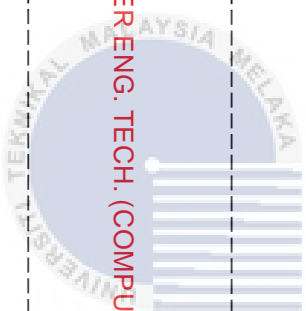


DEVELOPMENT OF RFID
JUKEBOX FOR CHILDREN USING
MICROCONTROLLER



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021



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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

B071710223

BACHELOR OF COMPUTER ENG. TECH. (COMPUTER SYSTEMS)

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT OF RFID JUKEBOX FOR CHILDREN
USING MICROCONTROLLER**

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 (Computer System) with Honours.

by
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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Computer Engineering Technology (Computer System) with Honours. The member of the supervisory is as follow:



ABSTRAK

Muzik sentiasa menjadi sumber hiburan bagi manusia tanpa mengira usia. Di dalam era globalisasi kini, dengan menggabungkan muzik dan teknologi ia boleh mencipta sebuah gaya hidup yang baru kepada manusia. Dengan melaksanakannya, ia dapat memberi manfaat kepada orang di seluruh dunia terutama untuk mengembangkan pertumbuhan anak-anak kecil. Projek ini pada dasarnya adalah jukebox yang boleh dimainkan oleh anak-anak sendiri tanpa bantuan ibu bapa mereka. Projek ini membolehkan anak-anak bermain dengan diri sendiri tanpa pertolongan oleh ibu bapa mereka. Projek ini membolehkan anak-anak memainkan muzik dengan hanya menyentuh kad RFID pada kotak dan muzik akan memainkan spesifik lagu berdasarkan id kad RFID. Objektif penyelidikan ini adalah untuk selidik permasalahan yang berlaku dari perspektif ibu bapa dan anak-anak di dalam rumah dan untuk mewujudkan satu jukebox yang dapat memainkan lagu dengan kad RFID dan juga untuk menilai kebolehgunaan RFID Jukebox pada kanak-kanak. Dalam projek RFID Jukebox ini, ia menggunakan Arduino Uno mikrokontroller, Cytron Easy MP3 Shield, Pembaca Kad RC522 RFID, Pembesar Suara, Butang Suis, Bank Kuasa, Pemacu Pena dan Kad RFID. Hasil yang dapat disimpulkan iaitu dengan merujuk kepada kajian yang telah dilakukan dan juga dengan mengikuti kaedah yang tepat untuk menghasilkan produk akhir dari projek ini iaitu RFID Jukebox.

ABSTRACT

Music has always been a source of entertainment for human beings, regardless of age. In this new era of technology, combining music and technology can create a new lifestyle for people. By implementing this, it can benefit people around the world, especially in developing the growth of young children. This project is about the development of a jukebox that children can play with themselves without requiring any help from their parents. This project can let the children play the music just by tapping the RFID card onto the box, and the music will be played according to the song associated with the specific RFID id. The objectives of this research are; first to investigate the issues and the problem from the perspective of the parents and the children in the households, second, to develop a jukebox that can play a song with a RFID card, and third, to evaluate the usability of the RFID Jukebox within the children. In this project, the RFID Jukebox is using Arduino Uno microcontroller, Cytron Easy MP3 Shield, RC522 RFID Card Reader, Speaker, Switch Button, Power Bank, Pendrive and RFID Card. The result is concluded by referring to the research that had been done and also by following the right method to produce the end product of this project which is RFID Jukebox.

DEDICATION

To Umi & Abah

To my beloved parents the strong and gentle souls who taught me to trust in Allah SWT, believe in hard work, and never give up!

To my supervisor,

His contribution and guidance have raised the quality of this thesis. He always supported me and have given me enthusiasm for research. He has patiently guided me. I am very grateful to his supervision and I owe him the greatest degree of appreciation.

To my siblings

Thanks for trusting and loving me, that's the greatest things that keep me going

To my friends

Thanks for all the support and help that given to me to keep me doing well in this thesis

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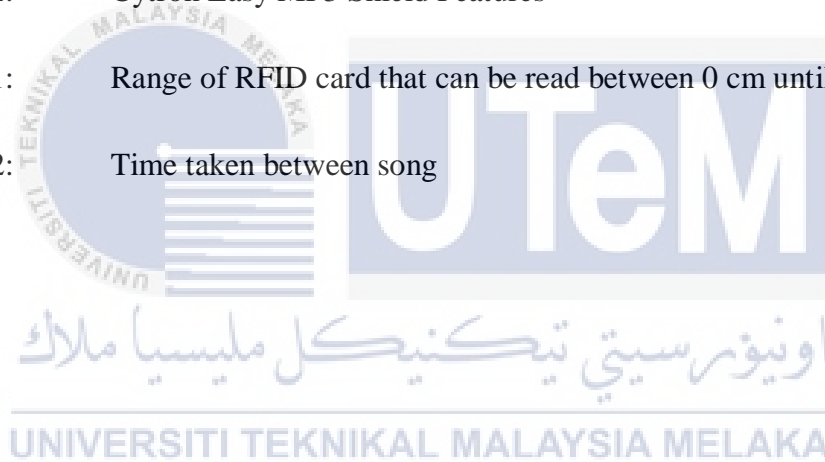
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LIST OF ABBREVIATIONS

