Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF EASY CAR SEAT FOR OKU TO LOAD INTO THE VEHICLE

MUHAMMAD ALIFF AIMAN BIN ZAIMATULAKMA

Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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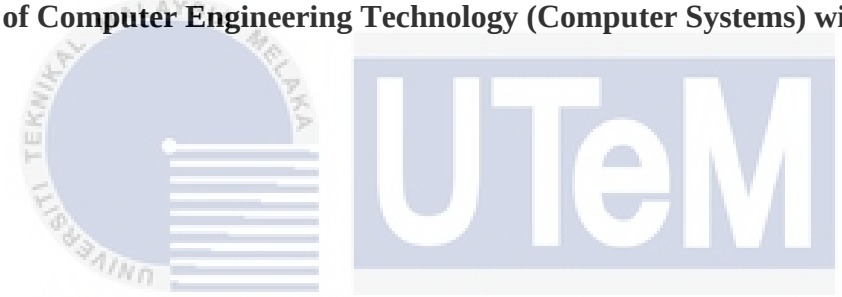
DEVELOPMENT OF EASY CAR SEAT FOR OKU TO LOAD INTO THE VEHICLE

MUHAMMAD ALIFF AIMAN BIN ZAIMATULAKMA

A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Computer Engineering Technology (Computer Systems) with Honours



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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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FAKULTI TEKNOLOGI KEJUTERAAN ELEKTRIK DAN ELEKTRONIK

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Sesi Pengajian : 2021/2022

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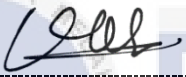
Signature : 

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APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours.

Signature :

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Date : 11/1/2022

Signature :

Co-Supervisor :

Name (if any)

Date :

DEDICATION

I dedicate to my loving parents whose prays, affection and support are always a source of encouragement for me to reach at this destination. My parent and teachers who give me real eyes that help to lead myself. Thank you to being a part of my life.

ABSTRACT

The “Easy Car Seat for Oku To Load Into The Vehicle” project is designed with a device and system that suitable to produce an alert system. It is allowing disabled people to transfer from their wheelchair to car seat easily without their caregiver 's help like to lifting or twisting them hard. The idea of using electric car seat for OKU people is good because it will make them more comfortable and safer if they transfer themself from wheelchair into car seat. This is why “Easy Car Seat for Oku People” designed. This system contains a few modules such as NodeMcu Esp8266 to control the movement of the actuator system in and out. Buzzer to be installed in the circuit to make some sound when the actuator is moving. ESP8266 is used in this project as a main controller for this system that will communicate each other with other components such as ic controller that control the following circuit, buzzer is used to make some sound alert when the actuator start to moving. The objectives have been accomplished which is the circuit of system that can control the movement of the actuator by using NodeMcu Esp8266. Next, the other objective of this project is to produce the best prototype with the suitable analysis. We can manage and cut the cost for this project because our focus is for ordinary people. Moreover, the last objective of this project which is to analyze the performance and functionality of the system. The project has been observed and the data has been recorded through the project analysis to show the stable of the system.

ABSTRAK

Projek "Easy Car Seat for Oku To Load Into Vehicle" dirancang dengan peranti dan sistem yang sesuai untuk menghasilkan sistem kemudahan bagi golongan yang kurang upaya. Ini membolehkan orang kurang upaya untuk berpindah dari kerusi roda ke tempat duduk kereta dengan mudah tanpa bantuan daripada penjaga mereka seperti mengangkat atau memindahkan mereka dengan kuat. Idea menggunakan tempat duduk kereta elektrik untuk orang Oku adalah baik kerana ia akan menjadikan individu terbabit lebih selesa dan lebih selamat jika mereka memindahkan diri dari kerusi roda ke tempat duduk kereta. Inilah sebabnya mengapa " Easy Car Seat for Oku People" dibangunkan. Sistem ini mengandungi beberapa modul seperti NodeMcu Esp8266 untuk mengawal pergerakan sistem penggerak masuk dan keluar. Buzzer akan dipasang di litar untuk mengeluarkan bunyi ketika penggerak berfungsi. ESP8266 digunakan dalam projek ini sebagai pengawal utama untuk sistem ini yang akan berkomunikasi antara satu sama lain dengan komponen lain seperti pengawal ic yang mengawal litar, buzzer digunakan untuk membuat beberapa bunyi amaran ketika penggerak mula bergerak dan bertindak balas. Objektif telah dicapai iaitu litar sistem yang boleh mengawal pergerakan penggerak dengan menggunakan NodeMcu Esp8266. Seterusnya, objektif lain projek ini adalah untuk menghasilkan prototaip terbaik dengan analisis yang sesuai. Kami boleh menguruskan dan mengurangkan kos untuk projek ini kerana tumpuan kami adalah untuk orang biasa. Selain itu, objektif terakhir projek ini iaitu menganalisis prestasi dan kefungsian sistem. Projek telah diperhatikan dan data telah direkodkan melalui analisis projek untuk menunjukkan kestabilan sistem.

