Faculty of Electrical and Electronic Engineering Technology

PORTABLE LANGUAGE SYSTEM VISUALIZER USING RF SIGNALS AND IOT TECHNOLOGY

TARANI BASCAR

Bachelor of Electronics Engineering Technology (Telecommunications) with Honours

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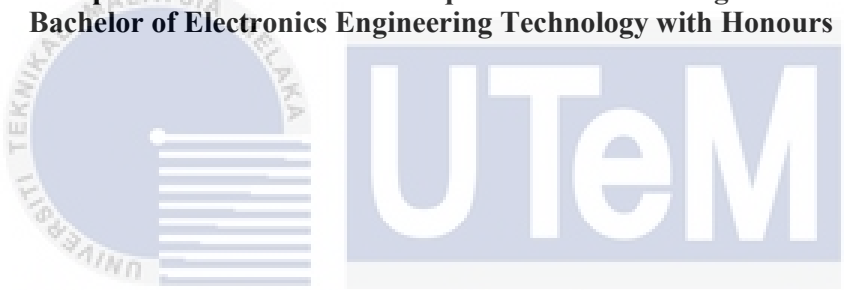
A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology with Honours



Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I declare that this project report entitled "Portable Language System Visualizer Using Rf Signals and IoT Technology "is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : 

Student Name : TARANI BASCAR

Date : 11/1/2022

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 : 

Supervisor Name : Adam Wong Yoon Khang

Date : 2/3/2022

Signature :

Co-Supervisor :

Name (if any)

Date :

DEDICATION

To my beloved mother, Vikneswary A.Raju, and father, Bascar Palanisamy,

and

To dearest late elder brother, Deva Ganez Bascar and

My younger brother, Uva Kuhan Bascar

ABSTRACT

Internet of Things (IoT) has made people's life more convenient and practical where it supports any person to be connected to any things, anywhere, via the Internet. Portable Language System Visualizer Using Rf Signals and IoT Technology was mainly to minimize the problems that often happens to the deaf-blind students and for young children's mainly in the aspect of slow learning and short-term memory loss. Therefore, some immediate actions must be taken in the improvisations of the learning kit for the deaf-blind people. The proposed development is based on the portable language system visualizer of three ways of learning method for T&L purposes. The first method will be whereby a deaf-mute person has to tap on a RFID reader and there will be visualization of alphabets and numbers on the Raspberry Pi LCD screen. The second method is whereby the blind person will be using braille attached keyboard to familiarize braille through keyboards and listen to the alphabet's pronunciation through Text to speech converter. Thirdly, a method to learn any language through retyping the word on the image and by listening on how the word sound. As a result, the project works perfectly based on the google survey done with the deaf-mute children, when the question "Will the students complete the level 1 SL faster by using SL Visualizer?" asked ,there were 100% "YES" answer answered. In a nutshell, the project was successful as the objective to build an interactive and engaging method to learn the Sign Language .was implemented and applied.

ABSTRAK

Internet of Things (IoT) telah menjadikan kehidupan orang ramai lebih mudah dan praktikal di mana ia menyokong mana-mana orang untuk disambungkan kepada apa-apa perkara, di mana-mana sahaja, melalui Internet. Sistem Visualisasi Bahasa Mudah Alih Menggunakan Isyarat Rf dan Teknologi IoT adalah terutamanya untuk meminimumkan masalah yang sering berlaku kepada pelajar buta pekak dan untuk kanak-kanak kecil terutamanya dalam aspek pembelajaran lambat dan kehilangan ingatan jangka pendek. Oleh itu, beberapa tindakan segera mesti diambil dalam penambahbaikan kit pembelajaran untuk orang buta pekak. Cadangan pembangunan adalah berdasarkan visualisasi sistem bahasa mudah alih bagi tiga kaedah kaedah pembelajaran untuk tujuan P&P. Kaedah pertama adalah di mana orang yang bisu pekak perlu mengetik pada pembaca RFID dan akan terdapat visualisasi abjad dan nombor pada skrin LCD Raspberry Pi. Kaedah kedua ialah orang buta akan menggunakan papan kekunci yang dilampirkan braille untuk membiasakan braille melalui papan kekunci dan mendengar sebutan abjad melalui penukar Teks kepada pertuturan. Ketiga, kaedah untuk mempelajari apa-apa bahasa melalui menaip semula perkataan pada imej dan dengan mendengar bagaimana perkataan itu berbunyi. Hasilnya, projek ini berfungsi dengan sempurna berdasarkan tinjauan google yang dilakukan dengan kanak-kanak bisu pekak, apabila soalan "Adakah pelajar akan menyelesaikan tahap 1 SL dengan lebih cepat dengan menggunakan SL Visualizer?" bertanya, ada 100% "YA" jawapan dijawab. Secara ringkasnya, projek ini berjaya sebagai objektif untuk membina kaedah yang interaktif dan menarik untuk mempelajari Bahasa Isyarat .telah dilaksanakan dan diaplikasikan..

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First and foremost, I would like to express my gratitude to my supervisor DR ADAM WONG YOON KHANG for the precious guidance, words of wisdom and patient throughout this project.

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LIST OF ABBREVIATIONS

- RFID – Radio Frequency Identification
- ASL-American Sign Language
- LCD – Liquid Crystal Display
- IoT – Internet of Things
- AV-Audio Video
- GSM – Global system for mobile communication
- GUI-Graphical User Interface
- USB-Universal Serial Bus

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background

Sign Language based communications have been utilized since three hundred years ago to have interactions among the deaf and mute community.Literally,15 millions of people around the world who have difficulties in speaking, hearing and seeing uses sign languages to interact among themselves.[1] There are many type of Sign Languages around the world but American Sign Languages are the mother of all sign languages and it is the most widely used hand gesture around the globe by the deaf and mute. On the other hand, the blinds use Braille to stay connected with the society. Mainly, Braille is widely used toread and write. Braille system basically consist of maximum 6 dots and are divided to three grades which are Grade 1 are beginners , Grade 2 are for intermediate, and Grade 3 are advanced level. In this project ,it is emphasized on Grade 1 Braille.[2]

Besides that, the foundation of the ASL education system especially for the children should have massive improvisation. In Malaysia, there is still inadequate of tools to make the deaf-blind children to study in a fun and interactive environment. Besides that, these methods will also as well increase the memories capabilities to absorb the sign language faster. According to Dr. Erica Warren who is an educationalist specialist utters out that “Teaching Visualization Can Improve Academic Achievement for Students at Any Age”.

To have better understanding and interest, the deaf-blind younger communityneeds to learn by having some infusions of visualizations and physical movements, in line

with that, the system that i have proposed is a basic programmed ASL RFID cards tapping methods on a RFID reader that would visualize the Audio Video of the ASL .Besides that, the second method is the braille attachment keyboard to understand the basic sign language better by using Raspberry pi. This method to learn the ASL will help the children to learn it anywhere and anytime. The physical movements that students must tap the RFID cards, will make the students to learn in a fun method. Moreover, not only the deaf blind community can learn, and the normal citizens would be able to learn to create a great bond and interactions between the deaf-blind children with the normal children.

1.2 Problem Statement

In the current status quo, many researchers have developed the learning of American Sign Language(ASL) in various unique methods to help the Deaf-Blind society. One of it is the Sign Language Recognition device that could help the deaf children to recognize ASL by first showing the hand gesture to camera, but the issue roses when not all children have the capability to have knowledge and show ASL hand gestures to the ASL recognizer .[12]

According to the research on Braille, it is clearly stated that today's Braille learning are having difficulties in interactivity. Traditional method of learning such as all tutors or educator would run teaching in small groups (2-4), which is the root cause of the interactivity among students. Second problem is the lack of resources. Braille classes usually limited for blind learners to a Perkins Braille typewriter like a slate and to paper sheets. In a nutshell, according to the research ,that mostly, all current tools that allow the training and invention of Braille content are very costly.[14]

1.3 Project Objective

The main aim of this project is to propose a systematic and effective methodology to teach the Deaf -Blind children. Specifically, the objectives are as follows:

i. To build an interactive and engaging method to learn the Sign Language .
ii. To design a software interface to visualize an attractive output of ASL.
iii. To perform analysis for the proposed system.

1.4 Scope of Project

The scope of this project focuses only on using Raspberry Pi to communicate with RFID reader, RFID tags, 3.5" LCD and Braille keyboard. The Braille RFID tags will be tapped on its reader to visualize a basic Alphabets in American Sign Language (ASL) Visualization. Braille keyboard is a method for the Blinds to learn Braille by typing on the Braille Keyboard and a speaker will release the Alphabet Pressed by using Espeak software.; Lastly, there is method for customizable learning language. In here I have chosen Arabic as a learning system. The projects work by when student type the word in the picture and click speak now so the project scope is only for Blind and Deaf Children between 6 -8 years old to learn basic ASL Braille and to learn new language.

1.5 Thesis Organization

Chapter 1 provides the background of the American Sign Language System Using Rf Signal and IoT Technology for Deaf-Blind People. A problem statement is stated, and objectives are listed to set as a benchmark to be achieved to solve the problems. Lastly, this chapter covers the scope of research and thesis organization.

Chapter 2 discusses the related research done by researchers based on project implementation and functionality. A comparison between the projects is done to identify the main idea, theory, and provide a wider view of the type of implementation which will be suitable for this project. Chapter 3 gives an overview of the methodology done to complete this project. The methodology is done by taking specific steps to develop the project while obeying the objectives stated. A flow chart is designed to show the procedures taken.

Details of results are provided in Chapter 4. The data or output of the project will be analyzed and discussed in detail. Figures of output will be attached. Chapter 5 concludes and summarizes the main ideas and states whether the project output has achieved the objectives. This chapter also gives suggestions on further improvement of the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the relevant information and detail which are found by study and research from related previous study. The discussion starts with the study of teaching American Sign Language(ASL) and Braille education for the younger children. It is important to study these concepts because they are the main idea of this project. Lastly, this chapter ends with the comparison of the related previous papers and the type of implementation that will be done in this project.

2.2 American Sign Language Visualizer

In general, American Sign Language (ASL) Visualizer refers to a teaching method for deaf and blind children by using RFID braille tapping system and a braille keyboard as an input. This concept was initialized to attract the deaf and mute children to learn and absorb the ASL faster and effectively by implementing audio video visualization. Furthermore, having learning activities which involves some actions would make learning atmosphere more fun and interesting. Students tend to engage more when it involves physical activities such as tapping on RFID cards and utilizing braille keyboard. According to Dr. Lynell Burmark , education consultant who writes and speaks about visual literacy: "…unless our words, concepts, ideas are hooked onto an image, they will go in one ear, sail through the brain, and go out the other ear. Words are processed by the short-term memory where it can only retain about seven bits of information (plus or minus. Images on the other hand, go directly into long-term memory where they are indelibly etched.

2.2.1 Audio Video Educational Concept

There were many educational concepts the community had tried to implement for a better learning process but there are instructors who have failed to carry out a learning process of creating an attractive atmosphere. Before learning to apply the alphabets or sign languages, students first need to learn and grasp the basic alphabets. A successful learning kit with some physical activities could be a tool that is fun and interactive. This method could be easily accepted especially for younger children. Besides that, making a portable learning kit could not only educate the younger generation buts also simultaneously the older generations too. This alphabets or sign languages could be easily absorbed as there are images that could easily be memorized by them. [1]

The justification that visual aids are beneficial can be seen in the effects that caused to an individual. Visual aids could undoubtedly encourage students to have a learning process in an easier and interesting methods. There are two research had been done by the Research of Cuban(2001).First research was the percentage absorbed through learning senses and secondly on how many percentages could people generally remember. Both data had been clearly stated in table below:[2]

Table 2.1: Percentage of Learning through Senses

No	Activities through process of learning	Percentage Learned(%)
1	Sense of Taste	1
2	Sense of Touch	1.5

3	Logic of Smell	3.5
4	Logic of Hearing	11
5	Sense of Sight	83

Table 2.2:Percentage of Remembering through Activities

No	Activities through process of remembering	Percentage Remembered(%)
1	Reading	10
2	Hearing	20
3	Seeing	30
4	Saying	70
5	Say and do	90
6	Hear and see	50

According to the table 2.1 and 2.2, it is clearly stated that the 'Say and Do' and 'sense of sight' has a huge positive impact on the deaf and blind community in earning the ASL through portable, physical, Audio and Visual Aid.

2.2.2 The Radio Frequency Identification (RFID) in Learning Process

An ASL alphabetical programmable RFID cards are implemented to attract the deaf students and at the same time to create a fun and interesting learning environment. Physical activities such as taping or typing could kill boredom compared to ideally sitting on a static place and gaining knowledge. The main agenda is to help the deaf children, education tutors

,teachers, parents, friends, siblings, or anyone to not only learn together the ASL but also to continuously encourage the deaf children to learn the basic A-Z in American Sign Language method.

RFID usage on children would give the best solution for the students to recognize the alphabets. Besides that, the children would enjoy learning when they must move their hands, eye, and other organs. The most essential element is to create a great interface with appealing and vibrant backgrounds on the LCD screen. These exceptional interactive educational tools could be greatly beneficial for the teachers to assist and simultaneously encourage the children to learn the fundamental knowledge in their pre-school. This concept could also be a small spark to transform the educational system from traditional approach to active learning approaches.[3]

2.2.3 Braille Keyboard

The concept of wireless Braille keyboard was implemented for the blind children to be familiarized with the usage of keyboard since young itself. The visually impaired children will first learn to type the basic alphabetical and numbers in the braille form and it will convert to a speech. In the current status quo, technologies are growing rapidly such as internet of things, artificial intelligence ,machine learning etc. Molding and shaping the kids to learn the alphabetical by using the keyboard would let them to gain more interest in the technological field and adapt quicker to the current changes.