RFID	Principal Component Analysis
PC	Personal computer
CPU	Central processing unit
ID	Identification
USB	Universal serial bus
OS	Operating System
IDE	Integrated Development Environment
HDD	Hard Disk Drive
I/O	Input / Output
RAM	Random Access Memory
AC	Alternating Current
DC	Direct Current
ICSP	In Circuit Serial Programming
PWM	Pulse Width Modulation
NFC	Near Field Communication
LF	Low Frequency
HF	High Frequency
UHF	Ultra-High Frequency
DAC	Digital to Analog Converter
PCB	Printed Circuit Board

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will clarify more on how the possibility of this project is proposed. The portrayal of research factors and the main issue of the task will be detailed more within this chapter.

1.2 Background

Music is a source of entertainment for the people, regardless of any age. Entertainment is anything that gives enjoyment to the people. Almost all of us need some sort of entertainment in life. Also, the benefit of the music for the children at an early age is very effective for their brain. University of Southern California Brain and Creativity Institute in 2016 had found that musical experiences in childhood can accelerate brain development, particularly in the areas of language acquisition and reading skills. Music also can trigger all areas of child development and their qualifications for school readiness, including intellectual, social-emotional, motor, language, and overall literacy. It helps the body and mind work together.

Exposing children to music during early development can help them learn the sounds and meanings of words. Dancing to music helps children build motor skills while allowing them to practice self-expression. For children and adults, music helps strengthen memory skills

Nowadays, we live in an era where technology is everywhere around our environment. The technology lets the human interact or communicate with the machine. Therefore, by implementing technology with music, it can develop a new way of life for the next generation. The children of a young age can be exposed by this element and let them enjoy and learn a lot of benefit from this technology.

There are many ways, on how the music can be disseminated to the people. One of them is through radio or jukebox. It can help the people to hear the song that is playing through the speaker on it. Also, there are many kinds of toys that have been created for the children for many years, which include the feature of a contactless technology such as RFID. So for the kids or children by using the RFID card, and simply touch the card to the sensor, it will play the song that they want.

Thus, the idea of integrating these elements of RFID Jukebox is hopefully to help the children to gain more information on how to use the technology in a simple, easy, and interactive way.

1.3 Problem Statement

The problems that can be identified is when the children do not know how to use the Internet to find the song that he or she likes. The children are likely to get attracted to their surroundings, especially when they see or heard something that makes them focus on it. For example, the kids are watching the television, and the tv show is playing considerably good music, which eventually causes the children to like the song. When the children want to listen to their favorite song again, they will need to wait for the tv show to be telecasted again on the television, which is quite irritating.

Furthermore, the children will need guidance from their parents to use or play with a machine or gadget. So, when they want to hear the song, the parents will need to open it on their gadgets so that their kids can hear the song. This also will make the parent not have their time because they need to be around their kids. For example, when the parents have a lot of workloads or in a hurry of doing something, and at the same time, their children want to listen to a song, this will make the parents unable to finish their task because they need to assist their kids

1.4 Project Objectives

The main objectives of this project are listed as below:

1. To investigate the issues and the problem from the perspective of the parents and the children.
2. To develop a jukebox that play song with a RFID card, called RFID Jukebox
3. To analyze the functionality of the RFID Jukebox on children.

1.5 Project Scope

This project will cover several scope of development, that are:

1. This application is to be used by children around the world.
2. The RFID card that contains the data of a specific song.
3. A database reader that will read the RFID card.
4. Sorting function on how the music is playing between the RFID card

1.6 Expected Project Outcome

The expected outcomes from this project are:

1. To ensure children getting a piece of knowledge to a machine.
2. To let the children, choose and play any song that they want.
3. To make the children explore the machines by themselves.

1.7 Project Planning

Table 1.3 and 1.4 shows how the project is scheduled.

Table 1.1 Project Milestone for Semester 6

Task / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mutual Acceptance (F1)			■											
Proposal Outline Form (F2)			■											
Writing Chapter 1			■	■										
Chapter 1 Submission					■	■								
Writing Chapter 2					■	■	■							
Chapter 2 Submission								■	■					
Mock Presentation										■	■			
Writing Chapter 3											■	■		
Chapter 3 Submission													■	■
Plagiarism Checking														
Full report														
Final Proposal Presentation														
Project in Progress (F3)														
Writing Proposal Report														

Table 1.1 Project Milestone for Semester 7

Task / Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Data Collection	■													
Build Interface	■	■												
Develop Algorithm			■	■	■	■								
Writing Chapter 4							■	■	■	■				
System Testing											■	■		
Writing Chapter 5												■	■	
Writing Chapter 6														■
Full Report														
Plagiarism Checking														