



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**IMPLEMENTATION OF FUTURE WALKING KIT FOR
DISABLE PERSON WITH SECURITY SYSTEM BY USING
ARDUINO AND GLOBAL SYSTEM OF MOBILE (GSM)**

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

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Engineering Technology (Department of Electronic and Computer) Bachelor's Degree in Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

.....
(WAN NORHISYAM BIN ABD RASHID)

ABSTRAC

Generally, this project is intended to create a design using a combination of the software with the hardware with the ability to control and also handles the movement of the limb from his center level by using Android and Bluetooth technology. In addition, through this project can also mempelajari how to design and use of the Arduino programming language for the purpose of access to be diperlajari and it can also be increased. There are three main parts to the success of this project where the first part is the emphasis on job creation programs to move pengantaramukaan, enter data and timing. In the second part is to make a study of the components of the appropriate and necessary to the success of the project in terms of invention which correspond the project. The third part is a section combines all the relevant section. In this project, the main components used is the servo motor which is the nerve to do the movement. The project is using Bluetooth as technology application from connection and access to a platform to an Android device. System for the project consists of three types of movement which the first movement, the second movement to forward to sit and third movements to wake up.

ABSTRAK

Secara umumnya, projek ini adalah bertujuan mencipta reka dengan menggunakan gabungan perisian dengan perkakasan yang mempunyai keupayaan untuk mengawal dan juga mengendalikan pergerakan anggota badan dari paras pusat ke bawah dengan menggunakan teknologi Android dan Bluetooth. Selain dari itu, melalui projek ini juga dapat mempelajari bagaimana untuk mereka bentuk dan penggunaan bahasa pengaturcaraan dalam Arduino bagi tujuan pengantara muka dapat dipelajari dan juga dapat dipertingkatkan. Terdapat tiga bahagian utama untuk menjayakan projek ini di mana bahagian pertama adalah penekanan kepada gerak kerja penghasilan atur cara untuk pengantaramukaan, masukkan data dan pemasaan. Pada Bahagian kedua ialah membuat kajian mengenai komponen yang sesuai dan yang diperlukan untuk menjayakan projek dari segi reka cipta yang bersesuaian dengan projek. Bahagian ketiga merupakan bahagian menggabungkan kesemua bahagian yang berkaitan. Di dalam projek ini, komponen utama yang digunakan ialah servo motor yang merupakan nadi utama untuk melakukan pergerakan. Projek ini menggunakan teknologi aplikasi Bluetooth sebagai platform daripada sambungan dan pengantara muka kepada peranti Android. Sistem bagi projek ini terdiri daripada tiga jenis pergerakan di mana pergerakan pertama untuk ke hadapan, pergerakan kedua untuk duduk dan pergerakan ketiga untuk bangun.

DEDICATION

I dedicated this to my beloved parents, siblings, lecturers, friends and fellow member without them it was almost impossible for me to complete my project report.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

GSM	-	Global System of Mobile
SMS	-	Short Message Service
PWM	-	Pulse Wide Modulation
COM	-	Center Of Masses
ZMP	-	Zero Moment Point
DC	-	Direct Current
AC	-	Alternating Current
LCD	-	Liquid Crystal Display

CHAPTER 1

INTRODUCTION

1.0 Introduction.

Basically aids for the paralyzed half of the members or disabled, always use a wheelchair for daily mobility. In today's market, there are also existing aid as aid which is controlled electronically to move the member in the leg or in the lower level of the center. When the human race in life to pursue a dream and not least in the disadvantaged. This project is one of the incentives to help the needy in which not only to make them a reality in the long run not even make one of the products that prioritize safety factor as well. The project will also emphasize on the maintenance of which is not hard to create their own maintenance. The process works by creating a product control everything automatically controlled using the technology.

1.1 Project Background.

For the person who lacks capacity in terms of running or crippled limb in half down the center of the level is very difficult to move, and many rely on others in activities that lead to a weak or paralyzed limb. Walking for the disabled person kit is designed to help solve problems and also to the less fortunate and also runs the paralyzed half of the body. Walking kit for the disabled person also is to aim to facilitate the use of one or more appropriate in terms of the nature of the physical. The project is expected to add a new innovation in current technology rather than manually controlled movement to control the movement of the android application and platform used as a Bluetooth connection. In the passage of time more and more

sophisticated and require quick movement in any daily affairs that makes this project was made for those who are less capable and paralysis that may come back to live like a normal person that is able to run using the kit for walking disabled person.

1.2 Problem Statement.

- i. There are many wheelchair users are unable to stand and sit with their own ability
- ii. Most wheelchair users had to put out the activities that require movement are whether more will not make a person think themselves disadvantaged or expect him to be a problem to others.
- iii. The people who use wheelchairs has a limit of movement and not all areas that can be used again.

1.3 Objective.

To achieve the goal of these objects, an objective is defined as a guide. The objective is:

- i. To understand the basic concept of the android application using MIT application inventor and to simulate an Arduino application in order to control the movement of the servo motor.
- ii. To make the user to stand and sit with ease.
- iii. To make the user being able to walk like normally people and to allow movement within a limited area.