There are some studies had been done for visually impaired community. It is a system with self-learning braille method for blind peoples. It was designed as braille writing and reading tutor which had let the blinds to do things independently without the help of tutors.

The other beneficials of using text to speech in Braille Keyboard is that blind children could learn to speak English faster. This creates a communicating learning platform for the blind children.[4] The braille is an important useful tool and has a high efficiency for the blind people. The wireless keyboards are mainly intended to be in a reasonable price, user-friendly, self-learning and portable .Basic function that is required is a tool for reading documents and a could implement on the text to voice-recognition technology. This is the basic requirement a blind need. [5]

A) Braille Codes

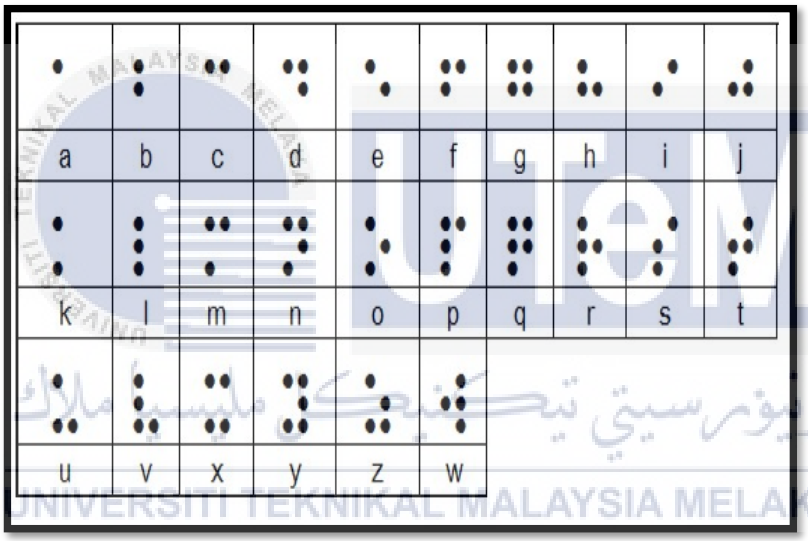

Figure 2.1: Uncontracted Grades (1)Braille

2.2.4 Internet of Things(IoT)

This is a IoT is an extremely powerful system that has the capability to transfer a certain information over a network without needing an interaction .Today, IoT has become potential threats for most of the innovating technology industries. According to Big Data Insights, the term Internet of Things was established by Kevin Ashton, who was a member of the team that discovered RFID tag to be used as a communication link to connect objects

to the Internet. The term was first used in 1999 and since then, it has been growing enormously in several types of sectors around the world. Kevin Ashton has also said that the Internet of Things is possible to bring more changes to the world compared to as Internet did. Apart from that, defined IoT as a network that consists of physical, technological, and broad socioeconomic environments. There are 3 focus elements of the IoT landscape below in figure 2.2 and IoT networks are shown in the below.[6]

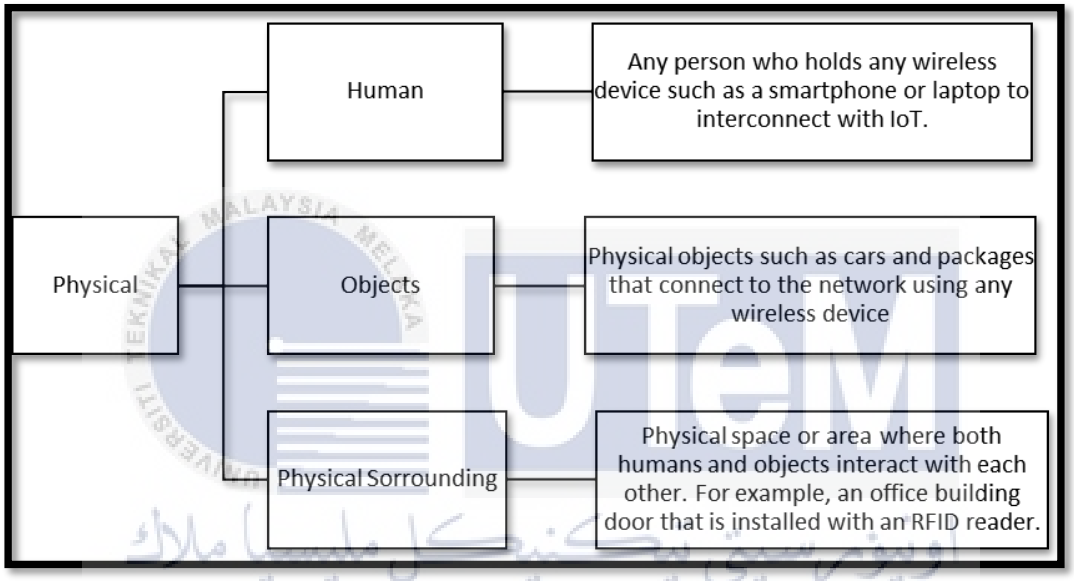

Figure 2.2:Elements of the IoT landscape[6]

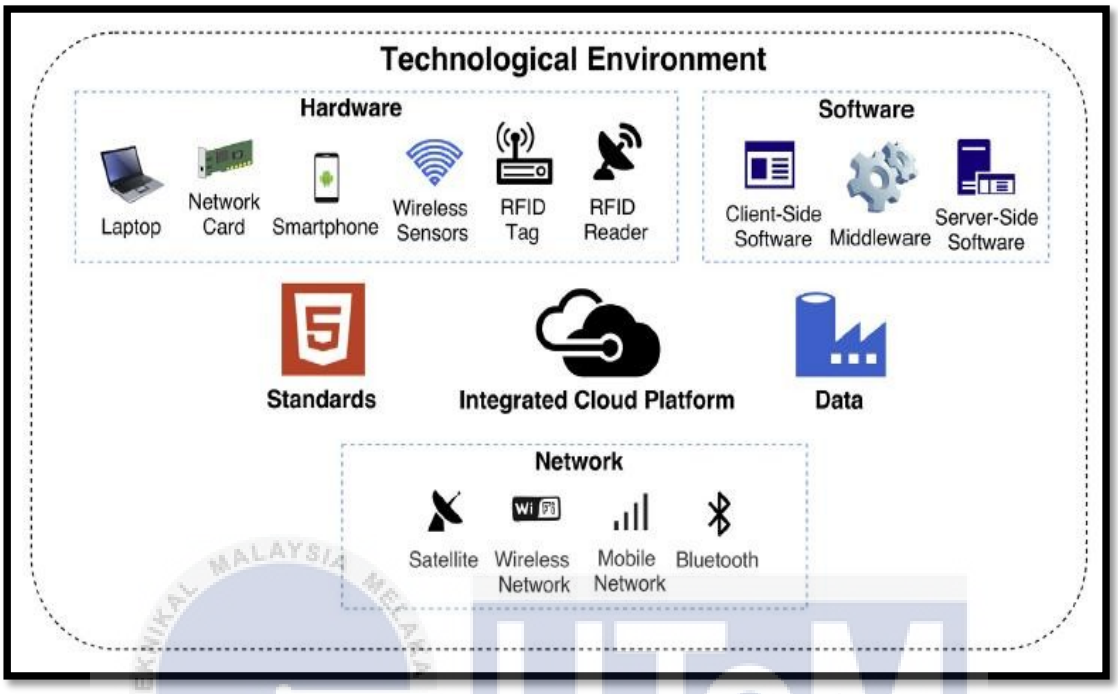

Figure 2.3:Technological Environments in IoT[6]

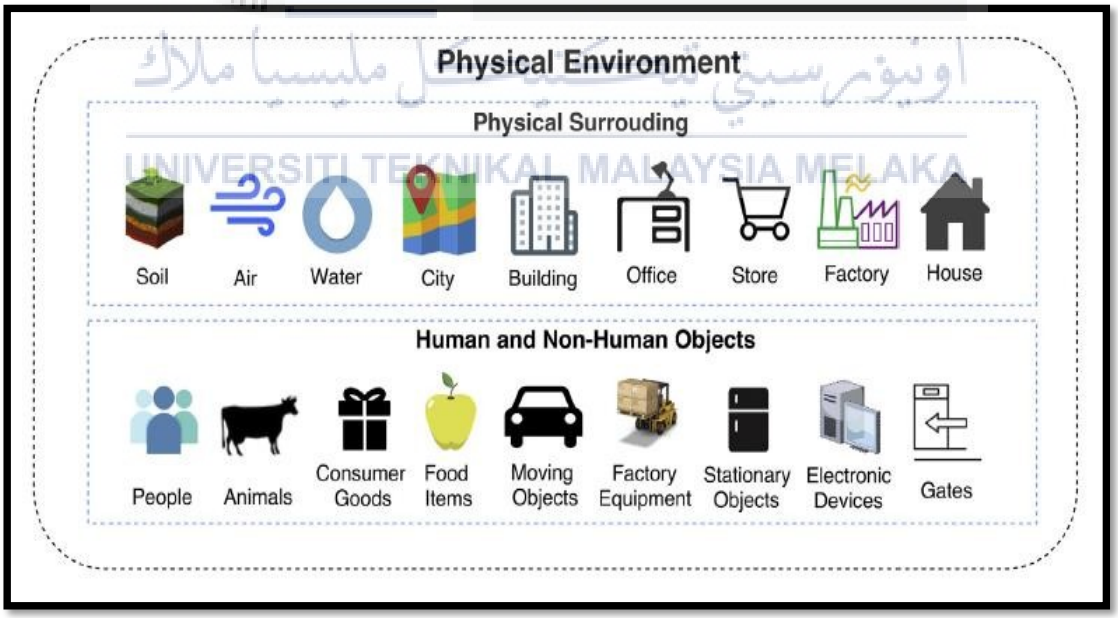

Figure 2.4:Physical Environment[6]

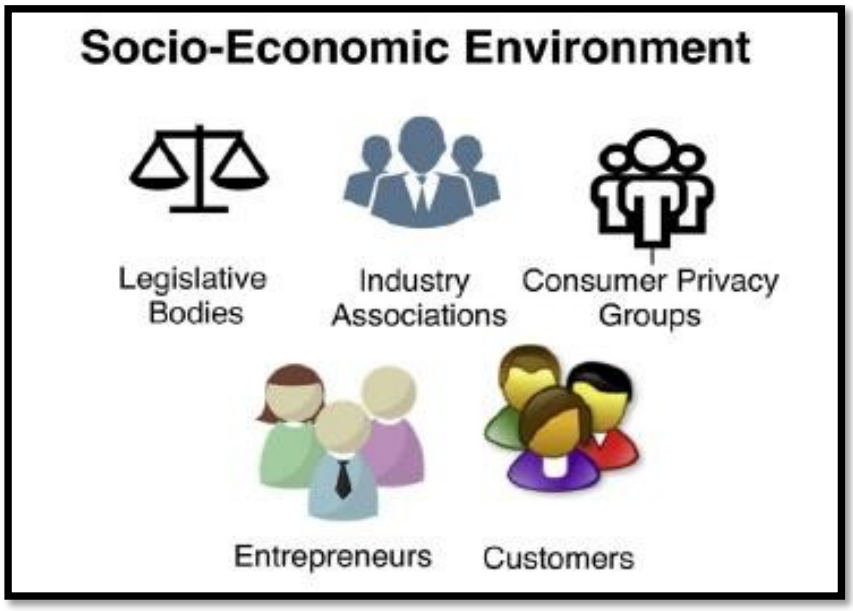

Figure 2.5: Socio-Economic Environment[6]

IoT is referred to like things and sensors that are intelligent, addressable exceptionally depending on their communication conventions and independent and adaptable with essential security. The author has categorized IoT in three visions: Internet-oriented: a vision that gives attention to the connectivity between objects. Things oriented: a vision that gives attention to common objects. Knowledge oriented: a vision that gives attention to representation, storage, and organization of information.[7]

IoT opens-up to numerous business opportunities where companies have the chance to build new business methodologies and models to apply the concept. Besides, inventive research opportunities to researchers and investigators of multi-disciplinary fields also have the chance to learn about IoT. Therefore, engineering skills, science, business studies and humanities are all within the scope of IoT. IoT also makes the world a smart world where everything is simply accessible in less time and energy implemented. There are few IoT smart applications in below Figure 6.[7]

Figure 2.6 : IOT based smart Applications[7]

The theory of IoT is that it is omnipresent no matter in any surroundings of humans and objects that interact with each other through wireless or wired links and has unique addressing scheme, which works together with other objects to create new applications and achieve a common target. The aim of the Internet of Things is to allow and support any things and any person to be connected anywhere, anytime with anything using the Internet. [8]

Figure 2.7:Internet of Things [8]

It is also mentioned that the Internet of Things is not a standalone technology, but it is a combination of various hardware and software technology. It gives solutions based on the incorporation of information technology, which refers to hardware and software that includes electronic systems for communication. [8]

