UNIVERSITI TEKNIKAL MALAYSIA MELAKA

AUTOMATIC T-SHIRT FOLDING SYSTEM

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

by

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APPROVAL

This report is submitted to the Faculty of Electrical & 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 Systems) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Kebanyakan orang mengalami masalah jadual yang amat padat pada masa kini. Masalah tersebut telah menyebabkan mereka tidak dapat melaksanakan kerja-kerja rumah yang nampak remeh seperti melipat pakaian. Oleh itu, objektif projek ini adalah untuk merekabentuk sebuah mesin elektronik melipat baju t-shirt berkos rendah yang menggunakan mikropengawal, modul sensor inframerah dan servo motor. Selain dari itu, projek ini juga bertujuan untuk mengurangkan pengunaan masa dan tenaga pengguna mesin ini. Projek ini akan mengguna mikropengawal Arduino Uno yang akan mengawal segala proses dalam projek ini. Kemudian, 4 servo motor yang mempunyai gear logam juga digunakan untuk membantu proses melipat. Projek ini juga melibatkan pengunaan sensor sebagai input untuk projek ini. Selepas itu, sebagai petunjuk kepada pengguna, penggunaan 3 LED yang berlainan warna dan buzzer juga telah disertakan dalam projek ini. Ini menjadikan sistem lebih cekap, jimat dan teratur dengan wujudnya projek ini.

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ABSTRACT

Most people are experiencing a very dense schedule nowadays. This situation causing them unable to perform seemingly tedious housework such as folding clothes. Therefore, the objective of this project is to design a low-cost t-shirt electronic machine that uses microcontrollers, infrared sensor modules and servo motor. So, the project aims was to reduce the time and energy usage of the machine user. This project will use the Arduino Uno microcontroller that will control all processes in this project. A single infrared sensor was used as an input for this project. Then, 4 servo motors with metal gear were also used to aid the folding process. Afterwards, as an indicator to the user, 3 LEDs with different colour and a buzzer are also included in this project. This makes the system more efficient, economical and orderly with the existence of this project.

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DEDICATION

To my beloved parents, Jumaan bin Baharun and Jumirah Binti Jumadih, and for my beloved family who encourages me, also do not forget to whom may involve in order helping me to complete my project. I also dedicate this report to my supervisor, Madam Niza Binti Mohd Idris who always encourage and guide me until the completion of the project. Finally, this dedication is also dedicated to my helpful friends that have provided me with a strong moral support and always teaching what goods for me.

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CHAPTER 1

INTRODUCTION

1.1 Project Background

According to Weng (2015), most by far of the advancements are expected to make people's life less requesting in order to satisfy the necessities of being emotionless. People put wheels on our apparatus to make voyaging simple. They envisioned lift to make climbing less requesting than whenever in late memory. They made microwaves to save time and imperativeness when cooking. Inventive considerations begin from lazy people to make things more direct. KACC folding clothes machine is focusing on two primary market, home and industry utilize. The machine will be sold as a bit of home apparatus. The modern clients incorporate attire fabricate, doctor's facility related office, inn and retirement home. There will be four fundamental highlights in this machine, which incorporate get, extend, overlap, and administer. The greater part of the highlights don't require human communication.

Based from Liu and Wang (2017), the project was intended to address the issues of folding clothes for housewives or any individual who experiences difficulty folding clothes. Bunches of understudies are irritated by investing energy folding clothes in view of our client interviews. What's more, the greater part of clothes folding machine in advertise are either for industry utilize or excessively costly. We are attempting to manufacture a versatile programmed clothes folding machine at a modest cost to serve

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the vast majority. It consolidated the measurements from existing items as well as have two collapsing designs, which is more helpful and proficient.

