UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SMART STICKER CUTTER WITH VOICE CONTROL BY USING ARDUINO

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

by

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Tajuk: SMART STICKER CUTTER WITH VOICE CONTROL BY USING ARDUINO

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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electrical Engineering Technology (Industrial Automation and Robotics) with Honours The member of the supervisory is as follow:

Signature: .....

Supervisor : MUHAMMAD FAREQ BIN IBRAHIM

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Co-supervisor: NURUL KAUSAR BINTI AB MAJID

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ABSTRACT

The title of this project is “Smart Sticker Cutter with Voice Control by Using Arduino”. This paper will presented on standard problems in the first place which arise in industrial cutting processes. Usually, to cut the sticker paper we need to mark and feed equal dimension paper in each process. These Smart Sticker Cutter were designed to be useful for office or individual. This Smart Sticker Cutter was also design to be possible where is small and light uses to cut sticker papers into length and number of strips needed with equal dimensions. This Arduino-driven device cuts sticker paper to the length that varies to different size by using Arduino software and it also using voice recognizer control to detect the system to run. For the dimension of sticker, it can be controlled by using Bluetooth and voice control. The method that is used in this project by pulling paper inserted into the machine body at precise intervals using a Stepper Motor and roller. Next, the second stepper motor moves a blade over the paper cutting it into strips. The blade supported by slider that combines with stepper motor. The development of this machine will reduce the manual work of cutting sticker paper besides it also will eliminates the most time taking process of sticker paper marking and cutting. So, this creation of this machine will help to set the quantity of the cutting paper with equal dimension.

ABSTRAK

Tajuk projek ini adalah "Pemotong Pelekat Pintar Dengan Kawalan Suara Menggunakan Arduino". Laporan ini akan menerangkan mengenai masalah-masalah asas yang telah wujud di dalam proses pemotongan industri selama ini. Biasanya, untuk memotong kertas pelekat, kita perlu menandakan dan menggunakan kertas berukuran yang sama seperti saiz proses yang dikehendaki. Pemotong Pelekat Pintar ini direka untuk kegunaan pejabat atau individu. Alat Pemotong Pelekat Pintar ini juga dihasilkan pada saiz dan dimensi yang kecil serta ringan agar mudah dialihkan dan sesuai digunakan untuk memotong kertas pelekat mengikut panjang dan saiz yang sama pada kuantiti yang banyak dalam satu-satu masa. Peranti yang didorong oleh Arduino ini memotong kertas pelekat dalam pelbagai variasi ukuran yang berbeza dengan menggunakan perisian Arduino dan juga menggunakan kawalan pengecam suara untuk mengawal sistem yang akan dijalankan. Bagi menentukan dimensi pelekat, ia boleh dikendalikan dengan menggunakan Bluetooth dan kawalan suara. Kaedah yang digunakan dalam projek ini dimulakan dengan menarik masuk kertas yang ke dalam badan mesin pada sela masa yang tepat dengan menggunakan motor pelangkah dan penggolek. Seterusnya, motor pelangkah kedua akan menggerakkan bilah ke atas kertas dan memotongnya menjadi jalur. Bilah yang disokong oleh gelangsar yang disambungkan dengan motor pelangkah. Dengan terhasilnya mesin ini, ianya akan mengurangkan kerja memotong kertas pelekat secara manual di samping mampu menghapuskan proses penandaan dan pemotongan kertas pelekat yang memerlukan masa yang lama selama ini. Akhir sekali, penghasilan mesin ini dapat membantu menetapkan kuantiti kertas pemotong dengan dimensi yang sama.