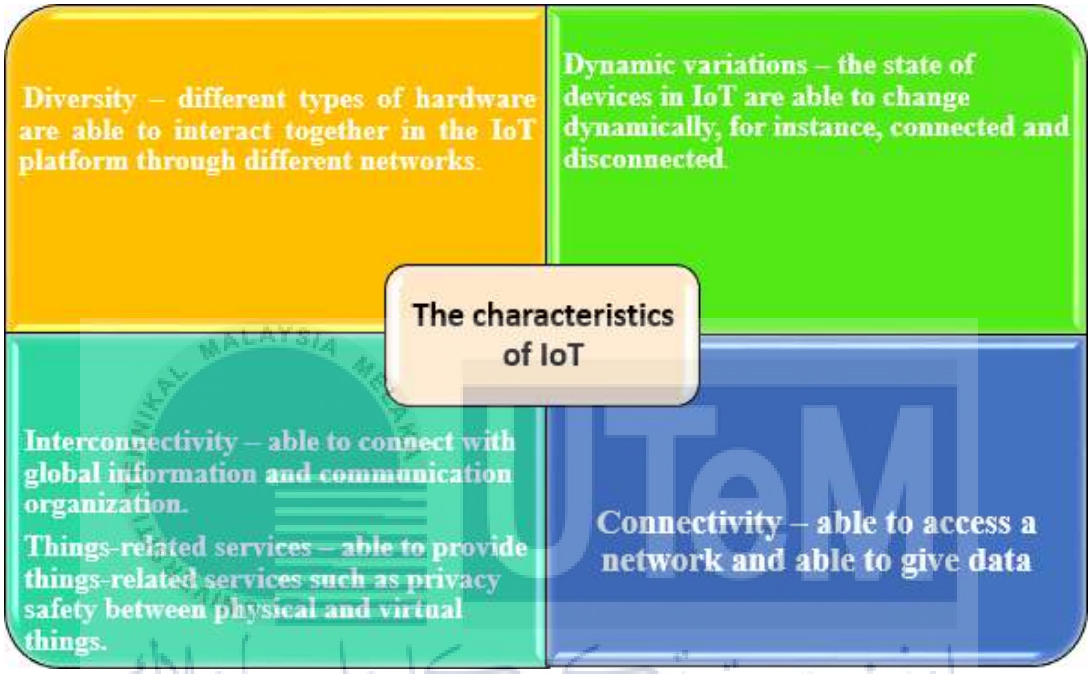

Figure 2.8: The characteristics of IoT[8]

2.3 Sign Language Recognition

Sign Language is a method used by the mute and deaf community to have interactions among themselves. There are many ways Sign Language could be recognized such as face expressions, finger gestures, body actions to deliver a message. Sign Languages have been implemented in the last 300 years ago and it has been a profound tool for the deaf and mute community. Sign Language Recognition is method of transforming gestures into words or alphabets of currently used spoken dialects. The gap between the world and the

deaf and mute community could be succumbing by using the translation of sign languages intowords by an algorithm.

There is development of Sign Language Recognition by using a wearable device to convert sign languages into speech and text. The device which was implemented is a glove-based device . This device is functioned to read the actions of a single arm and five fingers. In this device consist of five flex sensors to recognize the fingers movements, there is an accelerometer to detect arm gestures. The collaboration of both of this sensor could identify any specific movements that is related to the ASL, and it could interpret into speech through a speaker and convert it into a text that could be displayed into an LCD visualization.[9]

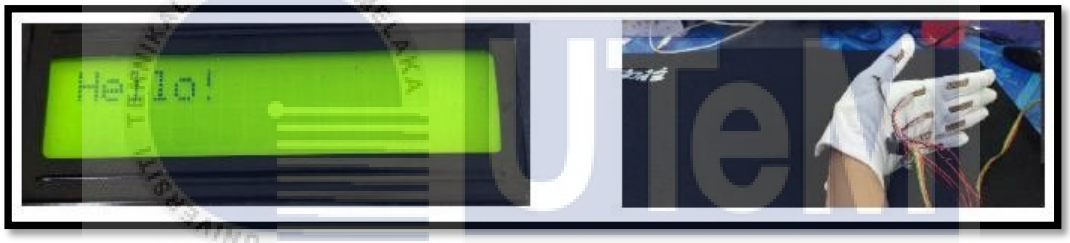

Figure 2. 9: LCD displays “Hello!” and a Sign language for “Hello!”.[9]

Besides that, hand movements correspond to a massive amount of data that could be used as a fundamental communication for people with hearing and speaking difficulties. The challenging part of this is the information of the hand movements is entirely depending on the movements of sequences, recognizing the hand movement with the accuracy. There are many techniques to transform gestures into speech but the recent one is Raspberry pi 3 implemented on a an ASL identifying by using picture pre-processing methods and a Convolution Neural Network(CNN) . In this method, the raspberry pi 3,camera module will be capturing an image and functions as a pre-processed to achieve a better resolution to extract better features. The CNN category will feed the features into it. The result will be

executed in the raspberry pi 3 if the time taken and the classification of result has been adequate to end users. However, there is limitations of American Sign Language(ASL) recognition whereby only simple static and certain Sign language will be converted into text-based output. [10]

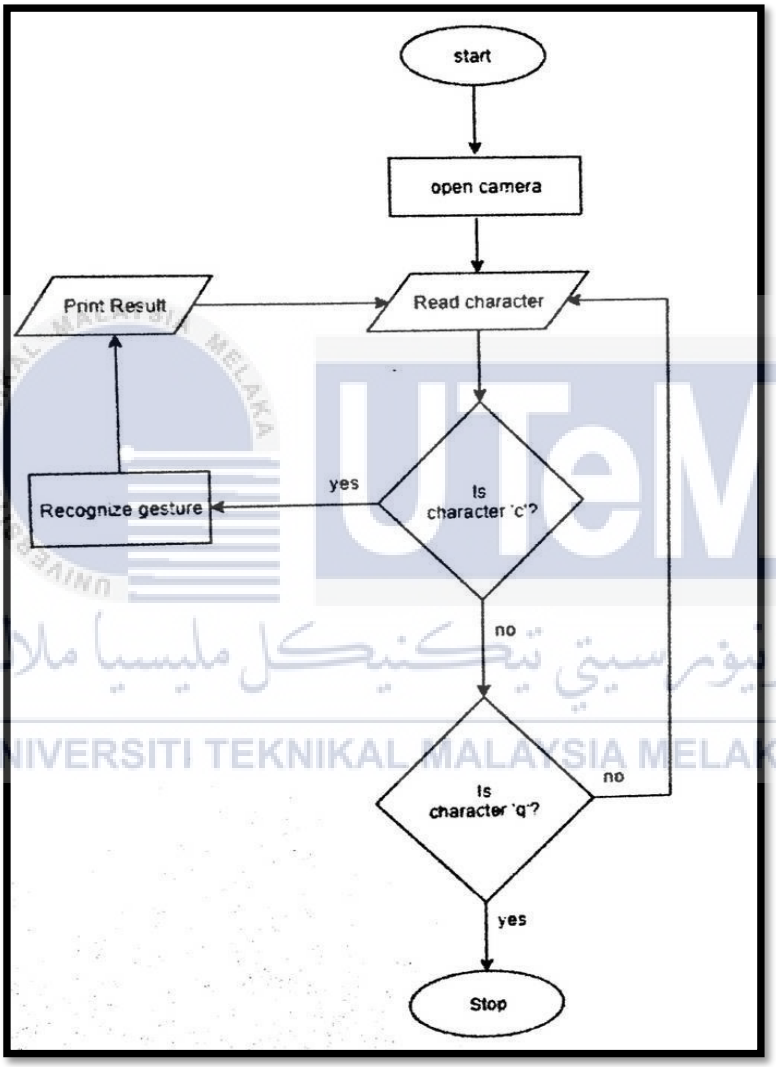

Figure 2.10: Flowchart of a Sign Language Recognition system [10]

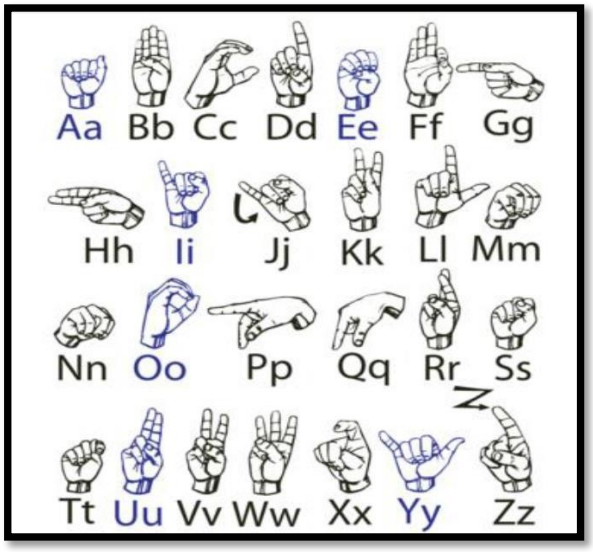

Figure 2.11: Sign Language Gestures and Characters[10]

According to the flowchart in Figure 10,it is a flow chart of a Sign Language recognition system. Firstly, the camera will be open. Then "Read Camera" function will be automatically ready. Once a hand gesture shown in the camera, the function 'read character' will try to detect the alphabet shown. A pop out question will appear example 'is character C?'. If alphabet C is shown , then the character is recognized, and it will print out the result. In case, the result is not recognized then it will request another alphabet like the hand gesture shown previously . If it is detected, then it will stop .If the character was still not recognized, then the system will loop back to 'Read Character' to detect upcoming new gestures.[10]

$$G(x,y) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{\frac{-x^2+y^2}{2\sigma^2}} \dots\dots\dots\dots (i)$$

$$T = T[x, y, p(x,y), f(x,y)] \dots\dots\dots\dots\dots (ii)$$

Figure 2.12:Calculation used for removal noise[10]

Gaussian Filter is used to get rid of unnecessary noise as shown in the equation I and ii, whereby the value x represents the distance between the starting point in the horizontal axis. The distance y is from starting point of the vertical axis. σ is the standard deviation of the Gaussian distribution. Thresholding process is used to convert the image to binary. In equation ii, T represents the Threshold value, whereby x and y are the coordinates of the threshold value point of p(x, y) and f(x, y) were the gray level image pixels.[10]

2.4 Braille Learning

Braille was invented by Louis Braille. He was born in Coupvray , France. He had figure out an easy method to create alphabets to read by using fingertips. Basically, Braille is a learning system are design for blinds by using a dot system. People who are visually impaired or have exceptionally low visions uses braille system to read. Braille is currently implemented by millions of people all over the globe by using their native language.

A Braille based system has been designed specifically for the deaf and visually impaired community to have interaction and communications among themselves. A simple SMS system has been interfaced by using Braille pad with the mobile phone. A deafblind people can communicate with the ordinary person by sending a SMS to the specific mobile number that has been connected to the GSM module. Message sent by using serial data transfer to the microcontroller will maps the subsequent alphabets of the message according to the braille script. The microcontroller is directly connected with the braille pad.[11]

A braille learning system tool had been invented for the blind children. It is designed for the children to learn the pronunciations of alphabets and English words by using

Raspberry Pi 3.There were two mode invented, whereby the first mode is learning mode and the second mode is question mode. The microcontroller is connected to the voice recognition system processing and text to voice conversion. [4]

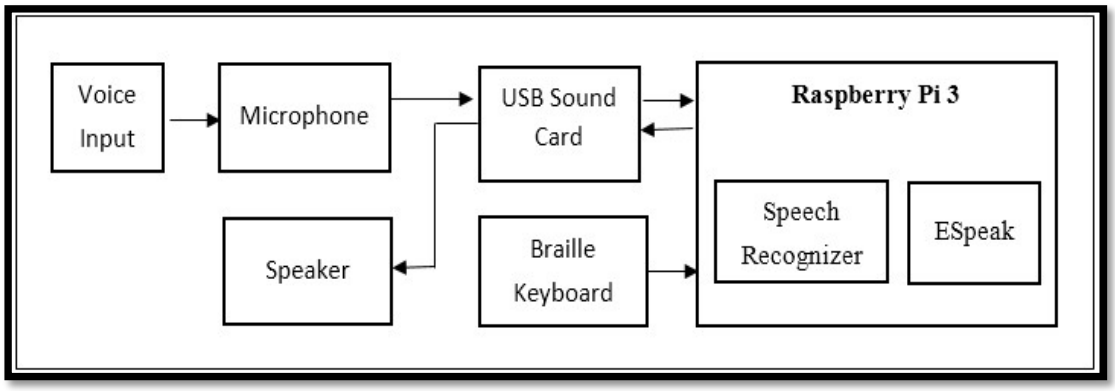

Figure 2.13: System Block Diagram

Elaboration for the block diagram above, the brain of the system is the Raspberry Pi 3. It uses Phyton as a main programming language that entirely supports the microcontroller such as C or C++. The voice input by the visually impaired through the microphone, the USB sound card connects to the microphones and speakers. When an instrument issue a question in the inquiry mode, the children will say the alphabets then the device will try to declare whether it's true or false. This mode is speech to text method. In a nutshell, this design of the system mainly to enhance the interactive learning media for the visually impaired to pronounce English letters and words to be completed.

