RASPBERRY PI SMART CONVOCATION SYSTEM WITH RFID

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RASPBERRY PI SMART CONVOCATION SYSTEM USING RFID

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This report is submitted in partial fulfillment of the requirement for the

Bachelor of Computer Science (Computer Networking)

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

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2016

DECLARATION

I hereby declare that this project report entitled

RASPBERRY PI SMART CONVOCATION SYSTEM USING RFID

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT: _____ Date: 24/08/16

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I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of Computer Science (Computer Networking) With Honours.

SUPERVISOR: _____ Date: 24/08/16

(DR. NORHARYATI BINTI HARUM)

DEDICATION

This work is dedicated to my beloved family and siblings who passed on a love of reading and respect for education. To my supportive supervisor and my friends, a million thanks for assist and help.

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ABSTRACT

This project is about to develop a new system convocation with combination two technologies which are Raspberry PI and RFID. The purpose of this system was to avoid human speech error also to reduce time and staff involve during convocation held. Overall this system is a system that easy to use and can be implement to any institution's convocation.

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ABSTRAK

Projek ini adalah mengenai pembangunan satu sistem baru konvokesyen dengan kombinasi dua teknologi iaitu Raspberry PI dan RFID. Tujuan sistem ini adalah untuk mengelak kesilapan pihak jurucakap berucap. Disamping itu, untuk mengurangkan masa dan kakitangan yang terlibat semasa konvokesyen berlangsung. Keseluruhan sistem ini adalah satu sistem yang mudah untuk digunakan dan boleh dilaksana di mana-mana institusi konvokesyen.

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CHAPTER 1

1. INTRODUCTION

1.1 Project Background

Each year academic organization such as Universiti Teknikal Malaysia Melaka (UTeM) has held the convocation for students who have end of teaching in the university. During the convocation ceremony is important for a graduate. Graduates who stood on the stage are feeling very happy. This is one of the most beautiful memories in the life of person. In addition, the audience attending the convocation from the outside, including family and friends of graduates will be pride and will also be associated with each image universities.

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Accordingly, various techniques have been used to ensure that the convocation will implement smoothly. Appropriate technology will be used to reduce complexity in the work of the management convocation. Thus, mistake during convocation time information can be further reduced. Currently, UTeM manages the convocation manually without using any devices. The graduated student needs to line up according list name by alphabetic order.

In this project is Radio frequency identification (RFID) wristband and Raspberry Pi will be used. RFID is identification technology based on radio waves. This technology is able to confirm the various objects without required direct contact or

within a short distance. RFID wristband can be used for repeat usage and it is comfortable when worn for extended periods of time. While for Raspberry Pi effectively used to store information of graduated student. The small size makes for an easy-to-hide computer that save power and can be mounted behind the display with an appropriate case.

1.2 Problem Statements (PS)

We develop this project based on following problem statement. The Research Problem (RP) is summarized into Table 1.1.

Table 1.1: Summaries of Research Problems

No	Research Problems
RP1	Emcees need to read the graduated name's according list name that may occur human speech error.
RP2	The graduated have to line up in alphabetical order that may lead time consuming to arrange.
RP3	Graduated picture's follow up according to list name that need many staff involve.

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1.3 Project Questions (PQ)

RQ1: Identifying the current convocation system in UTeM

This research question is about to understanding technique to recognize the current convocation system in UTeM.

RQ2: Which suitable method that can reduce the problem during convocation?

This research question is about to develop a new system that can reduce problem during convocation held.

RQ3: How to verify the system and technology able to work?

This research question is about to verify the system and technology can able to work together.

Table 1.2: Summary of Research Questions

RP	RQ	Research Questions
RP1	RQ1	How to identify the current convocation system in UTeM?
RP2	RQ2	Which suitable method that can reduce the problem during convocation?
RP3	RQ3	How to verify the system and technology able to work?

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1.4 Project Objective (PO)

The objective of this project is to make sure that this system will reach the goals. The objectives are stated as below:

RO1: To study current system UTeM used.

Understand the current system that UTeM use.

RO2: To develop a new smart convocation system by using Raspberry Pi that can reduce staff involved, time consuming and human speech error.

Develop a new system that can reduce problem stated.

RO3: To verify the system and technology use able to run smoothly.

Ensure the system and technology able to work functionally.

Table 1.3: Summary of Research Objective

RP	RQ	RO	Research Objectives
RP1	RQ1	RO1	To study current system UTeM used.
RP2	RQ2	RO2	To develop a new smart convocation system by using Raspberry Pi that can reduce staff involved, time consuming and human speech error.
RP3	RQ3	RO3	To verify the system and technology use able to run smoothly.