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mm	-	Millimetre
cm	-	Centimetre
m	-	Metre
km	-	Kilometre
inch	-	Inches
V	-	Volt
A	-	Ampere
N.m	-	Newton metre
rpm	-	Revolutions per minutes

LIST OF ABBREVIATIONS

UTeM	Universiti Teknikal Malaysia Melaka
BEEA	Bachelor Degree of Electrical Engineering Technology (Industrial Automation and Robotics)
IoT	Internet of Things
RFID	Reader Radio Frequency Identification Reader
IDE	Integrated Development Environment
LCD	Liquid Crystal Display
I2C	Inter-Integrated Circuit
PWM	Pulse Width Modulation
UART	Universal Asynchronous Receiver/ Transmitter
SPI	Serial Peripheral Interface
DC	Direct Current
AC	Alternating Current
CNC	Computer Numerical Control
OLED	Organic Light Emitting Diod
IR	Infrared

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter introduced the general background of the Voice Recognition for Sticker Cutter Machine. Additionally, the inspiration of project to be developed is discussed along in the problem statement of this Chapter 1. Others such as two main objectives, scope and limitation also been reviewed. Besides, this chapter will discussed general background and view of the developed project based on Internet of Things (IoT).

1.2 Background

The Industrial Revolution 4.0 (IR 4.0) as shown in Figure 1.1 is changing our lifestyle in how we live, work, and communicate; it is also likely to change the things we value and the way we value them in the future. Nowadays, we can already see changing business models and employment trends. There are including flexibility of movement, enabling in monitoring process, highly accurate and efficiency in wireless data communications. It is very important for an industry to had an improving the product qualities, reducing costs and increasing in operation speeds followed by safety for their production company line related to IoT context.

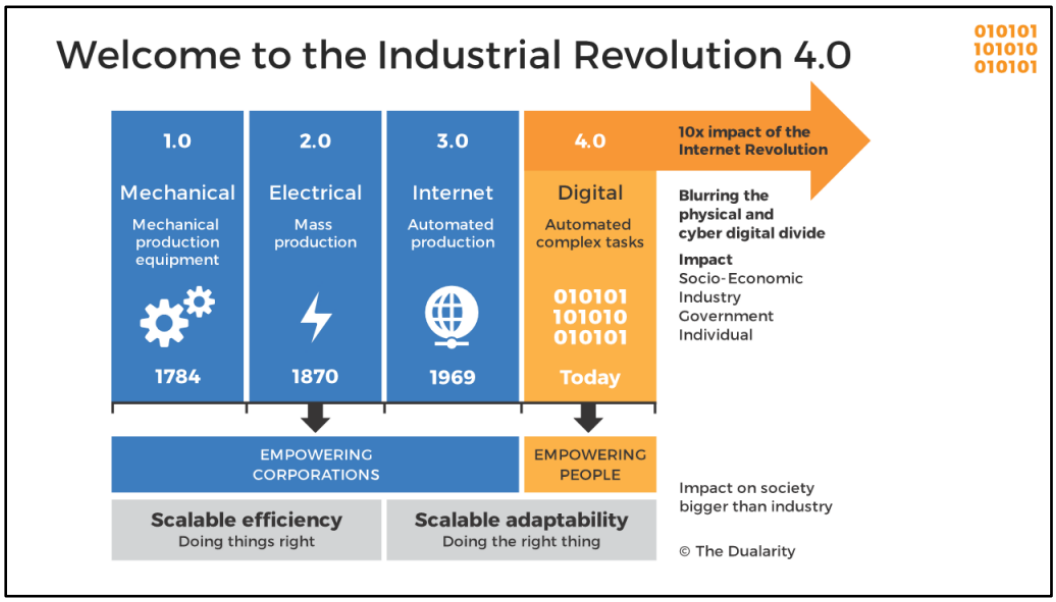

Figure 1.1: Revolution of Industrial (Olivier Van Duüren, 2016)

Basically, Internet of Things (IoT) is a network where connects and communicates with a system of devices each other as well as the end user. Several data transfers are made between these devices without the need of human-to-computer interaction. This means that data doesn't need to be inserted; sensors themselves gather the data. And as soon as the data is collected, it can be used in real time. It is also stored in the cloud and can be accessed whenever needed.

It is a basic arrangement of interconnected devices or gadgets irrespective of their types whether mechanical or advanced machines. It may interest you to know that these modules can likewise be used to hand off directions and simply by using Wi-Fi and infrared signals can control machines.