2.5 Comparison of Previous related Research Articles

Table 2.3 : Comparison of previous related Research Article

No	Project Title	References	Technique Used	Results
1	Portable Alphabet Learning Device	[1]	-Raspberry pi with LCD -Phyton programming Language	The results of this study indicated that the development of this device can facilitate learning the alphabet by using raspberry pi with LCD.
2	Teaching and Learning Module on Learning Disabilities (LD) Using RFID Technology	[3]	-RFID tags -RFID readers -Database	This research has done a storybook reading system which makes beneficial to stimulate teaching and learning process for the children to recognize letters and spell words,
3	Design of an interactive learning media to pronunciation characters	[4]	-Raspberry 3 -Voice recognition system (Espeak) -Braille Keyboard	In this report ,the learning media is expected to help the blind child in learning the characters and English words and expected this instrument can be used for use in the school blind.

	and words English for blind children			
4	Braille keyboard and printer interfaced	[5]	-Arduino -Braille Keyboard -Speaker	This design is a Braille system that supports all levels of the Braille system encoding so beginners as an advanced users can use it for typing. Blind Aid may be a self-learning system by implementing this Braille system in their project.
5	Braille Based Mobile Communication for Deafblind People	[11]	-Braille pad -Microcontroller -GSM Module -Braille Driver	A letter-to-letter conversion is done, and the information are sent to the braille driver. In the braille pad, mini-DC motors are used for the reducing the size and for the easy usage
6	Easy Chair Preprint American Sign Language recognition by using CNN for Raspberry Pi	[10]	-Camera Module -Gesture Input -Raspberry pi	.It was able to recognize the simple static ASL gestures with accuracy above 96% and classify real-world environment image with accuracy above 70% in good lighting conditions.

2.6 Summary

In a nutshell, Literature Review is an important chapter to learn and relate into this current project with the previous projects that has successfully completed. I have done research mainly on how Braille and American Sign Languages (ASL) are designed to help the blinds and deaf children to live a normal life in the society. Being born with disability should neverbe a burden for the deaf and blinds to be successful in life. In the current IoT world, inventions and ideas will never be a barrier to help the society, especially the Blind and Deaf.

Besides that, there were some innovations for normal children to learn any new languages. So, in this analyzing and examining the previous papers I have also successfully created a customizable learning GUI for children just by retyping the word displayed from the image and click speak now to hear them.

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CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discusses about the methodology on how exactly this project is going to be implemented to achieve the desired objective .Moreover, this chapter will emphasize on the detailed elaboration of hardware and software utilized in this project and followed by the projects flow chart. There are three parts to focus on which are project flow, data collection, designation on this project and hardware specification. Flow chart was created to view the entire process of the project.

3.2 Methodology

This Project flow will emphasize on two main subtopics. The first subtopic is about the Gantt chart. Gantt chart will show the flow of the project implementations from week 1 to week 14. Second Subtopic is on the block diagram to ensure on how project flows

3.2.1 Block Diagram

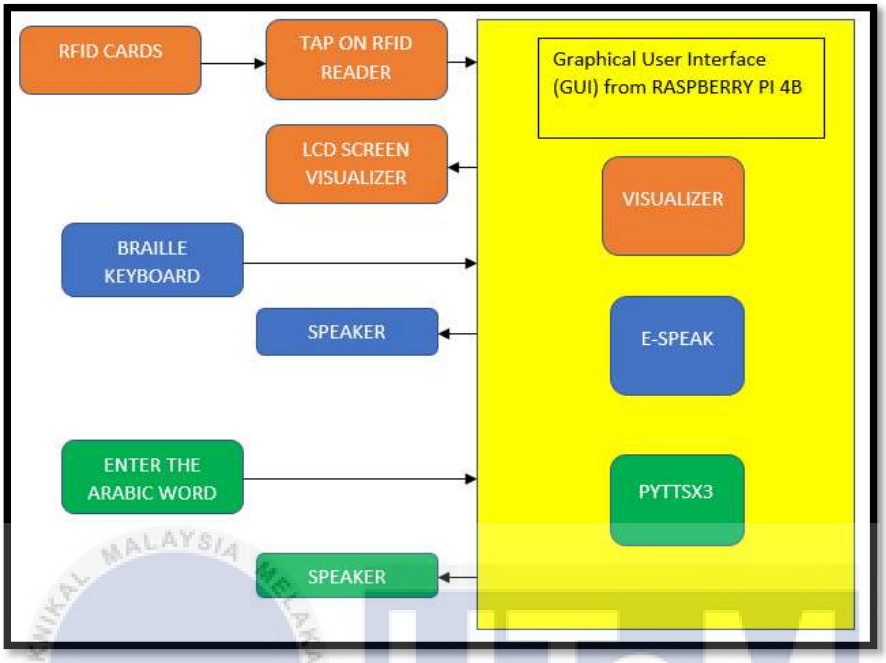

Figure 3.1: Block Diagram

Explanation of the Block Diagram starts with the brain of the project whereby it is the latest model which is the Raspberry Pi model 4b. This Raspberry pi has 4GB SD RAM with 2.4Ghz and 5.0Ghz IEEE 802.11ac wireless Bluetooth 5.0,BLE Gigabit Ethernet. It has 2 USB 3.0 ports with 2 USB 2.0 ports. Phyton is the main programming that supports Raspberry pi. Phyton uses programming language such as C/ C++. The RFID is the abbreviation for Radio-Frequency Identification. There are many types of RFID reading technology, tags, and readers. In this project, RFID Smart ID Card Reader EM4001(125 KHz) ID reader is used, it has 125 KHz of frequency, an interface USB and could read the first 10 digits of the RFID card. RFID card will be interfaced into the Phyton coding such a way then when the RFID card is tapped on the reader ,there will be a Sign Language Visualize on the LCD.

The braille keyboard is an ordinary wireless keyboard with braille keys on the keypad. The i8 mini wireless keyboard's operation frequency is 2.4G. It has operating distance up to 10 meters.so when a child press on the alphabets (braille keyboard), there will be abrupt respond from the speaker. To achieve this, a software called Espeak is implemented to convert the letters to sound. Besides that, Espeak is a tool to convert text into sound that is used in LINUX operating system through command line. This is used in many other languages too.

The third method is by using Tkinter software and the engine named pyttsx3 software. The python text to speech engine software allows the system to read what's in the box and release sound using speaker. The user will be entering the word from the above image and clicking speak now.

3.2.2 Designation of Project

In this project there are three fundamentals requirement needed to successfully run the project. The first three element are the raspberry pi, Braille keyboard, the RFID reader, and its cards. The designation is divided in to two parts. The first part is on ASL Visualizer. ASL Visualizer is designed such as when the RFID cards are tapped on the Reader, there will be a ASL visualizer on the screen. A phyton programming is used to run this project. As this project are mainly focused on the children's to first learn their basic Sign Languages Alphabets . The second designation is a i8 mini wireless braille keyboard. It is designed when a children pressed on a braille dot keyboard from A-Z. There will be an output from the speaker. The outputs are coming from the Espeak software installed in the Raspberry pi.

Figure 3.2 Designation of Project

3.2.2.1 Flowchart

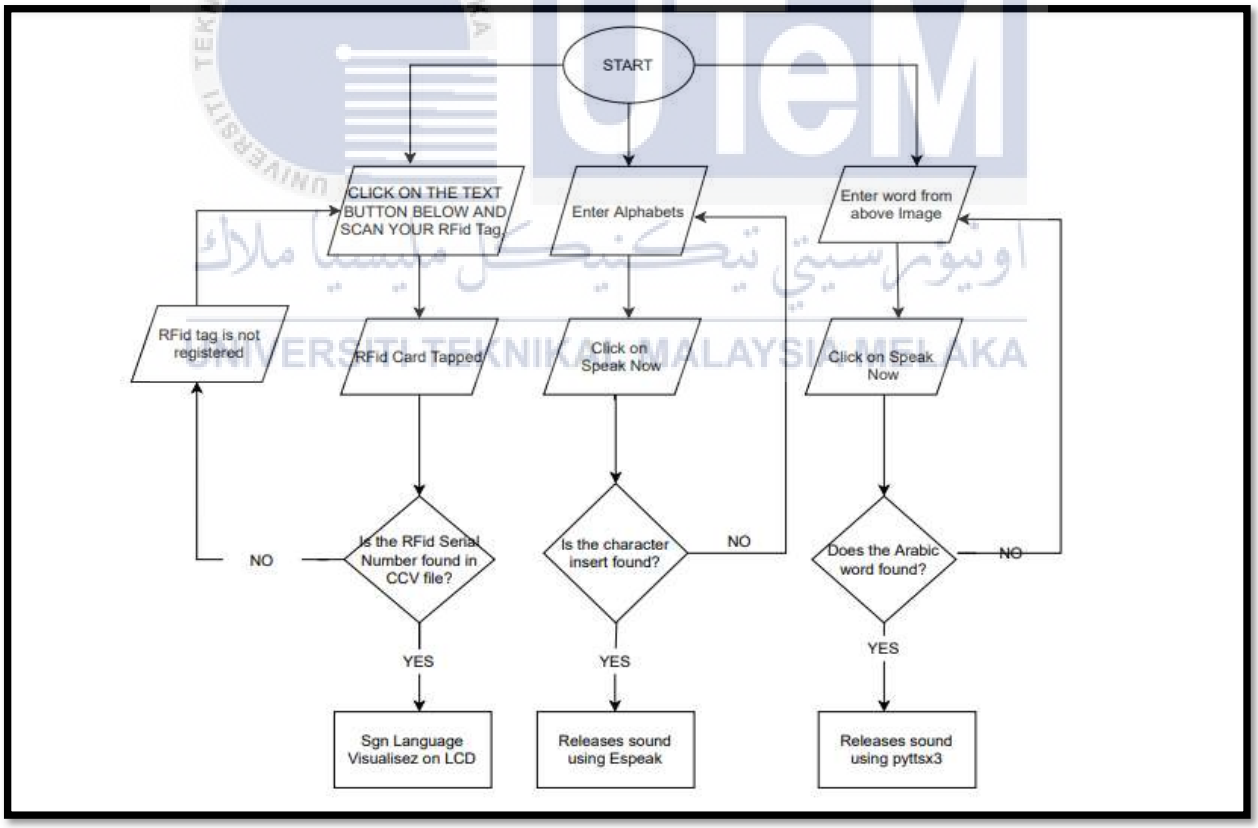

Figure 3.3:Flowchart of the entire system

Based on flowchart figure 4,whereby it is operated in two ways. When a visually impaired(Blind) child, tapped a RFID card on a RFID reader, it will first check whether the card tapped is valid card or not, if the card is valid, then an output will visualize on the LCD screen .Incase card tapped is invalid ,then the child must tap by using a new card. On the other hand, if a child presses on a braille keyboard, then there will be output fetched from the Espeak software .If a wrong character input, then student had to retry again with the correct character. Lastly, for a customizable learning system, the first step is children must retype the word from above image, then must click on Speak Now. If the Arabic word found, it will release sound using pyttsx3 ,otherwise the student had to retry from the beginning.

3.2.3 Data Collection

Data Collection is an important method to analyze information on how people or society react to this current project. Data collection is divided into two parts. The first part is a study on Edgar Dale Cone and a survey on how people react on the exposure of Sign Languages.

3.2.3.1 Edgar Dale Cone

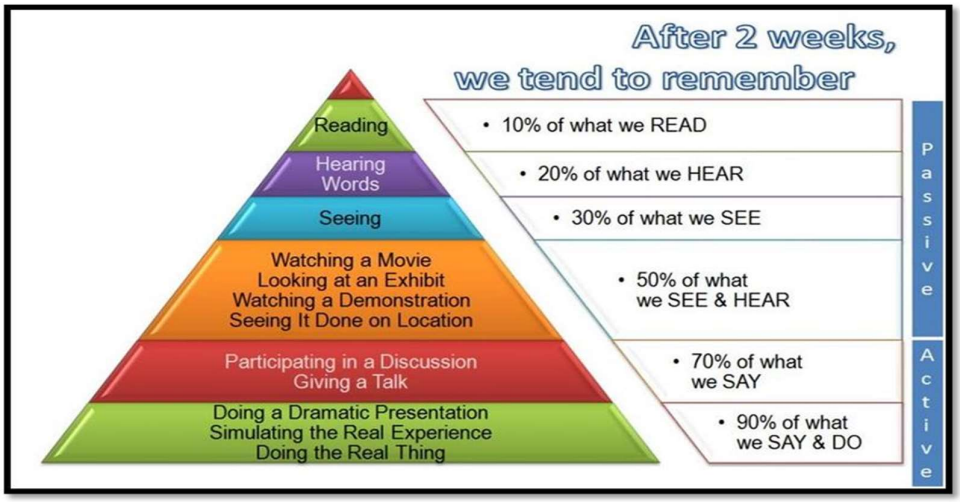

Figure 3.4 : Edgar Dale Cone

Edgar Dale Cone Experiment is a study done by Edgar Dale during the 1960s. According to this research, the top of the cone, shows the least effective method and the bottom of the cone shows how to implement a process to achieve a 50 - 90% absorption and the tendency to remember even after two weeks. It is clearly stated that when students are either physically engaged ,watching a video, demonstrations , say and do the real thing, the output could be tremendously great and highly effective. With this, I could conclude that this project on visualizing the ASL could be successful.

