UNIVERSITI TEKNIKAL MALAYSIA MELAKA

SMART MIRROR

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

By

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BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

Tajuk: Smart mirror

Sesi Pengajian: 2019

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DECLARATION

I hereby, declared this report entitled Smart mirror is the results of my own research except as cited in references.

Signature: ……………………………………

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Automotive) with Honours. The member of the supervisory is as follow:

Signature: ………………………………………………

Supervisor :   Dr. Sazahati bt Md Rozali

ABSTRAK

Tujuan projek ini adalah untuk mencipta sistem rumah yang pintar dengan interaksi yang mudah menggunakan cermin yang disokong dengan Google Assistant. Pada masa kini, terdapat banyak produk yang memasuki perniagaan rumah pintar dan ia mewujudkan persekitaran bagi pembuat untuk mewujudkan sistem rumah pintar mereka sendiri. Untuk projek ini, interaksi yang berbeza akan diperkenalkan dengan menggunakan cermin sehala yang akan bertindak sebagai cermin itu sendiri. Untuk automasi rumah pintar, pada dasarnya ia diambil alih kebanyakannya oleh Google Pembantu untuk melaksanakan sebarang perintah yang diberikan. Ciri-ciri yang tersedia untuk projek ini ialah widget yang mengandungi kalendar, masa, peringatan, sistem pemantauan dan lain-lain. Untuk bahasa sistem ini, projek ini akan menggunakan dua jenis bahasa iaitu C dan Python. Hasilnya diperoleh dengan menggunakan pelbagai kaedah seperti Google API, Nodejs dan lain-lain.

ABSTRACT

The aim of this project is to create a smart home system with simple interface using mirror supported with Google Assistant. Nowadays, there are many product that enter smart home business and it created an environment for maker to create their own smart home system by itself. For this project, a different interface will be introduced by using one-way mirror that will act as mirror itself. For smart home automation, basically it controlled mostly by Google Assistant to execute any command that were given. The features that available for this project is widget that contain calendar, time, reminder, monitoring system etc. For language of this system, this project will use two type of language which are C and Python. The results are obtained by using various method such as Google API, Nodejs and others.

DEDICATION

To my beloved parents, who have been my source of inspiration and give me strength and advice to not easy to giving up to success in my studies in UTEM. Thanks for my entire lecture especially to my supervisor Dr Sahazati bt Md Rozali who shared his experience and acknowledgement to finish this project successful. I also dedicate to my entire member for helping directly and indirectly during completing this project.

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I have taken effort in this project. However, it would not have been possible without the kind support and help of many individuals and persons. I would like to extend my sincere thanks to all of them.

I am highly indebted to my supervisor, Dr Sahazati bt Md Rozali for his guidance and constant supervision as well as for providing necessary information regarding the project and also for his support in completing of this project.

I would like to express my gratitude towards my parents for their kind cooperation and encouragement which helped me in completing of this project

My thanks and appreciations also go to my members and classmates in developing the project and to the people who have willingly helped me out with their abilities.

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LIST OF ABBREVIATIONS

NOOBS	**-**	**New Out Of Box Software**
UI	**-**	**User Interface**
IOT	**-**	**Internet Of Things**
CPU	**-**	**Control Processing Unit**
APP	**-**	**Application**
USB	**-**	**Universal Serial Bud**
HDMI	**-**	**High Definition Multimedia Interface**
CRT	**-**	**Cathode Ray Tube**
LED	**-**	**Light Emitting Diode**
GA	**-**	**Genetic Algorithm**
MMM	**-**	**Magic Mirror Module**

CHAPTER 1

INTRODUCTION

1.1   Background

The "Internet of things" (IoT) is an interesting and common topic that is discussed in many conversation and discussion nowadays. It's a concept that not only has the potential to impact how we live but also and [1] since that, various applications are introduced such as home automation, industrial asset monitoring and smart energy meter. While it is booming, implication occur where different equipment has different platform used while price-point is varied. The user experience hard time configuring on synchronize the equipment since different brand needs different setup. For newcomer, it will take quite some bit to figure out. Interface has been an issue for IoT where mostly all instructions are sent via IP address.