Voice recognition is the term used to define the rare ability of a machine or program to receive and interpret dictation and carry out spoken commands with the rise in intelligent assistance like Apple's Siri the concept gained worldwide recognition at a frantic pace. In layman's language, voice recognition enables us to interact with technology, be it reminders or other simple tasks, simply by speaking to it. As the technology matures, Artificial

Intelligence (AI), machine learning, and consumer acceptance also seem to have matured compared to few years back. Every modern home aspires to have a digital assistant, and consumers have started transcribing voice to text, responding to simple questions and requests like playing music or sharing weather or traffic information, setting up reminders, searching the internet and others.

Applications and software are modified with artificial intelligence and machine learning. These technologies have been programmed on how to perceive voice commands, which also means that applications can break down the instructions and anticipate possible outcomes. As a result, several applications such as Siri and Alice have set another benchmark with the help of voice recognition. Things have become easier for clients. It is safe to say that voice recognition and IoT have altered business and buyer expectations.

Internet of Things (IoT) technology features a framework set where physical and mechanical gadgets can be merged with electronic gadgets, especially ones that incorporate sensors and actuators. These perceive computerized flags and convert them into movement. Several tech organization are found working out minimal effort arrangements. This would empower clients to control their home appliances by talking. For example, turning on the television by speaking to it or customizing cooking with the help of voice-activated microwave ovens as example on Figure 1.2 voice processing module (Alango Technologies, 2016). In Figure 1.3 (Techcrunch, 2017) shows how the ultrasound are generated. As shows in Figure 1.4 the voice recognition technology (Engineeringminiprojects, 2011) that will shows in general how the microcontroller act with the voice recognition.

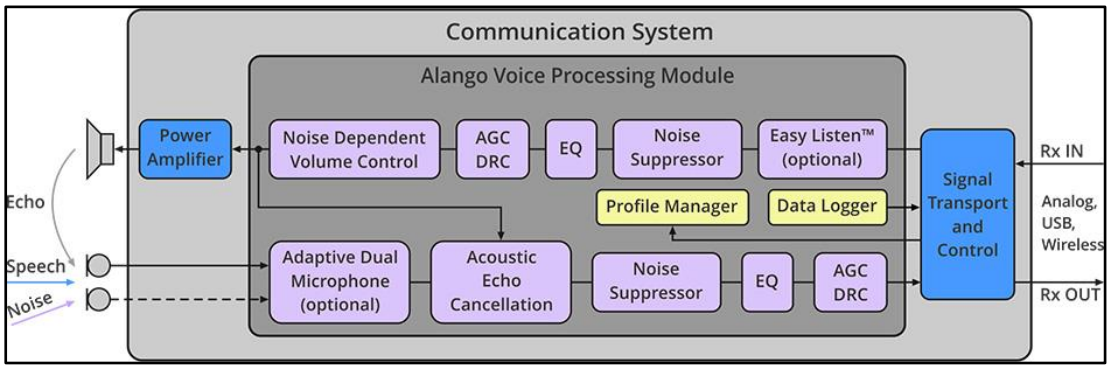

Figure 1.2: Voice Processing Module (Alango Technologies, 2016)