3.2.4 Google form surveys

The Google Structures is a cloud-based information the board apparatus utilized for planning and creating electronic surveys. This device is given by Google form. Furthermore, openly accessible on the web to anybody to utilize and make online surveys. The anyplace whenever access and other benefits (limitless overviews, 100 percent free) have made Google Structures a well-known item in on the web study research. Helia Jacinto11 of the College of Lisbon says about Google Structures that "I have involved Google Structures in a study (for an exploration project). It included north of 30 inquiries and pointed toward social affair information from explicit understudies from primary schools in the south of Portugal. The overview connect was scattered box email and box the school's board. It was more than 1200 reactions in a bookkeeping page, which are being coordinated and investigated by a partner particular in such information investigation. It has been chose to utilize Google Structures since it appeared to be amazingly simple to fabricate the survey. In general, the group thinks it is a decent asset and turned out only great for what it required".

The accompanying segment clarifies the means engaged with involving Google Structures for online study. The creators took an exploration study led by one of them to act as an illustration for clarifying the utilization of Google Structures. The theme requires the

information with respect to employability status of graduates, convenience of LIS abilities in business. Each progression beginning from planning and creating electronic review devices to finish of the study and examination of the information is talked about.[17]

3.2.4.1 Google Form Surveys on early childhood Educations

The 4.0 modern upheaval requests people to stay aware of the improvement of the advanced world. The progress of the advanced world isn't just appreciated by the individuals who work in innovation and industry yet in addition everybody living on the planet. The improvement of advanced innovation today has been remembered for the universe of instruction, including Early Childhood Education (ECE). ECE should have the option to apply advanced innovation items in this computerized period as a component of instructive change. One illustration of innovation in computerized time is the change of manual polls into advanced surveys. Computerized polls that can be handily applied in ECE are Google structures. The justification for picking Google structures as a computerized poll for ECE is that Batubara (2016) says that Google structures can be as one of prescribed programming to make on the web estimations.

The utilization of Google structures for ECE in the advanced period is to: 1) online enlistment structures for new understudies' confirmations; 2) movement enlistment structure; 3) review clients of youth administrations; 4) an elective method for making computerized idea boxes; 5) assemble analysis and ideas for the headway of ECE Establishments; 6) gathering parental cravings for kids' schooling or nurturing exercises; and 7) instruments of creating ability of teachers through research. The Google structures enjoy a few benefits that a manual survey doesn't have, to be specific paperless, harmless to the ecosystem, time productive, work costs, exact summarization of respondents' responses, and viable.[15]

3.3.4.2 Information Handling Techniques

Information handling techniques go through a few phases, to be specific: altering (checking and changing on a case-by-case basis to the examination information, the poll has been filled go big or go home); coding (the method involved with recognizing. Furthermore, grouping research information into numeric scores or character images); and scoring (giving a score on every respondent's response given a score and the scores are organized in stages dependent on a Likert scale). E.g., 1 to 5 from Easy to Hard. Lastly, all the data of the surveys are neatly and automatically collected and generated in Forms, with real-time response info and charts.

3.3.4.3 Conclusion

The Internet based studies or electronic reviews have become significant considering lesser expense in administrating questionnaire, ability to contact a large populace, geological and transient benefits, arriving at extraordinary populace effectively and different advantages. The review shows how the web-based survey is utilized for information assortment fora little review in library and data science utilizing Google Structures. The free accessibility of the device and programmed recording of client reaction in its bookkeeping page have made information assortment and investigation basic. In a nation like India where web client base is expanding step by step electronic study devices might end up being unmistakable decision for overview research.[17]

3.3 Hardware Specifications

In hardware specifications , a clearly explained on the descriptions and specifications of each equipment that has used in this project.

3.3.1 Raspberry Pi

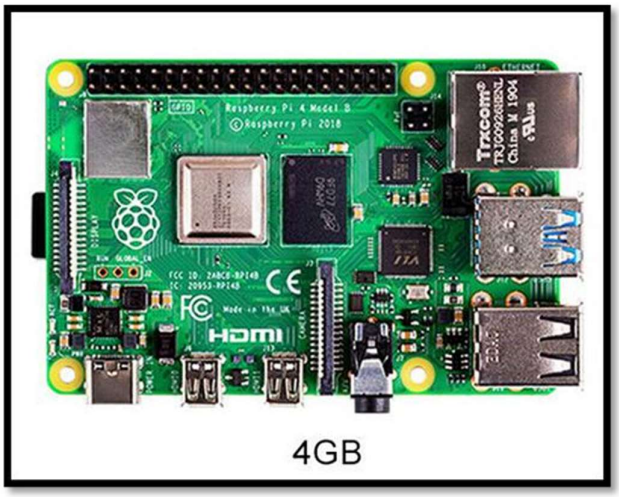

Figure 3.5: Raspberry pi

Descriptions	Item Specification
Raspberry Pi model 4B includes a high-performance with 64-bit quad-core processor and features as dual-display. It supports resolutions up to 4K via a pair of micro-HDMI ports. The hardware video decodes at up to 4Kp60, up to 4GB of RAM. It uses dual-band 2.4/5.0 GHz wireless LAN, Bluetooth 5.0, Gigabit Ethernet, USB 3.0, and PoE capability (via a separate PoE HAT add-on).	• Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC 1.5GHz with 4GB LPDDR4-2400 SDRAM • 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE with Gigabit Ethernet • 2 USB 3.0 ports; 2 USB 2.0 ports. • Micro-SD card slot for loading operating system and data storage

3.3.2 USB RFID

Figure 3.6:: USB RFID reader Smart ID Card Reader EM4001(125Khz)

Description	Specifications
RFID USB Reader 125khz Proximity Sensor EM ID Smart Card Reader has many applications. It has a Free drive read only ID tag serial number Mini reader device. In the process of use, it can be plugged and play at will. Without external power supply, users do not need to load any drivers, and output them to the computer through data interface, which is equivalent to automatic keyboard number transmission. The small size design is not only stable and reliable, but also enables the equipment to be embedded in the equipment more perfectly.	• Read card type: TK4001, EM4100, and other ID cards • Read card distance: 0-80mm • Reading time: < 100mS • Speed of card reading: 0.2S • Reading space: 0.5S • Communication interface: USB • Working temperature: -20℃~70℃ • Working voltage: 5V • Working current: 100mA

3.3.3 RFID cards

Figure 3.7 :RFID Card

Descriptions	Specifications
RFID Proximity Card is a very thin, truly credit card thickness of proximity passive card. It has very flat surface to print any photo ID directly on both sides of card with a direct image or thermal transfer printers. Works in the 13.56MHz RF range.	• Operation frequency: 125Khz • Thickness: 1.8mm with dimensions: 85 x 54 x 0.8mm • Detecting distance: 2-10CM • Each Cards has print ID on the card surface and the cards water resistant • Material: PVC

3.3.4 I8 Wireless Keyboard with Lithium battery

Figure 3.8: Wireless Keyboard with Lithium battery

Descriptions	Specifications
This wireless Keyboard comes with 3 in 1 wonderful combo with 2.4Ghz Mini Wireless Qwerty Keyboard, the touchpad Combo, it has Interface adapter built-in standard with QWERTY Keyboard with overly sensitive smart touchpad 360-degree flip design. It is design .Auto Sleep and Auto Wake Mode. Wireless Remote Control. The ergonomically handheld design is easy to Carry and Operate. It is Build-In Removable Rechargeable Li-ion Battery.	• Operating range: 10 meters (MAX), without signal disturbance and no direction limit. • Transmit power: +5db Max • Operation voltage: 3.3V • Operation current:<50mA • Sleep current:<1mA • Weight(grams): 110g • Size: 146*97*19mm(L*W*H) • Power by Lithium battery

3.3.5 LCD 3.5inch

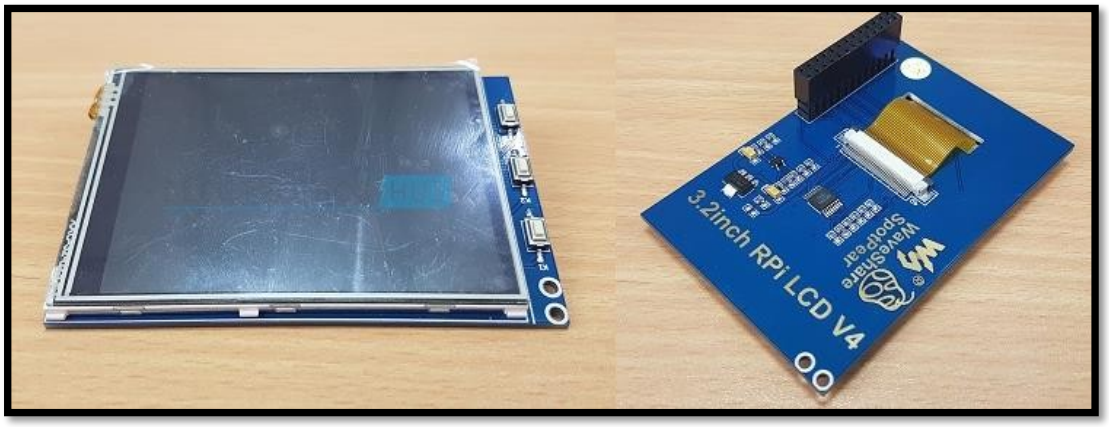

Figure 3.9 : 3.5-inch LC

Descriptions	Specifications
This 3.5-inch touch screen module is designed particularly for Raspberry Pi, using the latest Linux Core system (vision 3.18.9), the latest Raspberry Pi official UI desktop file system and the fastest SPI transmission data. It is also an ideal alternative solution for HDMI monitor and convenient Men-Machine interface for Raspberry Pi, combined with the portable power, DIY anywhere anytime.	• Type: TFT • Size: 3.5 inch • Touch Control • Refresh Rate: 50Hz • Resolution: 320 x 480 pixels • Backlight LED • Current: 120mA Power: 5V • Interface: SPI (Input 125MHz) • Working Temperature: -20 ~ 70 ℃

3.4 Limitations of methodology

In this project, the learning of American Sign Language system is only for a basic preliminary student of age between 6-8. In this system will only allow the children to learn basic sign language and basic Braille learning of Alphabets only. Besides that, tapping of RFID cards are also limited in range of detecting as I'm using a low frequency RFID whereby RFID cards must be tapped and touched on the RFID reader for the cards to detected. This project is an innovation trial to change the learning system to be fun and effective.

3.5 Summary

In this chapter, I have clearly explained and elaborate on how the projects will be implemented. At the beginning of methodology, it has been written about the project flow, whereby I have inserted Gantt Chart to ensure the project flows according from week 1 to week 14.Secondly,I have inserted the block diagram, flow chart and data collection had been done. Data collection has clearly shown a positive output that if there is a fun and effective methodology then the society would be grateful to learn the Sign Language to have some communication with the mute and deaf.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results and analysis on the development of a portable ASL Visualizer. In this project ,an interfacing of RFID card had been done with Raspberry pi andPhyton coding used to visualize the output. Preliminary results are shown and observed below. Analysis of tapping with different RFID cards are shown below.

4.2 Results and Analysis

In this part, the steps on how to visualize a sign language by using RFID cards and results that had experimented will be according described . The complete result below are all Alphabets with numbers are included.

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4.2.1 CSV File

This is a CSV file that is used to store information such as numbers ,the RFID's serial number and which Alphabet the card represents will be used to fetch RFID details to the RFID reader to visualize ASL.

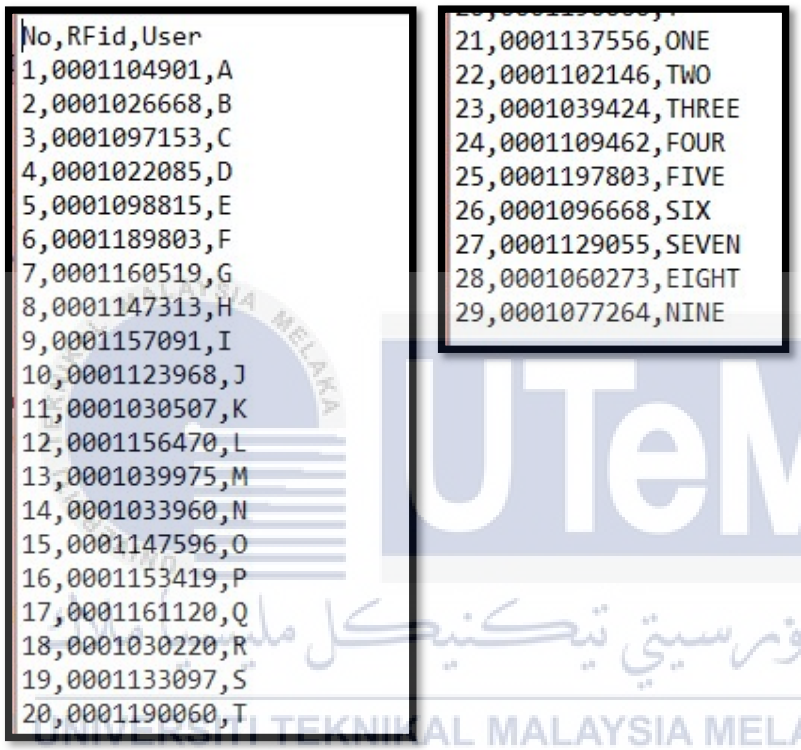


Figure 4.0 : Database.csv file for Python Coding to fetch RFID data

4.2.1.1 Result from VNC Viewer

A VNC viewer is used to interface between laptop and Raspberry Pi that has a remote access function that could take control of Raspberry pi on any other devices. Procedures to set up the visualizer is firstly; Raspberry Pi must be connected to a power supply such as power bank. Secondly, RFID reader and wireless keyboard must be plugged in to the Raspberry pi. Once the code is Run, Figure 4.2 will be visualized.