1.2   Problem Statement

People are interested in the smart home technology but are not ready to buy it [2]. There are several problems regarding to this. Firstly, the user will take ample amount of time for configuration and software update. Including upgrade the system user need to buy new product which is expensive in some cases. Another problem is, the electronic product usually have bad interface because they intended to add more feature while the interface are not changing and not suitable with the new features.

1.3 Objective

This project embarks into following objectives:

1. To develop a prototype smart home system that control electrical appliance using IOT concept.
2. To implement the system for daily use.
3. To analyze the performance of designed system in term of features available with other product.

1.4 Scope

In order for the project to be operated in the right path, there are scopes that needs to be outlined. The scope of the project are:

1. A raspberry Pi is used as controller for this project
2. The range of voltage is used for this project within 220V to 240V that coming from home electrical provider
3. Interface using smart mirror
4. Focused on home automation rather than other features available

1.5 Methodology

There are several steps to develop smart mirror system. We need the knowledge hence research and journal are viable option for study material that related to the project. This resulting idea on how to counter the problem.
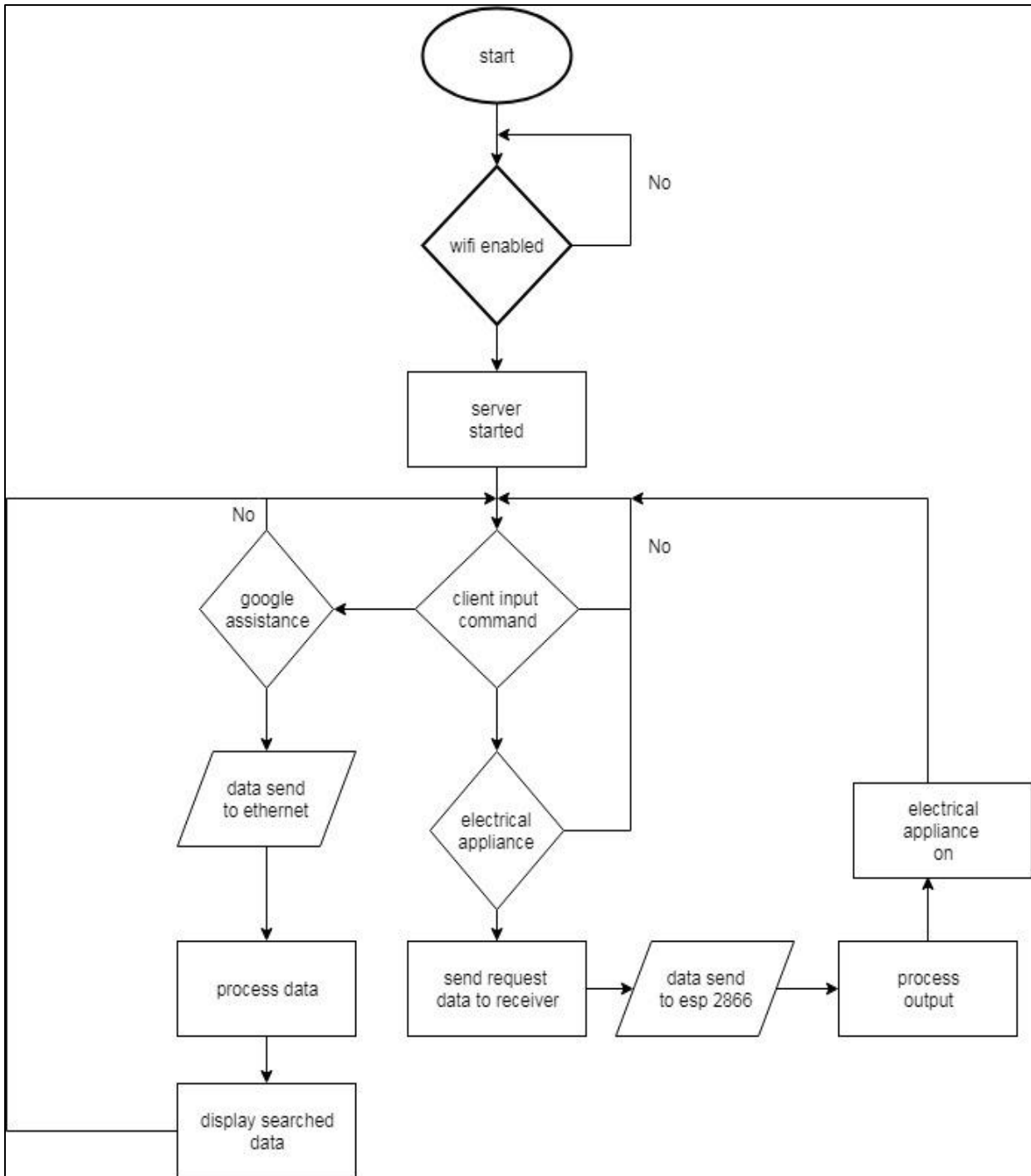
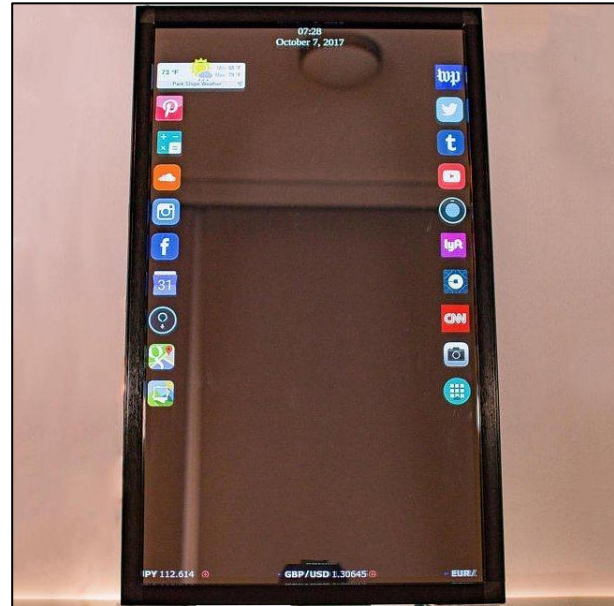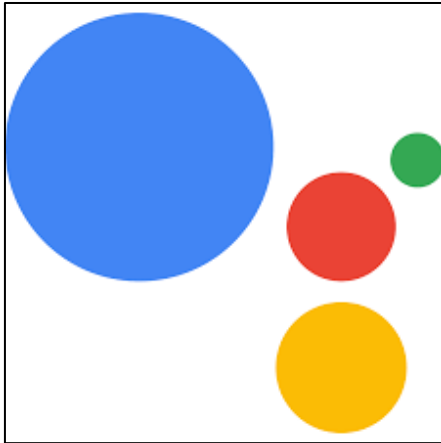Figure 1.1: Flow chart of smart mirror