1.4 Scope Work.

1. The project focuses primarily on comfort and also the daily movements will not make the paralyzed half of the body from the center down or disabled are limited in terms of movement that uses the movement of the foot.
2. Concerned about in terms of safety factors which uses GSM as the interface circuit to provide instructions to contact someone if they have an accident or an accident in which only pressing the emergency button provided and will automatically call the phone number specified by the user. This is a convenience for users who do not bring a communication tool.
3. For control units that control all elements is to use the Bluetooth application. Bluetooth applications have been selected for the various factors and meet all requirements for this project. Bluetooth application is also easy to use and does not require high costs. With this application, does not require a wire connection between the control device with the hardware of this project and in addition, it can also make it easier for users to control the control device in a variety of situations.
4. In addition, this project using Arduino as the master device which controls the entire system for this project which is the main artery. In order to achieve the objectives of the study, the following are guidelines for achieving the objectives.
 - i. First of all, to ensure the project achieves its objectives, the study of GSM technology and the use of servo motor function also needs to be done in detail to obtain more precise information and also make a selection appropriate to the project. For example, the appropriate movement to make every movement of safe and stable.

- ii. Studies should include all specifications such as features and applications to be used for this project. Each different ways to use the application and must make the appropriate application before combining all in one complete model.
- iii. Finally, it is the need to analyse the data obtained and selecting data that have optimal results.

1.5 Report Structure.

This thesis is divided into five chapters provides a clear understanding of the overall project, which shows the logical steps in the understanding of the methodology and can produce a prototype of this project. The first chapter includes a synopsis of the project, project objectives, project scope, problem statement and project results. The second chapter is a part of the information to facilitate this project. The information will be classified by journal articles, books, and some related to the interview. The third chapter is the part that will describe all the methods and processes of project implementation to achieve goals. Technical details of hardware and software will also be explained in the third chapter. The fourth chapter is an important part of the project, where the fourth chapter contains the implementation of the whole project and also an analysis of the critical parts of the system used. Chapter four also contains the theoretical findings and the results of a simulation of the circuit used. The fifth chapter is the last one of which contains the entire project and this thesis. In this final section, a number of references, discussions, and attachments to be referenced in the future.

CHAPTER 2

LITERATURE REVIEW

The second chapter describes the studies that have been made for this project. For the success of this project, several studies have been conducted to obtain information related to the project. Among the reference materials are used as reference books, articles, journals, and the internet. All above information obtained is useful as a guide in this project. In addition, studies on the components to be used is also very important to ensure that the hardware and software used in these experiments are appropriate to the project for no mistakes or accidents that are not in the desired effect. In the study of literature can describe as a report assessing the information found in the literature related to the project selected areas of study. This review shall explain, formulate, evaluate and explain this literature. The purpose of the literature review is to convey to the reader what knowledge, opinions, learning outcomes, thoughts and ideas that have been established in this project. On the other hand, the purpose of writing a literature review is to find what the project's strengths and weaknesses are. The literature review must be defined by the concept guiding such research objectives of the project or issue or issues related to the project. By doing some research on similar projects with this project, there is a difference in every human-robot project that has been made. The most noticeable difference is the systems and procedures used to drive a robot or components. Although there are differences in the type of system used, but for propulsion systems, mostly still use the same system of the servo motor.

2.1 Background of Walking Kit for Disable Person.

This project is one of the projects to be used as a model that can be used by people who are less fortunate in terms of movement that uses members of the legs or people paralyzed half of the limb from the central level down. The project is trying to become one of the fittings required by a person with a disability who paralyzed half of the limb from the central level down. The project is also focused on the weight of factors of safety and user comfort, but also in terms of the care that is convenient and affordable types. Between the safety factor used in this project is using the Global System of Mobile (GSM) as an intermediate device to contact telephone or other communications, where if the user falls or crashes (woe) while using this project, users can contact someone by pressing the emergency button for informing going on accident. There are many types on the market that are similar to the project but does not include all the equipment needed by a disabled person. Contrary to this project, which emphasizes the factors of safety and user comfort, but also in terms of easy maintenance and affordable. Among the safety factor used in the project is the Global System for Mobile (GSM) where if the user falls while using this project, the user can call someone by pressing the emergency button to alert the accident happening. In addition, there are also devices to locate the user if they wish to detect when something is happening.

2.2 Rehabilitation Robotic System.

A research review on the recovery using a device the robot. In particular, the rehabilitation robotic system assisted from motor sensor functions such as the arms, hands, and feet. Rehabilitation robotic designed using techniques that can determine conformity with patients to facilitate users to use. Many of the products for the rehabilitation market now have two types of a system where the first system for personal use and the second for use in clinical systems. For use in private systems suitable for daily use that can be used in residential houses. While for the second

system is designed for clinical recovery environments which provide a training exercise and therapy appropriate for clinical use.