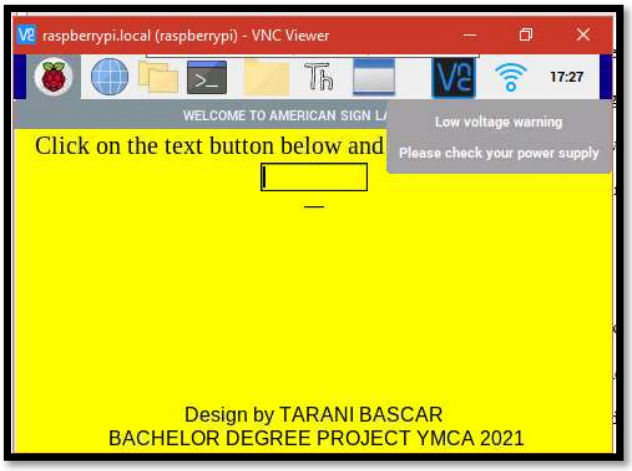
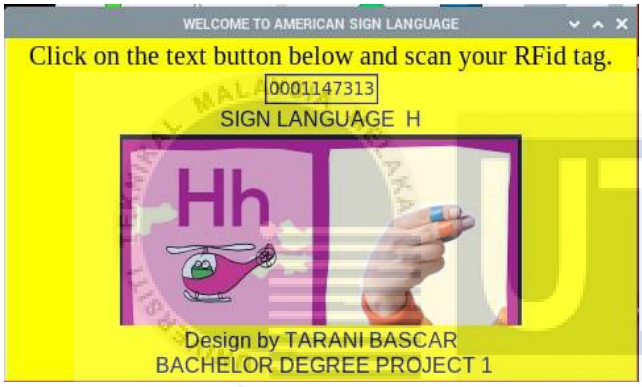


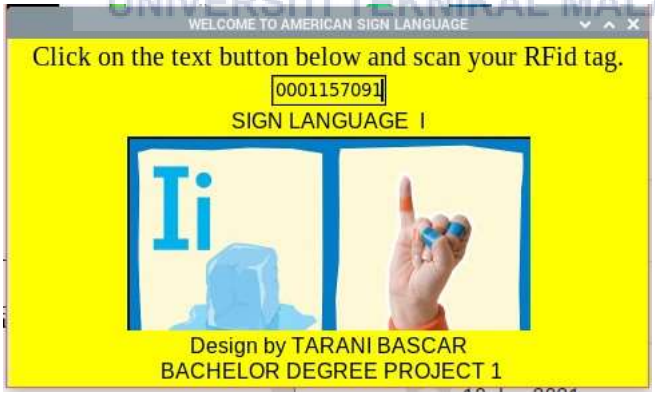
Figure 4.1: Output before RFID card is tapped.

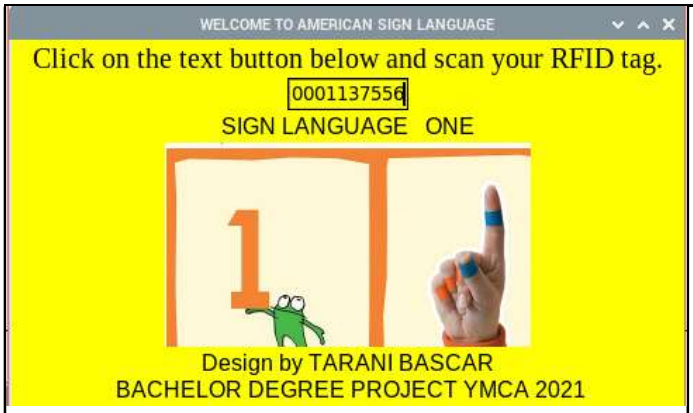
Figure 4.2:Output of Unregistered RFid Tag

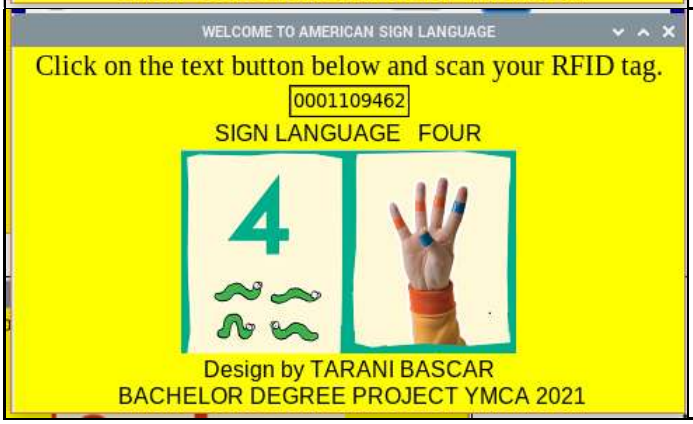
Table 4.1:Table of ASL Visualizer and Flash Cards

RFID cards after being tapped by RFID cards	Registered RFID Flash Cards
	
	
	









Based on the benchmarking paper [9] I have researched and examine on; I have done improvisations and betterment by first making the children to learn the ASL first. The papers I have studied are for advanced level whereby for students to implement the ASL by showing the ASL and the system will recognize it. In here I have done one step behind whereby to first let the children to recognize the ASL and speak out the language first.

Table 4.1 displays on programmed RFID Cards being tapped to visualize ASL. Firstly, the user must tap the card in the box provided, then on the LCD screen, it will mention what Sign Language is being tapped, e.g., ”Sign Language A” simultaneously followed by an image that shows the ASL. If the RFID reader could not read the card, then it will mention “RFid is not registered” as in Figure 4.2.After that, children’s must tap either correctly on the reader, or they must pick and registered card to visualize the ASL

4.3 Data Analysis conducted in Raspberry pi to test the Raspberry Pi’s internet speed.

There were two method analysis conducted which is the speed of internet using WiFi and hotspot. The main reason to conduct this data analysis is to figure out the reason of lagging when the RFID card is tapped. Two different locations for this analysis have been done whereby it’s at WiFi(home) and Hotspot(Deaf Blind Society).

4.3.1 Data Analysis based on Wi-Fi done at Home

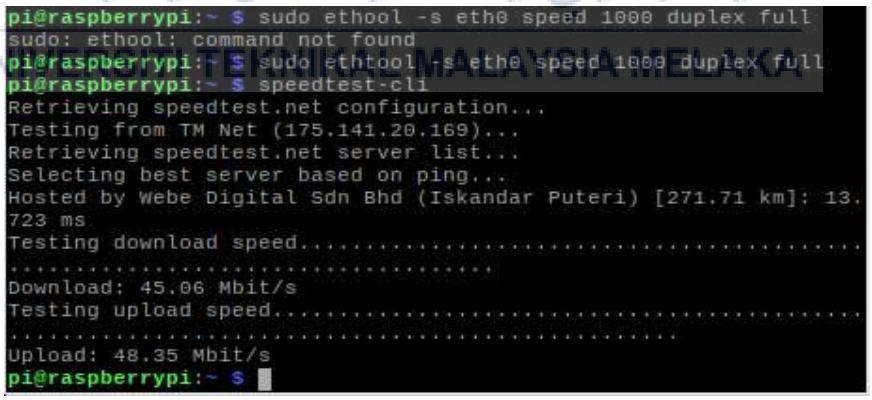
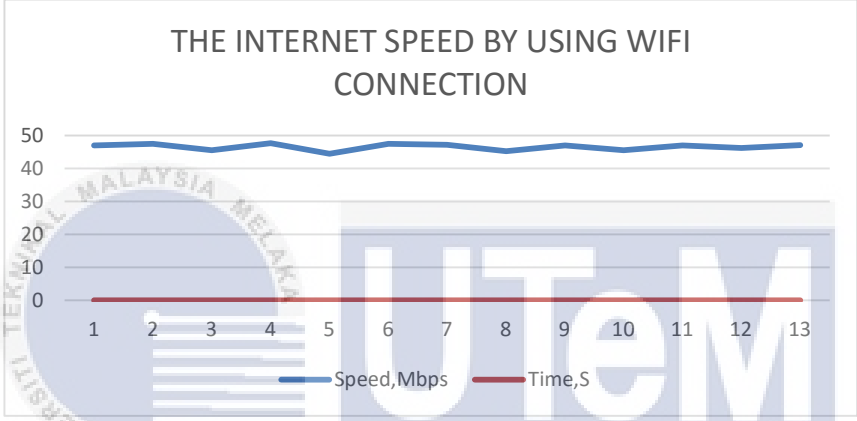


Figure 4.3 Output data from raspberry pi to test the raspberry pi

Time,S	Speed,Mbps
2:00Pm	46.94
2:10Pm	47.51
2:20Pm	45.43
2:30Pm	47.61

2:40Pm	44.46
2:50Pm	47.49
3:00Pm	47.1
3:10Pm	45.2
3:20Pm	46.92
3:30Pm	45.44
3:40Pm	46.93
3:50Pm	46.21
4:00Pm	47

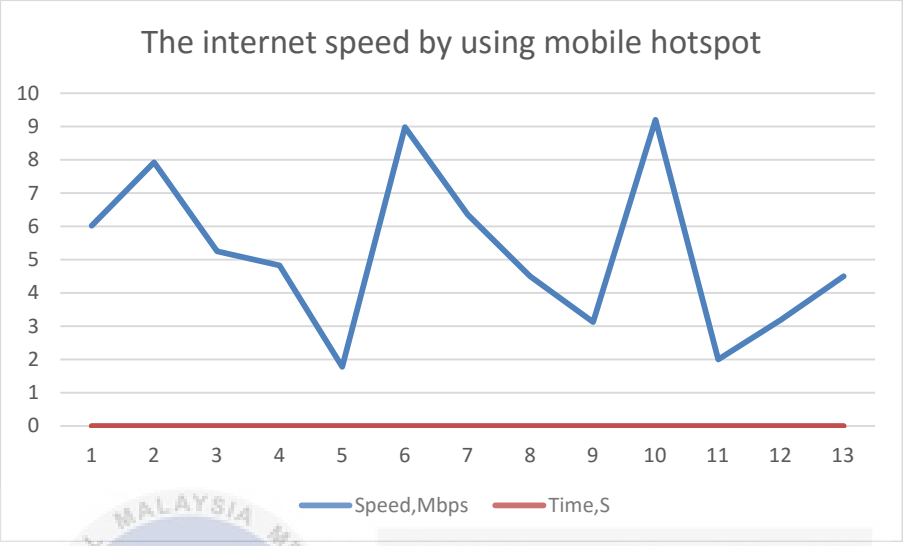
Table 4.4 : Time taken to test the internet speed by using WIFI



4.3.2 Data analysis based on mobile hotspot done at the Deaf Blind society.

Time,S	Speed,Mbps
2:00Pm	6.02
2:10Pm	7.92
2:20Pm	5.25
2:30Pm	4.83
2:40Pm	1.78
2:50Pm	8.98
3:00Pm	6.36
3:10Pm	4.5
3:20Pm	3.12
3:30Pm	9.2
3:40Pm	2
3:50Pm	3.2
4:00Pm	4.5

Table 4.5 : Time taken to test the internet speed by using hotspot



Based on Figure 4.2 and 4.3, it shows the internet speed for every 30 minutes when a raspberry is running. Based on the analyzed data, it shows that Wi-Fi has a better and a stable internet connection based on the graph. The graph remains constant with less fluctuations.

During the implementations of this project to the deaf and mute community there was lagging in the output ASL visualization. The output data was inconsistent as the reason was due the internet speed, the output was delayed by few milliseconds. After the data analysis was constructed, it clearly shows that hotspot connection has more fluctuations in the graph compared to Wi-Fi speed. WIFI has better output with stable output.

4.4 BRAILLE TO SPEECH

The second part is Braille to speech whereby when a character is being inserted by using a Braille keyboard, there will be output from the speaker mentioning on the character that has been typed when button ”Speak Now” is pressed.

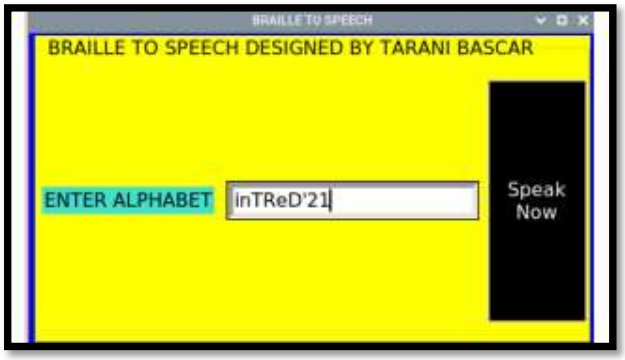


Figure 4.4 Braille to speech

4.5 Customizable Portable Learning Language

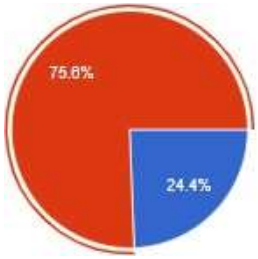
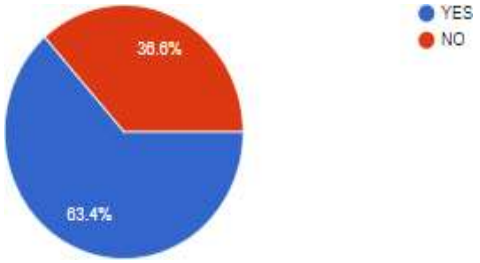
In here a new designation method for the normal children to learn any language. The language chosen here is Arabic language. Once the system run, it will show the picture of the first Arabic word, Then the children must enter the word from Above as shown in Figure 4.3 then click Speak Now button. Then the Voice will be heard for "Alif".

