent by the system through Firebase Cloud Messaging (FCM). Customers are able to choose whether to activate the notification or not to activate.

1.7 Conclusion

In conclusion, the queue management system with notification will improve customers convenient and comfortability while waiting for their turn to be served. Customers are able to have their time on other stuffs such as reply messages, or read some articles while waiting.

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CHAPTER II

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CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

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2.1 Introduction

As mentioned in the previous chapter, this project is about queue management system with feature that allow the customer to choose whether activate the notification using Android application. The notification will be sent by the Raspberry Pi through Firebase Cloud Messaging (FCM) system to the customer when his turn to be served arrived.

Additionally, this chapter will concentrate on the domain, Internet of Thing. The reason of Raspberry Pi being chosen and the facts and finding of this project will be discussed as well. Also, existing system will be compared with the project system. Moreover, the techniques and method to complete the project including project requirements and project schedule and milestones will be stated.

2.2 Facts and Findings

For this project, many aspects are being considered in decision making in the project planning. Those aspects including the domain, general finding and the comment on availability of the current existing system.

2.2.1 Domain

2.2.1.1 Internet of Thing (IoT)

The Internet of Thing is a standard or perspective where objects around us are able to communicate with each other or the other electronic items connected to the Internet to complete some tasks. Cannot be denied that Internet plays and important role in the Internet of Thing. As an addition, the existence of IPV6 has bring some remarkable functional development in increasing the address space of the Internet of Thing.

In the early 1800s, the electromagnetic telegraph creation by Baron Schilling and the further development in the same field leads to the introduction of Internet of Thing (IoT) by Kevin Ashton, the MIT Auto-ID Center executive director. The official name is announced in year 1999. Network is the main component of Internet of Thing.

As Mr. Ashton said:

"Today computers, and, therefore, the Internet, are almost wholly dependent on human beings for information. Nearly all of the roughly 50 petabytes (a petabyte is 1,024 terabytes) of data available on the Internet were first captured and created by human beings by typing, pressing a record button, taking a digital picture or scanning a bar code." (Mr. Ashton, 1999)

When the Internet of Thing is able to connect any device, any device such as the watch which is able to track the owner sleeping hours to analyze the owner's sleeping habit, interrupted sleep and sleep stages. *(Sleep Tracking, Wearable Technology, and Opportunities for Research and Clinical Care, September 2016)*