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In the Name of Allah, the Most Gracious,

The Most Merciful First and foremost, praises and thanks to Allah, the Almighty, for His showers of blessings throughout my thesis to complete this report successfully. I would like to express my deep and sincere gratitude to my talented supervisor, Ts. Niza Binti Mohd Idris, Lecturer, Department of Electronics & Computer Engineering Technology, Universiti Teknikal Malaysia Melaka (UTeM) for giving me the chance and supervise me in completing this report. Her vision, sincerity and motivation have deeply inspired me. It was a great honor to work and study under her guidance. I also extremely grateful to my parents Zaimatulakma Bin Muhamed Jusoh and Zauyah Binti Saad for their love, caring, prayers and support through financially in preparing me for my future. I would like to thank to my friends for discussion that related to the project and the sleepiness nights that we were working together. Lastly, my thanks to every people that have supported me to complete my thesis directly or indirectly

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CHAPTER 1

INTRODUCTION

1.1 Background

What is easy car seat for Oku people? It is a new technology that allows disabled people to transfer from their wheelchair to car seat easily without their caregiver 's help like to lifting or twisting them hard. The idea of using electric car seat for Oku people is good because it will make them more comfortable and safer if they transfer themself from wheelchair into car seat. This is because, if we transfer them manually, we need at least two or three people to standby and help to transfer the patient into car seat.

Easy car seats for Oku systems can make travelling easier and make it easier for Oku persons to access vehicles. The Oku will be seated on a chair, and with the assistance of this technology, the Oku will be able to simply transfer into an automobile.

The idea of using easy car seat for Oku people is good and innovative because it will make everyone move faster and feel safe to transfer the patient. This is also good because it will reduce the time of waiting for loading the patient in the lobby or parking lot.

This project will use hardware and software. For hardware, student will construct the flow of the movement seat. It will use stainless steel pipe to make railing for the seat and use bearing to make sure the movement of the seat will smooth. After that, actuator will function to move the seat in and out by using mobile application that student build by using PCB board and the circuit will connect to the mobile application[1]. For power source, this project will use 12-volt power supply to move the actuator and the servo motor to move the chair rotation.

The easy car seat for Oku people will use Blynk IoT to control the linear actuator in and out and servo motor to move the chair rotation. What exactly is Blynk? Blynk is an Internet of Things (IoT) platform for IOS and Android devices that can monitor Arduino, Raspberry Pi, and NodeMCU over the Internet and Bluetooth[2]. This programmed is used to construct any input that we give using a mobile application by compiling and delivering the required address on the circuit and ic controller.

1.2 Problem Statement

The problem statement of this study was to investigate the impact of seat height on the movement of a caregiver from a wheelchair to a car seat for the transition of a disabled person. The purpose of this research is to identify the variables that can influence the disabled person and how the height of the car seat can affect them and how to transfer them into car sit easily without hurt their bodies.

- The current car seat system does not have the facilities to make it easier for Oku people to enter the car easily and safely.
- The disadvantage of this Oku car seat is high mpv cars cannot be used because the height of this Oku car seat cannot be adjusted high low. The Oku could not move himself on the seat.
- The existing Oku car seat system now costs a lot of money to install into cars that do not have the Oku seat in their car.

1.3 Project Objective

The main aim of this project is to propose a systematic and effective methodology to estimate system of Easy Car Seat for Oku People. Specifically, the objectives are as follows:

a) To design the car seat OKU electronic system.

b) To produce the best prototype with the suitable analysis.

c) To analyze the performance and functionality of the system.