Figure 4.5 GUI for Arabic Learning System.

Figure 4.6 : GUI after the student has entered the Arabic word.

4.5 Google Form Output based on Survey 1

Survey on the reaction of the society about Sign Language and their interest to learn the Sign Language. According to the survey on the reaction of the society about Sign Language and their interest to learn the Sign Language, there were 40 responses recorded and analyzed below.

Do you have any family members, friends, relatives who are deaf or blind?	Have you encountered Sign Language in public ?
	

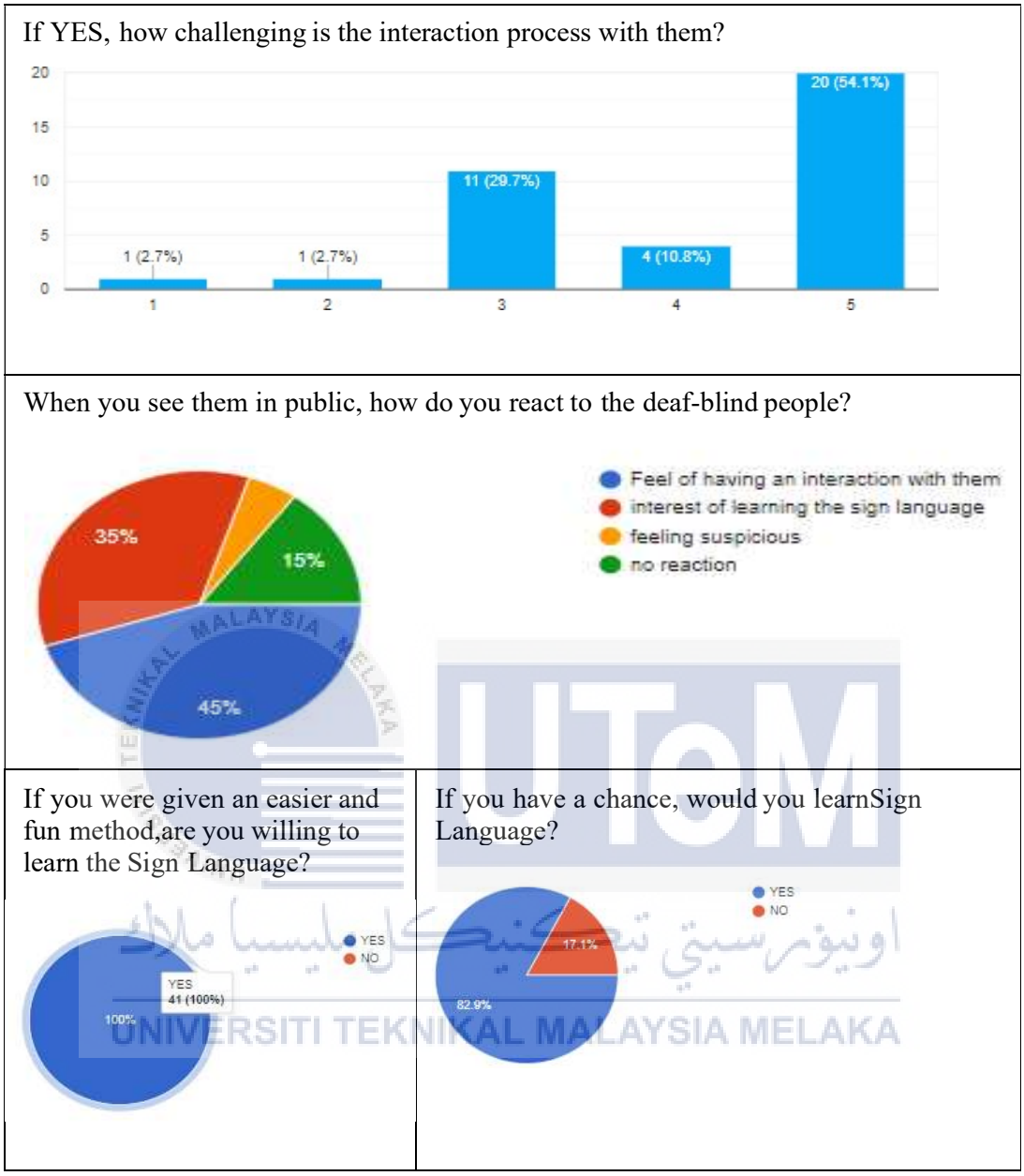


Figure 4.7: Statistical outputs from survey on Learning ASL

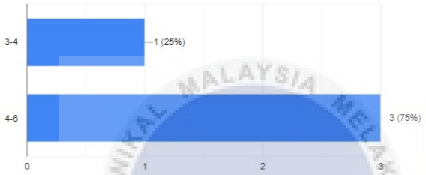
Based on the survey done, the output above clearly shows that the society are also 100% eager to learn the ASL if there are better and fun way to learnt it compared to the children. Besides that, there are almost 80% of the normal people wants to have a conversation with the deaf-blind society. Besides that, majority of the deaf-blind society areoften left aback due to lack of interactions with the normal citizens. The gap between

the upcoming deaf and blind children with the society could be overcome with the right learning materials. This survey was done to analyze the importance of learning the Sign Language to friends, siblings or anyone who are visually impaired.

4.6 Google Form Output based on survey 2

An implementation of ASL visualizer by using RFid cards for the deaf and mute children.

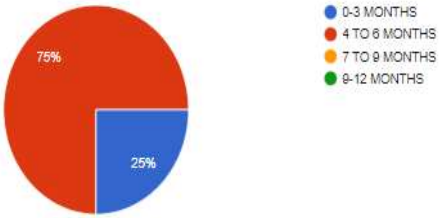
The age of the children.



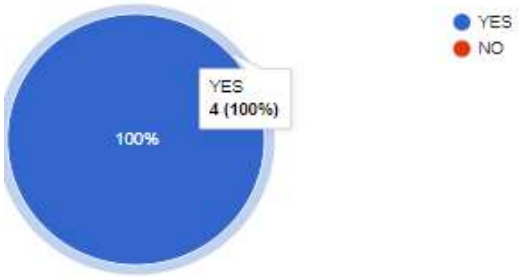
What is the current method of teachers teaching the sign language now?

Does the visualizer has an attractive output of ASL?

How long does it take for the children to absorb the level 1 asl by using the current method?



Will students learn faster by using sl visualizer ?



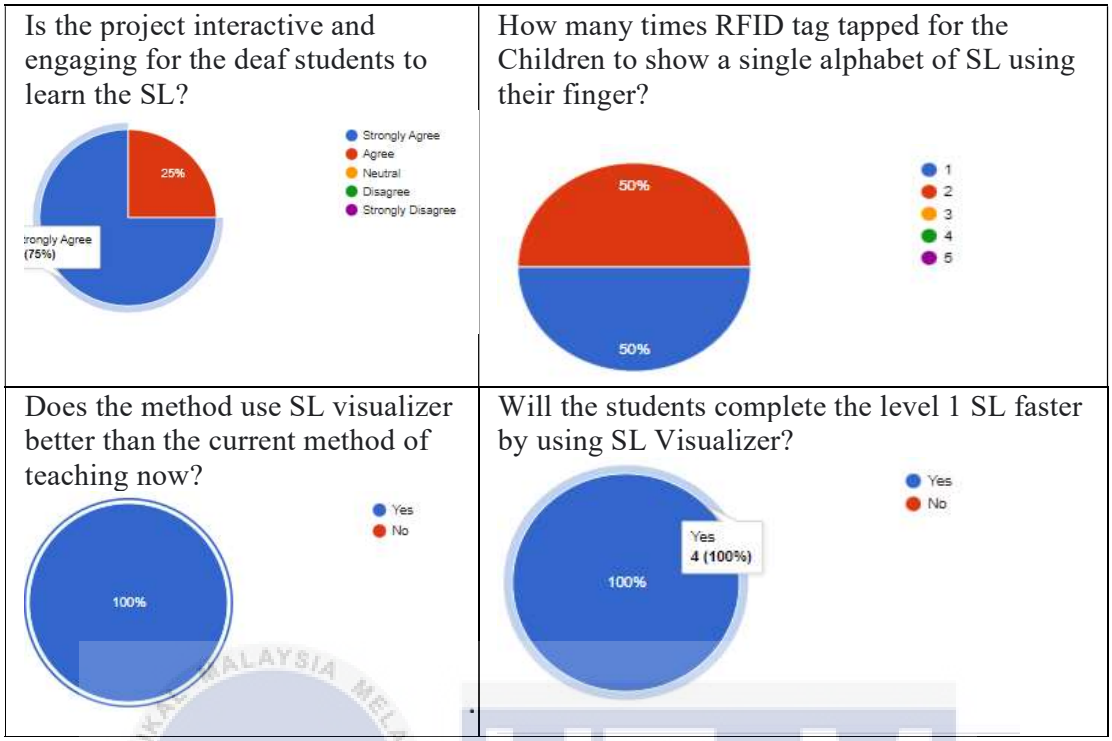


Figure 4.8 Statistical Output based on project Implementations

Based on the result of the survey done, it clearly shows that the ASL visualizer is useful for the children to learn the sign language faster and effective way. The children and the teacher both agreed that this method would be helpful for the children's who are basically learning the sign language .When it was asked does the project engaging for the deaf mute student in order to learn the ASL,the feedback for students who are learning face to face is effective compared to children who are studying through asynchronously However due to the pandemic, there was only 2 students allowed in the deaf-mute society. One student implemented the project virtually and the other student learn face to face. The effectiveness was 100% found for children who'd done the project hands on. In conclusion, based on the survey the project shown is successful.

4.7 Project implementation at the deaf-mute society in YMCA Brickfields.

On 24 November 2021,there was two students, and a deaf blind teacher was asked to implement this project to learn the basic ASL.Three method was used to visualize. Firstly, displaying through larger projector. Secondly, through laptop for students who're studying asynchronous and asking children to learn the ASL by using Raspberry Pi.