1.6 Expected Result

Figure 1.2: Assisted with Google Assistant

Figure 1.3:Contain Multiple famous feature

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews previous work on the project. This will be taken as reference for this project in order to complete. The source that gathered were previous projects that are taken from books, website and others. This literature review will come as a guidance for problem solving and statistical value for this project.

2.2 Magic Mirror

The first project that were posted by Michael Teeuw was in 2014 where the build by using flat-screen TV, a wooden frame and Raspberry Pi 2 as controller on web browser (Magic Mirror, 2014). By the time he posted on a blog, a number as many as 2.5 million view have already search and read the blog. The reason behind this is he gave a complete tutorial with step by step on how to build smart mirror software and hardware. This will be the first ever project that have this kind of attraction. The great thing about MagicMirror2 is it is an open-source software that power the mirror. In March 2016, it was completely rebuilt by Electron. The software support small widget that are called "modules". For default installation, it contains widgets for calendar, time, weather and news with 20 or more available additional features that are available for 3rd party user.

MagicMirror2 has a great feature such as clean UI and it collected huge community to support. There are certain group that specialized in MagicMirror forum which help other maker to write their own software and hardware plus modules. The blog that Michael posted has an active GitHub repository (GitHub/MitchMitch/MagicMirror, 2016) where anyone can help one another for developing the program. For this documentation, the device has a large active group where they share their codes with step by step which is very good for beginner for making the magic mirror. The project is the detail with step by step on how to build it from scratch. He gave great information such as default setting and installation plus.

