UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Faculty of Electrical and Electronic Engineering Technology

SMART SHOPPING CART USING RFID AND ARDUINO

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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Bachelor of Electrical Engineering Technology with Honours

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SMART SHOPPING CART USING RFID AND ARDUINO

MUHAMMAD HAFIZI BIN MD YUSOF

A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electrical Engineering Technology with Honours

Faculty of Electrical and Electronic Engineering Technology

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I declare that this project report entitled “Smart Shopping Cart Using RFID and Arduino” 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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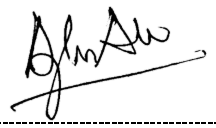
Signature : 

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DEDICATION

To This is dedicated to my beloved mother, Suzana Binti Johari, father, md yusof bin md nor and my siblings, Fatin Najeeha, NurAlia Syafiqah and, Muhammad Iman Hariss .Praise be to Allah SWT, that I am part of this supportive family. Thank you for your advice and best wishes towards me.

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ABSTRACT

Nowadays, buying and searching for products at shopping malls are turning into a daily activity in cities. We can see many number of people shopping at malls on holidays and weekends. The rush happens when there are special offers and discounts. People purchase completely various things and place them in trolley. After total purchase, one must visit the billing counter for billing and making payments. In the billing counter, the cashier prepares the bill victimization bar code reader that might be a time overwhelming method and leads to long queues at billing counters. This project targeted to minimize the queue at a billing counter in a shopping mall. The smart shopping cart does the same by displaying the total price of the product kept inside the cart. In this way, the customer can directly pay the amount either in-app or in the billing counter and leave with the commodities he/she has bought. The hardware relies on Arduino Nano, RFID Reader Module, RFID Card, and Buzzer. Eliminates the normal scanning of products at the counter and in turn speeds up the entire process of shopping is easy and also with this system, the customer shall know the total amount to be paid. Hence the customer can plan his shopping only by buying the essential commodities according to his savings. Since the entire process of billing is based on RFID, so it reduces the possibility of human error substantially. The system also has a feature to delete the scanned products by customers to further optimize the shopping experience .

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ABSTRAK

Kini, membeli dan mencari produk di pusat beli-belah bertukar menjadi aktiviti harian di bandar. Kita boleh melihat ramai orang membeli-belah di pusat membeli-belah pada hari cuti dan hujung minggu. Tergesa-gesa berlaku apabila terdapat tawaran istimewa dan diskaun. Orang ramai membeli sepenuhnya pelbagai barangan dan meletakkannya di dalam troli. Selepas jumlah pembelian, seseorang mesti melawat kaunter pengebilan untuk pengebilan dan membuat pembayaran. Di kaunter pengebilan, juruwang menyediakan pembaca kod bar penganiayaan bil yang mungkin merupakan kaedah yang membebankan masa dan membawa kepada beratur panjang di kaunter pengebilan. Kertas kerja ini menyasarkan untuk meminimumkan Baris di kaunter pengebilan di pusat beli-belah. Troli beli-belah pintar melakukan perkara yang sama dengan memaparkan jumlah harga produk yang disimpan di dalam troli. Dengan cara ini, pelanggan boleh membayar terus jumlah sama ada dalam apl atau di kaunter pengebilan dan pergi bersama komoditi yang telah dibelinya. Perkakasan bergantung pada Arduino Nano, Modul Pembaca RFID, Kad RFID dan Buzzer. Ia menghapuskan pengimbasan biasa produk di kaunter dan seterusnya mempercepatkan keseluruhan proses membeli-belah adalah mudah dan juga dengan sistem ini, pelanggan hendaklah mengetahui jumlah yang perlu dibayar. Oleh itu, pelanggan boleh merancang pembeliannya hanya dengan membeli barangan keperluan mengikut simpanannya. Memandangkan keseluruhan proses pengebilan adalah berdasarkan RFID, jadi ia mengurangkan kemungkinan kesilapan manusia dengan ketara. Sistem ini juga mempunyai ciri untuk memadamkan produk yang diimbas oleh pelanggan untuk mengoptimumkan lagi pengalaman membeli-belah .

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CHAPTER 1

INTRODUCTION

1.1 Background

Around the world, the number of shopping malls has expanded. Customers can experience issues with inadequate information about the product for sale and loss of time at the billing counters. Shopping centres use barcode standards in the current system. This method has replaced the prior manual methodology; however, it has drawbacks. A barcode scanner necessitates manual tracking, whereas RFID may be tracked automatically. Barcodes also necessitate a significant amount of manpower and human effort. Barcodes will be easily broken.