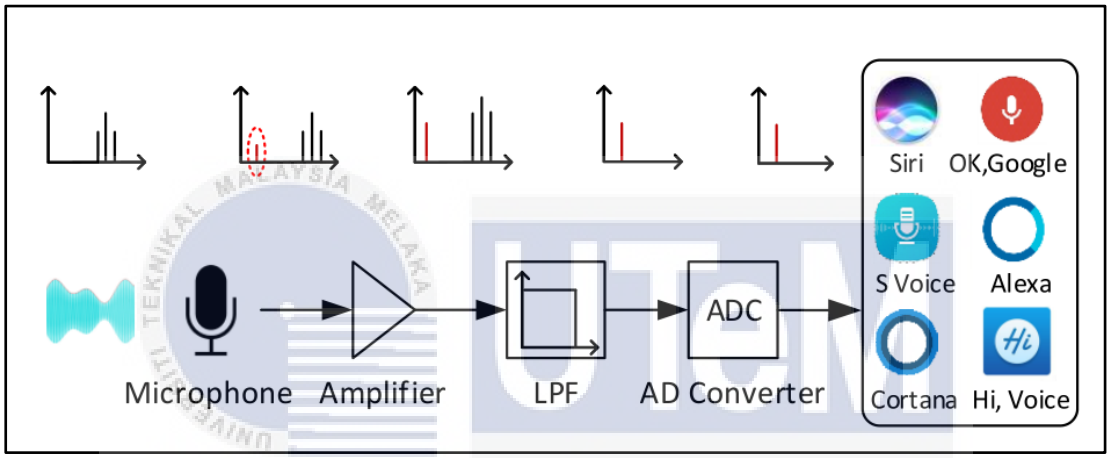

Figure 1.3: Diagram showing how the ultrasound (the black 'waves') are generated, creating the harmonic in red, then subtracted by the low-pass filter (Techcrunch, 2017)

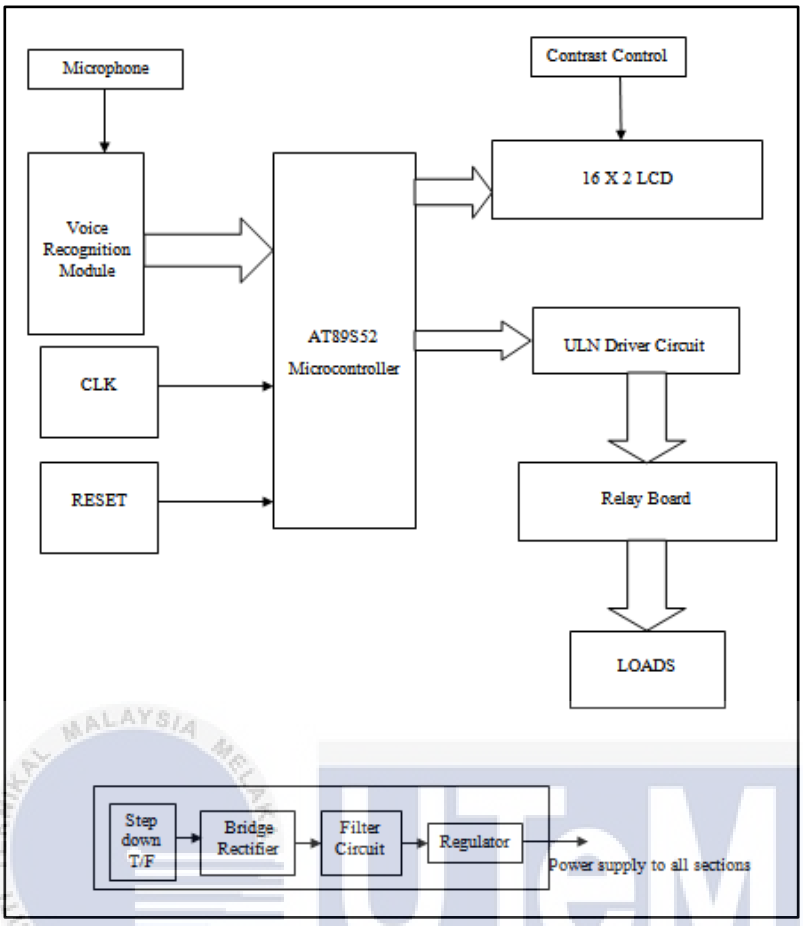

Figure 1.4: Voice Recognition Technology circuit (Engineeringminiprojects, 2011)

On the whole of this project, this voice recognition control system allows devices to be controlled through computers and Android smart phones at the same time and it will mainly work by Arduino Mega 2560 as the heart of body microcontroller. In order to highlight and meet the criteria in industry need, other components have been installs such OLED 12C display, DC servo motor, Voice Processing Module (VPM), load cell, DC stepper motor and power supply. Otherwise all programs of instruction on microcontroller will be works using 'Arduino IDE'. It will perform and responsible in control the main whole of body. However, for this project only focusing on analyze, design and develop sticker cutter in small scale of prototype due to limitations of budget, time as follows the schedule that has been given for this project.