Next, another reference is HomeMirror (GitHub/HannahMitt/HomeMirror, 2016) that was created by Hannad Mittelstaedt. The device was posted in Reddit in 2015 which gathering a lot of attention. In this device, Nexus 7 used as interface rather than standard computer board and screen.For this device, the interface runs on Android App with the same modules such as time, weather and reminder. This project was purely used as information area since it can support custom widget but the platform is an open source hence the community can modify and change current version. All the steps and guide are available on Github. For this project, it contains interesting factor and have easier setup since it contains two items but it lacks attraction where you need to modify each widget to fit the project

The Smart Mirror that created by Evan Cohen [3] is based from MagicMirror and HomeMirror. For this project, Evan Cohen focused mainly on software part which contain vast information such as voice command for interaction plus the voice command support usual widget that contain time, date, calendar and home automation that control the light in the house. The requirement for this project is one-way mirror, monitor and controller which is Raspberry Pi with USB attached microphone for voice command. For controlling the light, the author uses Phillip Hue light bulbs. Since it is an open source, the source can be found in Github and the build on Electron.For this project, this version is more

advanced and contain better features. There is downside for this matter, the software stands as single app which makes it difficult to write your own.

Max Braun is an engineer working at Google which he post a blog on January 30th on medium [4] where he created his own smart mirror while explaining the detail of the project. He stated that his dis device is one of a kind and feels like he is ahead of time. Although it is just a simple innovation, the news spread since it was built by google engineer.The software and hardware are similar with other smart mirror product which are one-way mirror, 15-inch USB powered display panel or monitor that run on an Amazon Fire TV stick which is a HDMI Android device.Android app can display similar interface with Google Now. The author state that it is not meant to interact with the UI instead it delivers relevant information automatically. The downside is it does not perform a Google search.This product shows a small level of interactivity compared to others by using voice command to search in Google. This device still contains static level of information panel due to restriction from the maker. As for the moment, the author does not make it open source hence there are a lot of hidden features available about it

For this product, the only information that we get is only from the video posted on Youtube hence the it is confirm that it is not an open source. He did not said anything about the build on software or hardware but he shows the feature that available which are fully functional multi-touch that display similar widget as smart mirror with difference interface. The product has a lot to offer such as music player, youtube videos, Dropbox, Messages and other available widget that can be added in the product. It also comes with fully functional on-screen keyboard.

At first the lack of information means the video is fake but later it was confirmed that it is real [6]. He did not release any other information since he intended to sell this product.

2.3   Apparatus

2.3.1   One-way Mirror

One-way mirror is a reciprocal mirror that have reflective effect on one side but transparent on the other side. The perceptions occur when the mirror is brightly and the other side is dark. This shows the view form the side is brighten but not by the darkened area. Usually, this mirror used in a brightly room area with darker room on the other side. People at the dark side that sees it will look like a transparent window
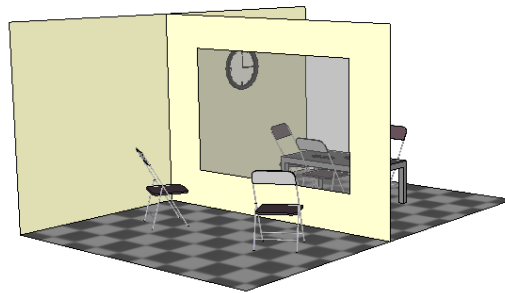

Figure 2.3: Example of One-way Mirror

2.3.2   Display Panel

Panel display are electronic viewing technologies used to see content in various range such as entertainment, consumer electronic, personal computer and mobile devices. They are lighter and thinner compare to CRT which usually are thick. The display can divide into two parts which are volatile and static. A volatile display shows an image when it has battery or AC main power. Static on the other hand is rely on material which the colour state is bistable. There were all sort of display panel that we can pick ranging form LED monitor to a tablet. The difference is on how to implement it.