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1.5 Project Scope

The scope of this project is going to be conducted by using the Raspberry Pi Model B+ with operating system New Out of the Box Software (NOOBS) which is containing Raspbian. Another hardware use for this project is EXPLORE-NFC-WW that acts as a reader to detect the RFID wristband. To implement of this system, this project use programing language java scripts to build the system while MySQL use to store the information.

1.6 Project Contribution

This system was developed to improve the current system with using new methods and technologies in the delivery process. Results from reviews and observations been carried out, the idea arise to develop a system that can coordinate system database to solve the problems.

With this system, the flow convocation will become more systematic and effective manner. Alteration of data and information is also more convenient. Through this system, the convocation will run smoothly.

Table 1.4: Project Contribution

PS	PQ	PO	PC	Project Contributions
PS1	PQ1	PO1	PC1	Improve the current system used.
PS2	PQ2	PO2	PC2	Build a new system with database.
PS3	PQ3	PO3	PC3	New method and technologies in the delivery process able to work appropriately

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1.7 Thesis Organization

1.8 Conclusion

In general, from this project, a new system develops with database by using various method and technologies to reduce staff.

CHAPTER 2

2. LITERATURE REVIEW

2.1 Introduction

In this project is RFID Wristband and Raspberry Pi will be used. RFID is identification technology based on radio waves. This technology is able to confirm the various objects without required direct contact or within a short distance. RFID wristband is use for repeat usage and it is comfortable when it attach to student's wristband. While for Raspberry Pi effectively use to store information of graduation and display to screen together with names of graduation's sound and graduation's image. Moreover, with its small size it can be carried anywhere.

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2.2 Related Work/Previous Work

2.2.1 RFID

Figure 2.2.1: RFID

Figure 2.2.2: RFID wristband

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Radio frequency identification, or RFID, is a generic term for technologies that use radio waves to automatically identify people or objects. The system development will be advanced its performance through the concept of scan the RFID tag and computerized system can make the delivery certificate via RFID technology more efficient, excellent and advanced related to reduce the work overlapping.

RFID technology is similar to the bar code system used in most shopping malls. The difference between the two systems is scanning the bar code system requires code every time they want to be identified, while RFID technology to identify the object automatically when it is in the area ranged in radio waves.

Most of the methods used to identify based on serial number and some of the most important information objects stored in the microchip attached to the wristband. It is called RFID tag. RFID wristband allows the chip to deliver data to the RFID reader. RFID readers have turned radio waves received from the RFID tag into digital information that sent to Raspberry Pi for further operations.

RFID wristband is a security wristband. The chips embed in the wristband allows identity verification to capture data either it in front or at the back wristband. However, RFID wristband is suitable for events. So, with this function, it suit for convocation ceremony. It is because RFID wristband printed with several of color and graphical image. RFID wristband has many optional wristbands' types such as silicone RFID wristbands, Woven RFID wristband and Photo Image RFID wristband. Each of it has different function. In this project RFID wristband will worn by graduated student. While RFID Reader used for read RFID wristband.

2.2.2 Raspberry Pi

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Figure 2.2.3: Raspberry Pi

Raspberry Pi is a small size of computer. It shows that it is convenient; it can carry anywhere and anytime. Raspberry Pi can use no matter of age whether young or old to learn how its program and how the computer works nowadays. Raspberry Pi use programming language such as Python and Scratch. Raspberry Pi exactly works as same like computer, it still can surf internet, play video, play music and word processing such as Word, PowerPoint, Excel and even Access.

Raspberry Pi has many models such as Modal A+, Modal B+, Pi 2 and Pi 3. All the models have different specification. Modal A+ has low cost variation of Raspberry Pi. It has 256MB of RAM, 1 USB port only, 40 GPIO Pins and not provides Ethernet port. However, The Model B+ has 512MB RAM, 4 USB ports, 40 GPIO Pins, and required Ethernet port.

Early February 2015, it was replaced by the Pi 2 Model B; it is the second generation of the Raspberry Pi. The Pi 2, shares many specification but it uses a 900MHz quad-core ARM Cortex-A7 CPU and has 1GB RAM only. The Pi 2 is very compatible and due to its flexibility for the learning. Latest, The Pi 3 Model B was launched in two months ago, it uses a 1.2GHz 64-bit quad-core ARM Cortex-A53 CPU, 1GB RAM, build in 802.11n wireless LAN, and Bluetooth 4.1.

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Raspberry Pi run in Raspbian based on Debian operating system. For beginner, it easy to use by using NOOBS (New Out Of Box Software). Arduino and Raspberry Pi have different perspective. Mostly Arduino is a microcontroller and it works on the electronics projects but Raspberry Pi works on Linux operating system. Using Raspberry Pi many things we can do such as learn the program, with 10 inch tablet can make a touchscreen Raspberry Pi. Inside Raspberry Pi we can play games. The famous game inside Raspberry is Minecraft. In this project, Raspberry Pi Model B+ will be used.