Washers and dryers have turned out to be so normal place that individuals do not consider them new ideas. Since Hamilton Smith licensed the rotating clothes washer in 1858, our approaches to manage clothing have not changed for right around 160 years. For some individuals, the most exceedingly terrible piece of doing clothing is folding all the garments once they leave the dryer. This movement could be dreary and tedious. In this way, a few people simply dump their clothing into the wardrobe without arranging them. This conduct regularly leaves a wreck and gives inconvenience when individuals are finding their clothes. From that, a financially savvy collapsing machine that could consequently distinguish and overlay the garments has been fabricated. The activity of the machine requires minimal human inclusion, which is fundamentally valuable for individuals who are not willing to sort out their clothes. (Li et al.,2017)

Most people these days have been living with tight timetable in their day by day life. Family unit ensemble in spite of sexual orientation inconsistency has been a weight for some. Among the whole tune that are time and vitality devouring is where laundries are concern. This work is a weight for some and now and again tiring relying upon the measure of attire and number of individuals in a house. Garments, for example, shirts, jeans and underpants are the typical and if duplicated by the quantity of individual in a family, will expend a ton of time and vitality. This is a scrape for a normal individual that should be settled. (Gomesh *et al.*, 2013)

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Based on Bersch et al. (2011), clothing is high upon the rundown of commonplace family unit errands that numerous individuals would prefer not to do and could, probably, be finished by an administration robot. In a cutting edge family unit, doing clothing requires washing, drying, and collapsing garments, a three stage process. What gives off an impression of being simple errands for a human, postures significant challenges for an automated framework. Most mechanical robots were produced to work with unbending articles in an exceptionally dull manner.

1.2 Statement of the Purpose

The following are the objective of this project:

i) To design a low cost electronic folding T-shirt system
ii) To analyses the capability in term how fast it can fold a T-shirt.
iii) To reduce the time and energy consumption of a user.

1.3 Problem Statement

The idea of this project is due to people facing a tight schedule problem and cause them to having no time to fold clothes. The tight schedule problem is inevitable because they have more important tasks and should be preferred instead of folding clothes. This is also because the folding clothes duty is just a trivial job. After that, folding clothes will need a good time to do it. With a tight timetable, there will be not enough time for people to do folding job.

In addition, in the market today does not exist a folding system that need a low-cost. In this era of modenization, there are many things that will need the use money.

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Often most person will send clothes to a laundry store to arrange their clothes. Because of that, waste of money and time will occur. From that, idea of a low-cost project are urgently needed today.

Next, most people experience a nasty problem in wardrobe at home. This is due to the problem of uneven creases and different crease sizes. This causes wastage of space in the closet and at the same time causing the closet looked messy. So, a folding machine was really needed to be built to help people.

1.4 Scope

The scope of this project is to build a folding system that will only fold T-shirt. It will only fold the t-shirt of children and adult with the size starting from XS to L. The maximum weight of t-shirt that can be fold was 400 gram. Other than that, the thickness of t-shirt material will only focusing on a thin t-shirt material.

After that, this project will using 4 servo motor that has the price of RM 34 each. Then, the main controller of this project was Arduino Uno that has the price of RM 27 bought on the online market. Next, the input of this project was using an Infrared sensor that cost only RM 8. The total cost of all of the component was only RM 119 not included with the price of material on the plate and body of the machine.

Furthermore, this project will dedicated to household usage only. This is because of this project was only a low cost project and it will not suitable to the other place than household. In the future, when this project was improvised or upgraded using better

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quality of material and component, maybe it can be used in other places not just only household usage.

There are several things considered in this project that can be classified into three major process element. These elements can gain an understanding of the whole project considering the final goal of building a project. The components are:

i) Design.
ii) Simulation.
iii) Testing.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will discuss the previous background study to make this project successful. In this way, some learning and research has been done through many sources such as books, journals, articles, internet, and documentation on applications and research work. Some data was utilized as a part of this task as a guide for an innovation enhancement and it exceptionally insistent to get all the more understanding identified with this research. There will be some comparison between some of the background study. It also discussing and presenting several advantages and disadvantages of an existing project.

2.2 Automatic Cloth Folding Machine

The project goal was to make a cost-effective cloth folding machine that will folding clothes automatically when there is a presence of laundry on the machine. The activity of the cloth folding machine is self-sufficient. It can distinguish the nearness of the cloth and after that check for the obstructions. If there was no obstacle on the plastic boards but only the cloth, at that point the folding operation starts. The machine will turn the plastic boards in a particular request until the point that the clothes turns into a slick rectangle.

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