UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT HUMAN MOVEMENT SUPPORT USING ANDROID TECHNOLOGY

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Electronic Engineering Technology (Industrial Electronic) with Honours.

by

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I hereby, declared this report entitled "Development Human Movement Support Using Android Technology" is the result of my own research except as cited in references.

Signature : _____

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Date : 20 DECEMBER 2016

APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirement for the degree of Bachelor of Electronic Engineering Technology (Industrial Electronics) with Honours. The member of the supervisory committee is as follow :

……

(Project Supervisor)

ABSTRAK

Setiap manusia mempunyai had dan keupayaan mereka sendiri terutamanya yang mempunyai kekurangan diri atau dalam perkataan lain kurang upaya. Ini akan mengehadkan kemampuan mereka bila bekerja yang boleh menyebabkan masalah jika mereka menghadapi halangan yang melebihi had mereka. Tujuan projek ini adalah untuk memudahkan kerja manusia atau melebihi keupayaan manusia terutama sekali dalam memuatkan atau mengangkat dengan menggunakan Teknologi Android. Dengan menggunakan Arduino sebagai mikro pengawal, ia akan bertindak sebagai satu medium antara peranti dan pengguna di mana penggunaan Bluetooth modul sebagai pemancar dan penerima. Micro pengawal akan menghantar signal untuk mengaktifkan pergerakan motor mengikut arahan diberi oleh pengguna. Ciri projek ini ialah ia boleh memuatkan beban sehingga 55 kg dan boleh dikawal sehingga 10 meter.

ABSTRACT

Every human have their own limits and capability especially those that have a natural limit or in other word disable. This would limit their ability when working which can lead to trouble if they were to encounter obstacle that are beyond their limit. The purpose of this project is to ease the human work or exceed beyond the human capability especially in loading or lifting by using Android Technology. With the use of Arduino as the microcontroller, it will act as a medium between the device and the user where the use of Bluetooth module as the transmitter and the receiver. The microcontroller will transmit command to activated the movement of the motor depending in how the user desired. The feature of this project is that it up to 55kg max and can be remote at a range of 10 meter.

DEDICATION

Alhamdulillah, praise to the Almighty ALLAH S.W.T.

This thesis is dedicated to

My beloved family,

My Friends,

and my lecturer

Thanks for their encouragement and support

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Bismillahirrahmaanirrahim,

In the name of Allah S.W.T, the most compassionate and the most merciful.

Firstly, thanks to Allah S.W.T because giving me a good health and huge courage and strength to do this final year project.

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HMS	-	Human Movement Support
MAC	-	Media Access Control
HCI	-	Host Controller Interface
EDR	-	Enhanced Data Rate
USB	-	Universal Serial Bus
AC	-	Alternating Current
DC	-	Direct Current
GND	-	Ground
RX	-	Receiver
TX	-	Transmitter
SPI	-	Serial Peripheral Interface
EDR	-	Enhanced Data Rate
IC	-	Integrated Circuit
PCB	-	Printed Circuit Board
IDE	-	Integrated Development Environment

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Overview

This chapter will provide brief explanation about the project which will cover the background, problem statement, objective and scope of the project. This explanation will describe the idea and concept of the project and how it is applied in the real world situation.

1.2 Background

The purpose of this project is lift objects that are beyond the limitation of the persons capability. This can be example such as outdoor product, home application product and many more where some of them are very heavy and require the use of heavy duty vehicle and can lead to a burden in terms of time and money. Other than that is the burden that a disable person has to go through when they are doing any item lifting. Without the usual help of third person, the disable person would helpless and could not lift the item that they need to carry. Because of these problem, we have develop a project which would help to reduce the burden of these problem where it is call Human Movement Support (HMS).

Human Movement Support (HMS) is a device that can carry item remotely using mobile control which is either through smartphone or tablet or etc. The usage of this project will enable the person to transfer a heavy item with ease which lighten the burden of a heavy-duty lifting or disable person where this project will become much more helpful for them. This project will be primary focus on the use of Android operating system, which will be connected through the Arduino via Bluetooth module as medium signal.