1.4 Scope of Project

The scope of this project are as follows:

The aim of this project is to design a development of Easy Car Seat for Oku People. Furthermore, this project is invented specially to allows disabled people to transfer from their wheelchair to car seat easily without their caregiver 's help like to lifting or twisting them hard. The idea of using electric car seat for oku people is good because it will make them more comfortable and safer if they transfer themself from wheelchair into car seat. Moreover, this project used NodeMcu Esp8266 as a main controller or as “brain” in this system that will communicate each other with other components such as linear actuator to move the chair in and out from car, buzzer to make some sound while the system is running and Blynk application to control the movement of the system

CHAPTER 2

LITERATURE REVIEW

A literature review is a corpus of text used to review crucial points of current knowledge for any related material in order to better grasp the concept and language used in the project.. The resources are obtained from the journals, books and websites which provide more information on IoT applications in house security, researches about building security measures and notification system.

The aims of this chapter are to find knowledge, important information and any related thesis that are in line with the concept of 'Easy Car Seat for Oku People'.

2.1 Introduction

This chapter examines and discusses earlier research, projects, and journals that are relevant to this subject. This chapter covers theoretical topics as well as some practical suggestions for this endeavor. Furthermore, these connected works were carefully assessed in order to increase the project's quality and reliability. As a result, this chapter is included to ensure that a proper plan for implementing this project is in place.

2.2 The Effect of Technique and Transfer Board Use On The Performance of Wheelchair Transfers" by Giulia Barbareschi, Tsu-Jui Cheng and Catherine Holloway

This paper explains about the effect of technique and transfer board use on the performance of wheelchair transfers by group of researchers (Giulia Barbareschi, Tsu-Jui Cheng and Catherine Holloway October 2017). This article is from 2 University which is University College London and University of Salford which explain about the effect of technique and transfer board use on the performance of wheelchair transfers.

Many wheelchair users must be able to move from their wheelchair seat in order to be self-sufficient in their everyday lives. The capacity to move from their wheelchair has been associated to a higher risk of falling and upper-limb injuries. Previous research on wheelchair transfers has mostly concentrated on the study of sitting transfers conducted by people with spinal cord injuries, who make up a small percentage of the overall wheelchair user population.

The purpose of this letter is to investigate how different transferring strategies (sitting, standing) and transfer boards affect ground response forces beneath the hands during transfer efficiency and quality, as determined by the Transfer Assessment Instrument (TAI).

Sitting transfers exhibited larger peak and mean reaction forces under both leading and trailing hands than the other methods, although the difference was only significant between sitting and standing transfers. Standing transfers had considerably lower TAI scores than sitting transfers, presumably indicating a poorer level of safety associated with their outcomes. Transfer boards, in contrast to sitting transfers were only marginally effective in lowering the weight carried by the upper limbs and resulted in only a little reduction in overall TAI ratings.

The University College London Ethics Committee gave the report their blessing (Study number 4271/002). A laboratory database as well as national and local charities were used to find participants. After reading the information and obtaining informed consent, six manual wheelchair users and one power wheelchair user (six males and one female) participated in the study. The inclusion criteria were that they must use a manual or powered wheelchair as their primary mode of transportation, be able to perform independent transfers for sitting or standing with or without the use of a transfer board, and have no UE discomfort or disability that would impair their ability to transfer.

Figure 2.1 Position of the sensor on the force sensing glove

The majority of our participants, six in all utilised a manual wheelchair. Both participants had to shift from their wheelchair to a transfer bench twice before returning to their own wheelchair. They attempted to compare the height of the bench upon which the wheelchair user would transfer with the height of a rigid-frame wheelchair with a pressure-relief cushion in a standard set-up. The transfer bench stood at a height of 55cm. Almost all of the participants had to conduct level transfers, with the exception of Subject 2, who had to execute a transfer with a height difference of more than 3cm to 7cm. Subjects were instructed to approach the bench at their own pace and position the wheelchair at an appropriate distance and angle. Before beginning a new SPT, they were also asked if they wanted to reposition the wheelchair, which included switching sides to ensure a clear leading and trailing arm following each move. After a period of familiarisation, two transfers were recorded: wheelchair to bench and bench to wheelchair. They questioned participants who did sitting transfers if they were comfortable with utilising a conventional wooden curving transfer board to execute the third and fourth transfers (length 72cm and width 25cm). If a student chose to use the transfer board, they were given additional practise time until the next two transfers were registered[3].

Figure 2.2 Set-up of the experiment[3]