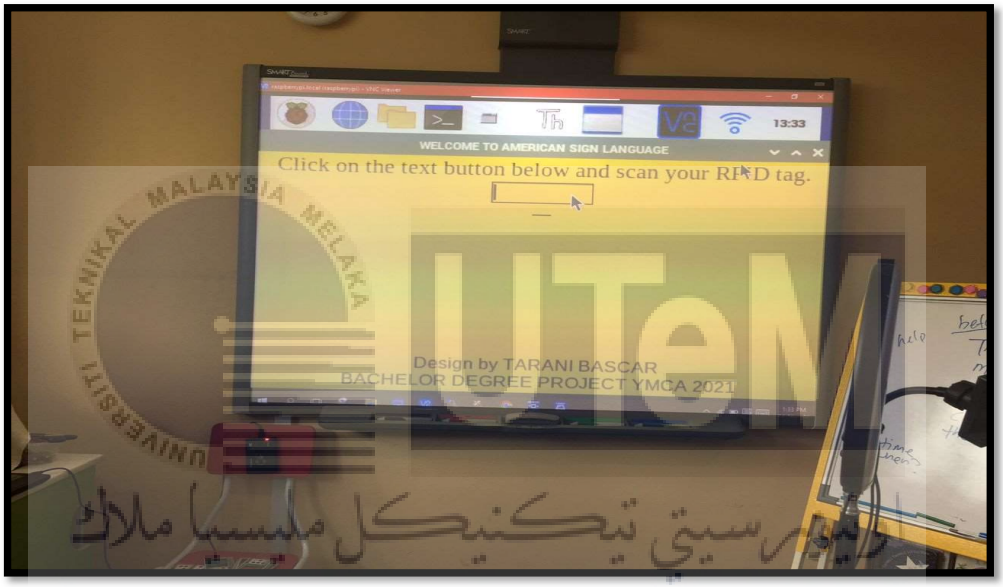


Figure 4.9: Displaying the ASL using Projector

Figure 4.10 :Teacher and student learning the ASL by using projector

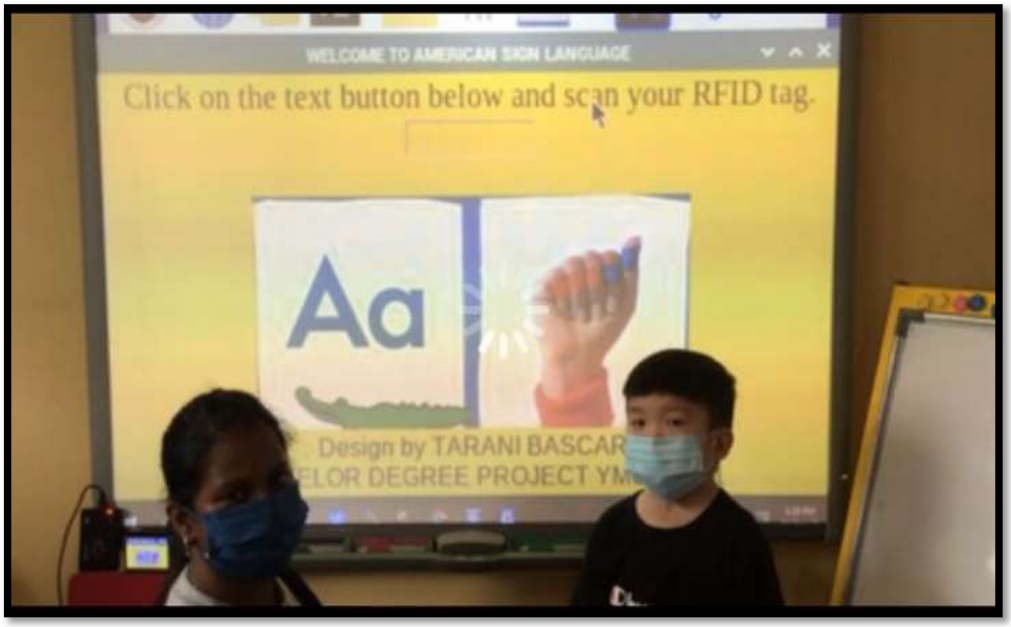


Figure 4.11 Children tap and showing the sign language

Figure 4.12 :Children learning the ASL by using portable ASL visualizer

Figure 4.13: Children are learning the ASL by their own self

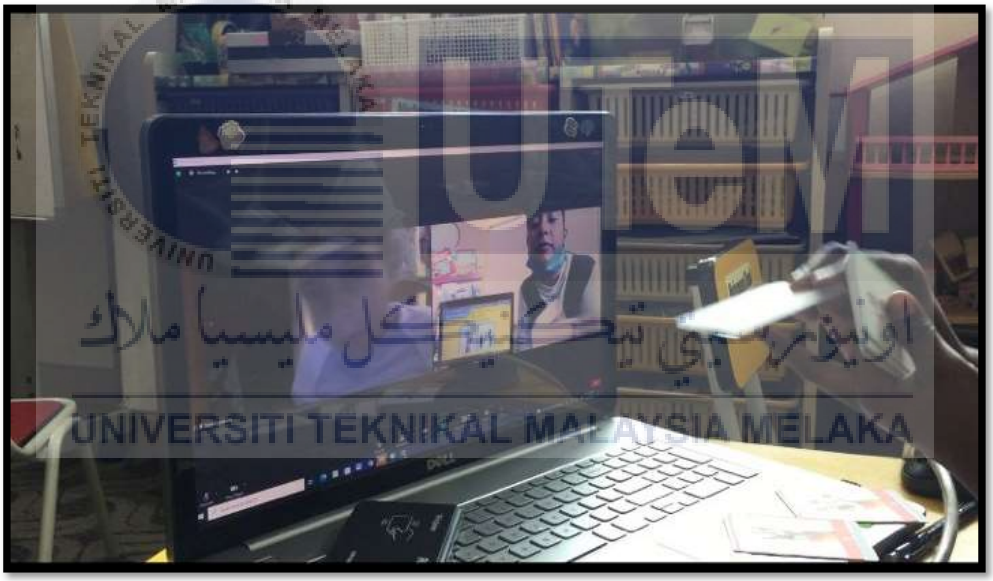


Figure 4.14 Children Learning the ASL Virtually through ASL visualizer.

In conclusion, both children were excited to learn by using the RFiD cards as it involves some physical actions. Students get to catch up the ASL quicker and smarter too.

4.7 Summary

In a nutshell , the main objective of this project is to visualize the ASL .Interfacingof RFID cards are successful through phyton programming. Besides that, visualizing of Sign Language is also successfully completed for basic learning for children. Secondly, Braille to speech was also successful. Children will get to learn Braille by typing on braille keyboard and press speak now and there will be output for that. Thirdly, it is the customizable language learning system whereby when the system run there will be an image with word using the GUI.Then the children must retype the word and press speak now. Thus, the student will be able to learn the any new Language. In this project, I have used Arabic learning system to learn Arabic Language. One word was successfully created it is “Alif”. In conclusion all three learning system was successfully created in a Graphical User interface (GUI) format.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This thesis presents a method for a learning improvisation for children who are deaf and blind to learn the American Sign Language faster and quicker with the aid of visualization. The deaf blind children are left aback and should have the education level as equal with the normal children. Hence, this could be achieved and the stereotypical view and perceptions on the deaf-blind children could be broken with the help of innovations in the teaching-learning method by implementing more advanced method with the usage of technology and IoT.

5.2 Future Works

For future improvements , system would be updated by inserting more elements such as numbers, greeting, colors and so on by using a single RFID Cards. Besides that, to upgrade a system with better and stable internet connections.

In conjunction with that, there is custom made GUI for Arabic letters to be visualized for the children. This project works by using button functions to reveal the Arabic Words. In Future, I would like to develop more language learning system.

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APPENDICES

1)Appendix A Certificate

Competition joined during semester break

2)Appendix B Project Coding

This is the coding created by using phyton programming .In this coding, a software named guizero is installed.Guizero is an app that is used fo r visualization.

```
rfidStatus.value = "—" rfidText.value = ""
rfidStatus.repeat(1000, checkRFidTag)

def checkRFidTag(): tagId = rfidText.value if tagId != "":
RFidRegistered = False print(tagId)
with open("Database.csv") as csvfile:

reader = csv.DictReader(csvfile) for row in reader:
if row["RFid"] == tagId: RFidRegistered = True print("Welcome " +
row["User"])
rfidStatus.value = "SIGN LANGUAGE " + row["User"] if row ["User"] ==
"A":
result= Picture(app, image="aa.PNG",)

elif row ["User"] =="B": result=Picture(app,image="bb.PNG")
elif row ["User"] == "C":

result= Picture(app ,image="cc.PNG") elif row ["User"] == "D":
result= Picture(app ,image="dd.PNG")

elif row ["User"] == "E":

result= Picture(app ,image="ee.PNG")
```

```
    elif row ["User"] == "F":


result= Picture(app ,image="ff.PNG") elif row ["User"] =="G":

result=Picture(app,image="gg.PNG") elif row ["User"] == "H":

result= Picture(app ,image="hh.PNG") elif row ["User"] == "I":

result= Picture(app ,image="ii.PNG") rfidStatus.after(10000, clearDisplay)

if RFidRegistered == False: print("RFid tag is not registered")

rfidStatus.value = "RFid tag is not registered" rfidStatus.after(5000,
clearDisplay)

rfidStatus.cancel(checkRFidTag)


app = App(title="WELCOME TO AMERICAN SIGN LANGUAGE",
width=10000,


height=700, layout="auto") app.bg = " yellow "

instructionText = Text(app, text="Click on the text button below and scan your
RFid tag.") instructionText.text_size = 15

instructionText.font = "Times New Roman" rfidText = TextBox(app)

rfidStatus = Text(app, text="")


rfidStatus.repeat(1000, checkRFidTag)


designBy = Text(app, text="Design by TARANI BASCAR\n BACHELOR'S
DEGREE PROJECT 1", align="bottom")

 result = image(app)

 box = Box(app, layout = 'grid' , grid=[2,1])

 app.display(
```

3)Appendix C -Google Form BDP 1

Google form on survey on the reaction of the society about Sign Language and their interest to learn the Sign Language

Bachelor Degree Project 1 Survey

Interaction between Visually Impaired(Blind) and Hard of Hearing(Deaf) Community

*Required

Do you have any family members ,friends, relatives who are deaf or blind? *

- YES
- NO

If YES, how challenging is the interaction process with them?

	1	2	3	4	5	
EASY	○	○	○	○	○	HARD

Have you encountered SIGN LANGUAGE in public ? *

- YES
- NO

If YES, how do you react to it?

- Feel of having an interaction with them
- interest of learning the sign language
- feeling suspicious
- no reaction
- Other:
- YES
- NO

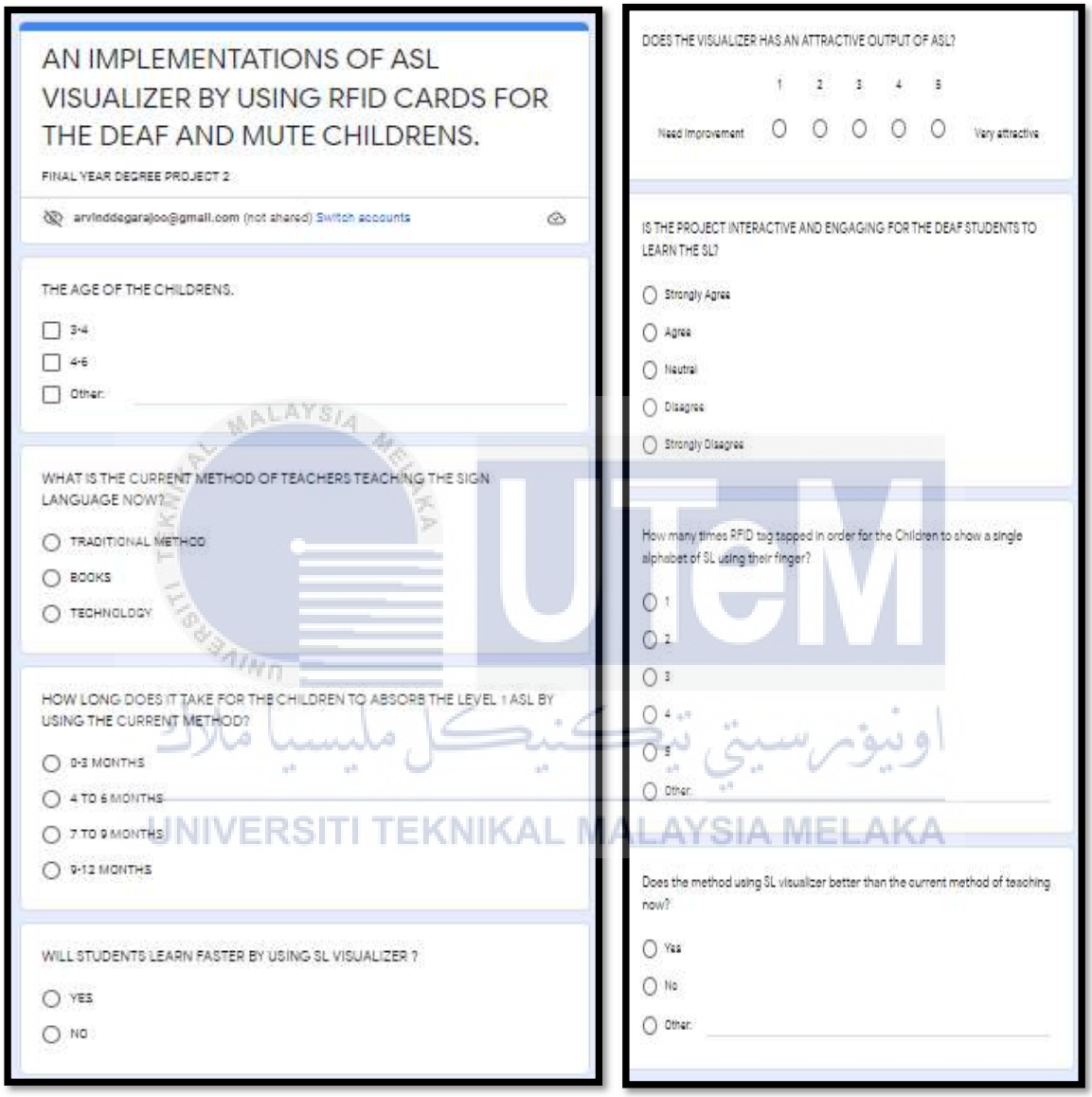
If you were given an easier and fun method, are you willing to learn the Sign Language? *

- YES
- NO

Submit

4)Appendix D-Google Form BDP 2

An Implementations Of Asl Visualizer By Using Rfid Cards For The Deaf And Mute Children's



AN IMPLEMENTATIONS OF ASL VISUALIZER BY USING RFID CARDS FOR THE DEAF AND MUTE CHILDRENS.

FINAL YEAR DEGREE PROJECT 2

arvinddegaraj00@gmail.com (not shared) Switch accounts

THE AGE OF THE CHILDRENS.

- [ ] 3-4
- [ ] 4-6
- [ ] Other:

WHAT IS THE CURRENT METHOD OF TEACHERS TEACHING THE SIGN LANGUAGE NOW?

- TRADITIONAL METHOD
- BOOKS
- TECHNOLOGY

HOW LONG DOES IT TAKE FOR THE CHILDREN TO ABSORB THE LEVEL 1 ASL BY USING THE CURRENT METHOD?

- 0-3 MONTHS
- 4 TO 6 MONTHS
- 7 TO 9 MONTHS
- 9-12 MONTHS

WILL STUDENTS LEARN FASTER BY USING SL VISUALIZER ?

- YES
- NO

DOES THE VISUALIZER HAS AN ATTRACTIVE OUTPUT OF ASL?

	1	2	3	4	5	
Need Improvement	○	○	○	○	○	Very attractive

IS THE PROJECT INTERACTIVE AND ENGAGING FOR THE DEAF STUDENTS TO LEARN THE SL?

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

How many times RFID tag tapped in order for the Children to show a single alphabet of SL using their finger?

- 1
- 2
- 3
- 4
- 5
- Other:

Does the method using SL visualizer better than the current method of teaching now?

- Yes
- No
- Other:

3)Appendix E

Gantt Chart

Project Activity (by week)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Project briefing														
Group and supervisor selection														
Title Discussion														
Project discussion														
Research materials														
Logbook week 6														
Proposal														
Methodology														
Logbook week 12														
Designing preliminary result														
Slide video presentation 1														
Presentation BDP 1														