Once this project is connected with the android application, it will control the device DC motor where the bluetooth module will act as a receiver and transmitter to the device and connect the module in the Arduino kit. The Arduino kit is the main body of the device which will response to the command of the user then react according to the command by moving the DC motor that is attach with the Arduino and allow the device to move arcordingly. The DC motor is located both left side and right side of the body which will enable the project to move forward and backward using both motor and left side and right side using only one of the motor. Also the project will have an additional component which four sensor that will mount in different direction to react when the project in counter obstacle when an object is nearby the project.

1.3 Problem Statement

1) **Carry a huge and heavy item with bare hand**

Depending on the type of field, the need of carrying huge and heavy item can be a burden to the person carrying it where a large amount of energy is needed to even lift the item and making the uncomfortable carry the item because of the stablitiy need to carry the item. With the aid of this device, the person will only lift the item to the device and then the device will carry the item using their mobile devices which will ease the burden of carry the item.

2) **Burden a disable person in carry and item**

Most disable person are either on wheelchair or have aid to support themselves for example in walking. Because of this, their need on carrying an object is trouble some where they require a helping hand to carry an item . By having this project, the disable person can independently carry the object using this project and controlling the device using mobile devices.

1.4 Objective

The objectives of this project are :

1. To study and understand about the basic concept of android application
2. To simulate and develop Arduino application in order to control the movement of DC motor.
3. To design and develop Human Support Movement in both hardware and software

1.5 Scope

This project is design to help ease the burden of carrying a huge and heavy object using the mobile devices to control the device. This project will be remotely control using Android Technology where Bluetooth will be connected as medium between the transmitter (mobile device) and the receiver (Bluetooth module). The receiver is then connected to the main body of the project which is the Arduino where it will control the DC motor of the project and allowing the project to move based on command it receive from the user. In addition, the project will add a few feature which is a sensor that allow the project to react when encounter object obstacle which enable the project to protect itself from self damage or notify the user that it has difficulties when a object or obstacle is nearby. But based on the scope of the project, the project itself is also limited within the following scope such as:

1. The range of the Bluetooth medium
2. The field situation to use the HSM
3. The type of magnetic motor to be use for the HSM
4. The design of the HSM

1.6 Thesis Outline

This implementation of Human Movement Support using Android Technology is arranged into following chapter :

Chapter 1

This chapter will provide brief explanation about the project which will cover the background, problem statement, objective and scope of the project. This explanation will describe the idea and concept of the project and how it is applied in the real world situation.

Chapter 2

Focuses on literature reviews of this project based on journals and other references.The method concept, and theory of component of hardware that used in this project is discussed in this chapter.

Chapter3:

Mainly focused on methodologies for the development of implementation of a Human movement Support. Details on the progress of the project are explained in this chapter .

Chapter4:

This chapter focus on the result and discussion that we obtain based on the methodology that we used. All information must be explained in detail in this chapter with the problem specification.The results were compared with the outlined .

Chapter 5:

Concludes overall about the project. Obtacle faces and future recommendation are also discussed in this chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will cover the background study about the project based on the knowledge and information required to design and develop the project. To develop this project, it is necessary to go through several research that is related to the idea of this project. The research that will focus on every hardware and software that will be used to develop this project. With the this, it will help in achieving the idea of the project based on what component is suitable to used. The source of these research has to be acceptable in the system format such as books, journals, articles and website that are licensed.

2.2 Software part

2.2.1 Android

Nowadays, Android is a powerful Operating system (OS) supporting a large number of applications in Smart phones. Aziz et al.(2015) state that Android technology is a solution that can provide a new approach to human interaction with machine or tools. These applications make life more easily and advanced for the users. Android is developed by the open handset Alliance led by google. Android comes with an Android market which is an online software store. It allows Android users to select and download applications developed by thirt party developers and use them. Figure 2.1 below shows the icon of android.

Figure 2.1 : Icon android

2.2.2 MIT App Inventor

There are few software that can create an application for android platform with diference type of code language such as Basic4Android and MIT App Inventor. The Basic4Android software used Visual basic language while the MIT used Block language. App Inventor is an incredible new system from Google that allows Android applications to be designed and programmed with a web page and Java interface. In this project, MIT App Inventor will be used to make the interface between the device and the android phone. This software has two section which is the Designer (Program the action of the application perform) and the Block Editor (The Program is take place or in other word the code program itself). The result of this is that it will display a simple graphical interface that can be easily read and understand when creating a basic, fully functional app. Figure 2.2 below shows the MIT App inventor icon.