2.3 Past Research Review.

2.3.1 Design Of an Electrically Actuated Lower Extremity Exoskeleton (Case Study 1).

2.3.1.1 Electrical Joint Hardware.

(Zoss & Kazerooni, 2006). Reported that design of an electrical actuated lower extremity exoskeleton. Using hydraulics to move some parts of the joints. Electric joint hardware can move the high load or more, but there are drawbacks in which in terms of size and weight. For the electric edge, joint hardware is just using a little electrical power and will only hydraulic lifting weights while doing the movements. In this study, also explain about how to move the electric motor based on the design used and to analyze trade off against energy consumption reduced.

2.3.1.2 Electric Motor and Gearing.

Describes how to reduce heavily guided at the motor connections with the gearing motor where the use of a suitable type of pancake that has a wide selection of small and large diameters. With make rather in the conditions of bare and stator, the motor can be bound by the more stringent and also secure in the mechanical joint structure. The selection of gear, gear or higher will produce large torques at the joints.

2.3.2 Incremental Fuzzy Control For A Biped Robot Balance (Case Study 2).

(Cuevas, n.d.). Reported for a biped robot balance control, which states that an efficient biped robot foot is important to achieve a dynamic movement. Dynamics of a biped robot is closely related to the structure and distribution of mass, therefore, the movement of the center of masses (COM) will have a significant influence on the stability of the robot. Zero moment point (ZMP) is a point recognized on the ground where a total of all momentum is zero at the origin and conditions by using this principle can try to determine the rate of the robot movement stability.

2.3.2.1 Robot Structure.

Define the structure of a robot, should get all the information from the movement of the Center of Masses (COM) which will affect the effect of stability on the robot. Biped robot the static stability rate with place a center of masses at a level that is as low as possible need stability but there is. In Figure 2.3, can see the position of the center of masses.

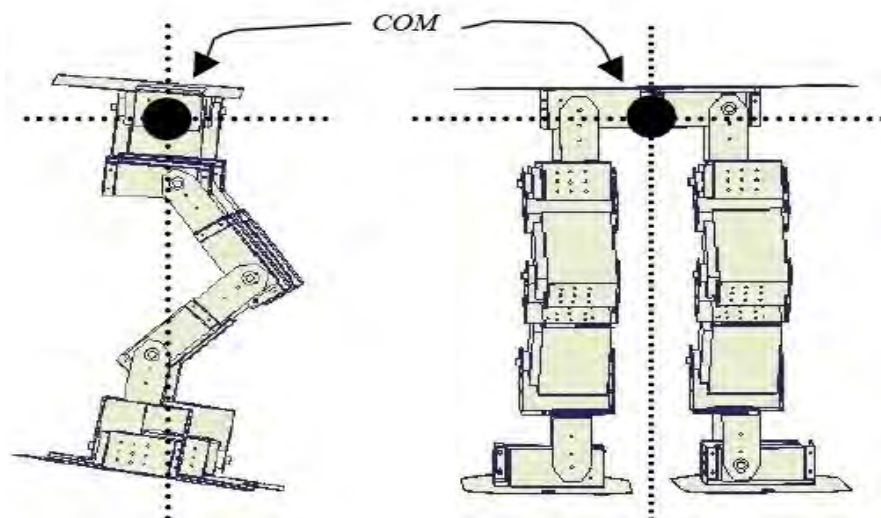


Figure 2.3 : Center of Masses location.

2.3.3 Design of Advanced Leg Module for Humanoid Robotics Project of METI (Case Study 3).

(Kaneko et al., 2002). Reported that HAL has a Cybernic control system that is a hybrid control system consisting of a ‘Cybernic Voluntary Control (Bio-Cybernic Control)’ and ‘Cybernic Autonomous Control (Cybernic Robot Control)’. In addition, the control system Cybernic can also give physical support to users who lack capacity to make the people become like one who is physically fit. The Cybernic control system has a physical support or act according to the operator's voluntary intention caused by the bioelectrical signals including muscle activity. HAL power unit capable of generating powerful torque in which the torque helps strengthen themselves with people who use it. Cybernic Robot Control does not use multiple applications and only use hardware as the main component of which load accommodate this control has been used to help power a healthy activity, for example, walking and standing from a sitting posture. Thus, the user will receive direct physical support using bioelectrical signals, which are easier to realize the operation of the manual controller such as a joystick.

2.3.4 Robot Leg Mechanisms. (Case Study 4).

(Deshmukh, 2006). Reported describes designs of the leg drive mechanisms, hardware architecture, and the leg control methods for walking machines. The difficulty factor in building a legged robot is also considerably higher than that for a wheeled robot. To help support their copyright mechanical legs should emphasize several key factors. Among the important factors is the Effectiveness of leg joints such as relating to the walking, Locations of leg joints, The movable extent of leg joints, Dimension, weight and center of gravity of a leg, Torque placed on the leg joints during walking, Sensors relating to the walking, and grounding impact on leg joints during the walking. The location of leg joints affects the kinematic and dynamic properties of the leg. Other than that, most of the robots using the wheel to make any moves because the wheel is a simple method for controlled and make movements and does not require a specific especially in the perpendicular