Not only that, but the Barcode method necessitates clients standing in long lines to have their products scanned and bills generated. The use of Arduino and RFID in a smart shopping cart could be a breakthrough in the field of Supply Chain Optimization. This strategy will not only allow you to avoid long lines in supermarkets and shopping malls, but it will also allow you to save a lot of time for the customers.

In addition, the technology assists the consumer in saving money. When scanning products, the system uses RFID tags rather than barcode tags, which are far more efficient and powerful.The globe is presently dealing with a covid 19 epidemic. This is one method for reducing traffic congestion at the store. Not only that, but this project will limit the amount of touching that occurs in supermarkets. We recognise that congestion somewhere will make the disease's symptoms easier to spread, and this initiative will help to decrease the disease's spread.

1.2 Problem Statement

People frequently face the dilemma of wasting too much time waiting in lines to be billed for their purchases in various shopping centres or supermarkets. Queuing has a bad effect on people's morale and can lead to misunderstandings or conflict, such as when someone cuts in line and stands in front of others.

The suggested proposal intends to solve this problem by presenting a creative alternative to existing invoicing systems that will expedite payment. Covid 19 is currently sweeping the globe. This is one method of reducing supermarket traffic congestion.

Not only that, but this project will eliminate supermarket contact. We are aware that congestion will make the disease's symptoms easier to spread, and this effort will help to decrease the disease's spread.

Furthermore, there is a problem with a supermarket's shortage of personnel, which makes the service procedure more difficult. Not only that, but this project aims to investigate the efficacy of using RFID in the buying and selling process.

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The next step in resolving the issue is to investigate the adoption of a modern technological system with a smart shopping cart. Customers will scan their own products, and the total amount will be calculated in the cart and displayed in the app. This will also provide shoppers with an estimate of how much their specific shopping session will cost. As a result, time and financial management will be addressed. There are five sections to the paper. The first segment provides a quick overview of the system. The second portion is concerned with shopping systems and, as a result, the investigation of associated current systems. The system's implementation is covered in the third segment. The fourth segment shows the outcomes of using the Arduino and an RFID-enabled device. Finally, the conclusion summarises the system's current and prospective scope.

1.3 Project Objective

The aim of this project is to propose smart shopping cart using rfid and arduino. The objectives to be achieved are:

- To study the project's effectiveness in a supermarket and see if it can help to reduce traffic congestion.
- Assisting in the reduction of a supermarket's labour and evaluating the efficiency of time and payment management.
- To study if employing RFID technology as a barcode scanner can help decrease the spread of the Covid-19 virus.
- To study the concept of a rfid system between scanned barcodes, which is easier.

1.4 Scope of Project

- The project Smart Shopping Cart Using Rfid and Arduino using card scanned as an item to scanned at Rfid.
- The RFID is a main component to get signal input from the card scanned as a using for the item. Type of Rfid is RC 522.
- This project used Arduino Nano as a main component for processing the system when Rfid get the signal input from card scanned to generate output at LCD.
- This project was created to make it easier for buyers to buy goods with the rfid technology.
- The card scanned must calibrate first to get the id number for each card scanned before using that card to scan at Rfid.

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- The distance card scanned can be detected from Rfid is between 0 cm – 2 cm.
- Buyers need to scan each item's card on the RFID when purchasing the item.
- After making a purchase, the rfid user needs to make a payment at the counter.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The study's overview was given in the first chapter. This chapter will concentrate on the study's literature review by offering background information and understanding research procedures from related academic articles from earlier studies. RFID is a new innovation that has recently become a serious concern for the research community due to the distinct advantages it gives over other existing recognisable proof and information detecting breakthroughs. RFID is a word used to describe systems that employ radio waves to naturally differentiate objects. RFID is a technology that allows information to be sent between labels and readers without a visible channel over distances of up to 10 metres, depending on the type of label used. Apart from the mentioned positive opinions, the evolution of this innovation from the early 1900's has also brought with it a number of issues. And the anticipated rationale for part is to look at the literature related to Radio frequency Identification in order to advance academic research and gain insight into some of the unique and pressing difficulties impeding the development of RFID technology. There is a pressing need to address these challenges in order to improve the RFID technology's perceptibility and item speed.

Table 2.1 History of Rfid

Decade	Event

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