Figure 2.2 : MIT App Inventor Icon

2.2.3 Arduino Software IDE

The Arduino Integrated Development Environment (IDE) as shown in figure 2.3 is Java Program that is derives from the Wiring projects and the IDE for the Processing programming language. Its contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and series of menus. It includes a code editor with features such as syntax highlighting, brace matching and uploading programs to the board with a single click. A program or code written for Arduino is called a "sketch". (Dey et al. 2015).

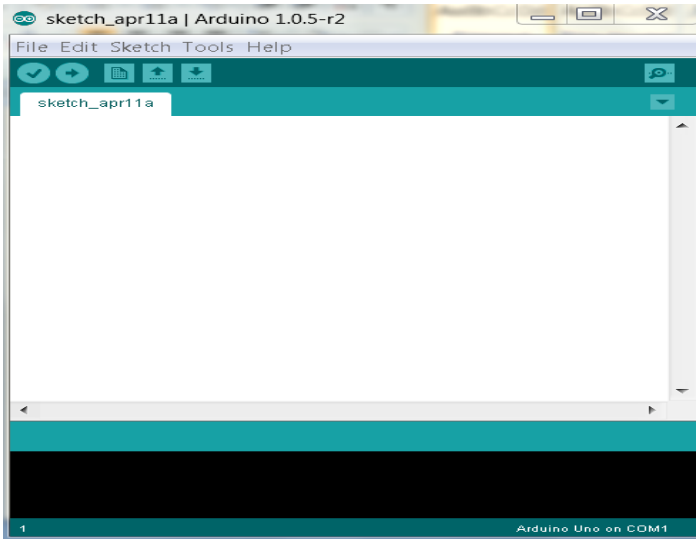

Figure 2.3 : Arduino software IDE

2.2.4 Proteus

Proteus as shown in figure 2.4 is a software design that allow the user to design and analyze the stimulation of a circuit. This software ease the progress of the circuit development because it can avoid any error that can cause any component replacement compare with using hardware analysis. This is because it will enable the user to analyze the circuit operation and measurement along with the intention on designing the desire circuit before moving on to constructing the hardware. With this, it will enable the user to

not only precise the hardware circuit contruction, but also experiment with the components that are available before choosing the suitable component for this project.

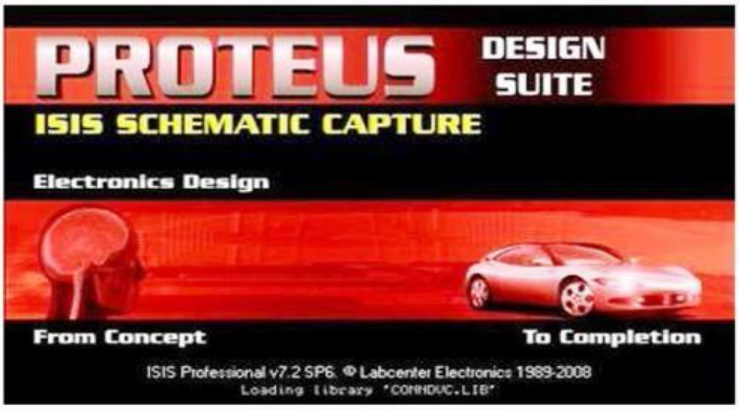

Figure 2.4: Proteus software

2.3 Hardware part

2.3.1 Bluetooth

Bluetooth is a low cost, low power, short- range radio technologies intended to replaced the cable connections between hand phones, PDA and other portable devices .Khurana (2015) stated that the circuit will less complex when the Bluetooth application eliminates usage of transmitter and receivers antenna of hardaware. Bluetooth is a wireless communications protocol running at 2.4 GHz, with client server architecture, suitable for forming personal area networks. Bluetooth is an extremely integral feature designed for low power devices. Bluetooth is the only appropriate communications protocol that has no fear of getting the frequency interferences because it uses the MAC adress (Media acess control adress) of the device. The usage of MAC adress that allows the Bluetooth for the connectivity between two devices. (Dey et al. 2015)