Project Report

ON

"Jarvis – A Smart Mirror."

IS SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE DEGREE OF

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

-: Submitted By: -

Mr. Krushikesh Thotange. **Miss. Dhanashree Ambadkar.**

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Mr. Vyankatesh Heda. **Miss. Sakshee Bansod.**

Under the Guidance of

Prof. A. D. Shah

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Accredited by NBA)

SIPNA COLLEGE OF ENGINEERING & TECHNOLOGY, AMRAVATI

ISO 9001: 2008 Certified

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

Year – 2020-2021

Project Approval Sheet

Project Entitled

"Jarvis – A Smart Mirror."

-: Submitted By: -

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Is approved for the degree of

Bachelor of Engineering

in

Computer Science & Engineering

of

Sant Gadge Baba Amravati University, Amravati.

2020-2021

Internal Examiner:	**External Examiner:**
Name:	Name:
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CERTIFICATE

This is to certify that the project entitled

"Jarvis – A Smart Mirror."

Is a Bonafide work and it is submitted to the Sant Gadge Baba University, Amravati.

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In the partial fulfillment of the requirement for the degree of Bachelor of Engineering (Computer Science & Engineering) during academic year 2020-2021 under my supervision and guidance

Date:

Prof. A. D. Shah — **Guide**

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Acknowledgement

A moment of pause, to express a deep gratitude to several individuals without whom this project could not have been completed.

We feel immense pleasure to express deep sense of gratitude and indebtedness to our guide **Prof. A. D Shah,** for constant encouragement and noble guidance.

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Last but not the least we are thankful to our friends and parents whose best wishes are always with us.

Mr. Krushikesh Thotange. **Miss. Dhanashree Ambadkar.**

Mr. Shantanu Baiswar. **Miss. Ayushi Mohkar.**

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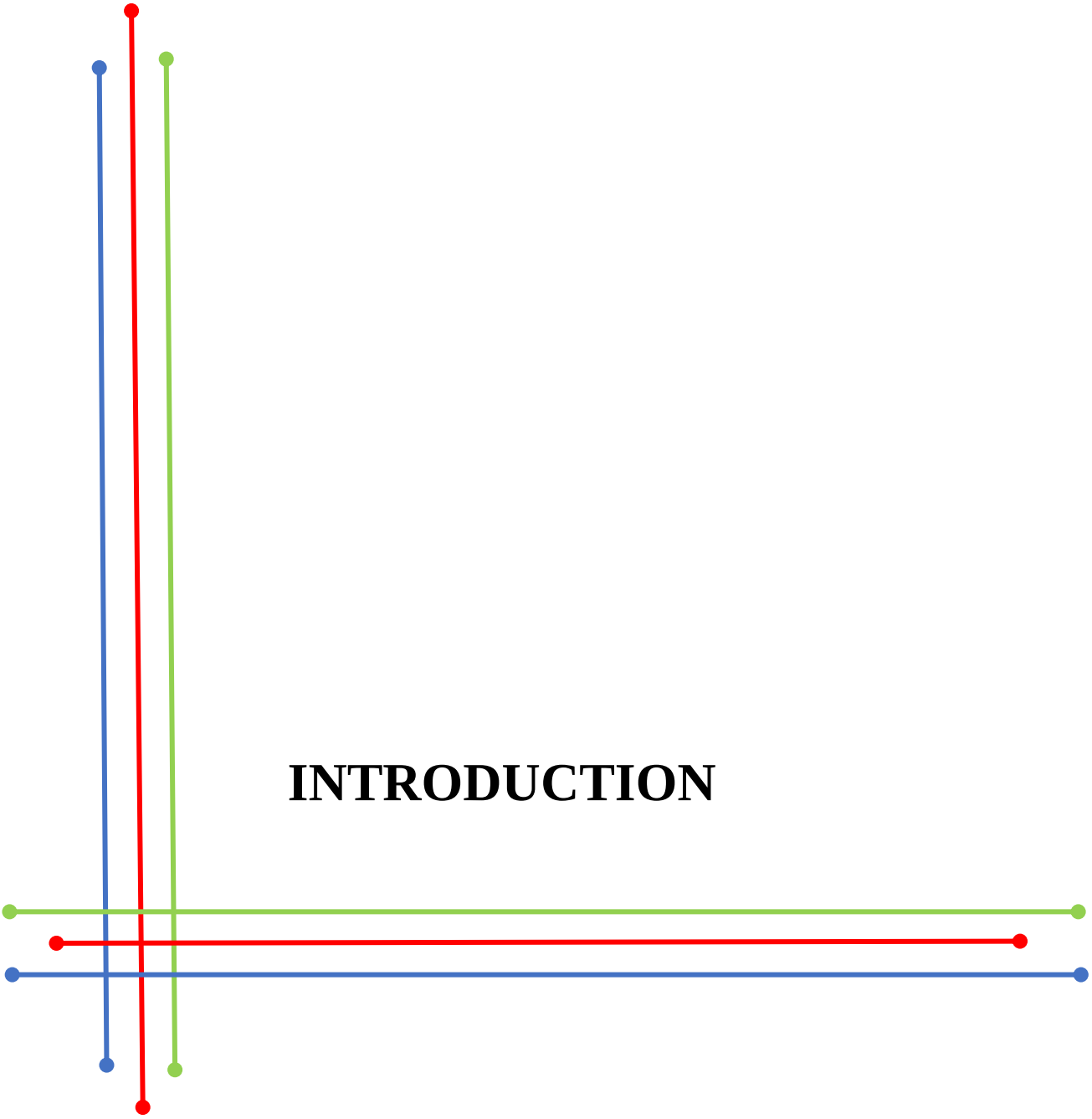
Abstract

This paper describes and explain the design and working of a mirror created smartly called “Smart mirror” built using raspberry pi. The visual representation of the product is similar to regular mirror that can display weather details, temperature, time and daily news on voice command.

The smart mirror act as a personal assistance, an enquiry center and display important curriculum or college notice. It can answer basic question, display class time table and show directions to various places. It could be linked to google cloud for various IOT based task like home automation etc.

Built on a strong speech of text engine, it understands various type of accent to understand predefined command clearly. The smart or interactive mirror designed by using a raspberry pi as the main controller and a lead display that is placed behind the mirror, can serve a variety of endless application-based command. With such a wide range of application, this could certainly become an important part of technology in future times.



INTRODUCTION

Chapter 1

Introduction

Mirrors are part of everyday used items that have been so far eluded from the idea of being smart. The idea of combination of mirror with intelligence and technology, discussing further possibilities and uses are some objectives of this paper. The smart mirror may seem to be similar to that of various other smart devices available like smart phones, smart televisions, smart lights etc. but have some certain and specific advantages because of its usage as a mirror.

This smart mirror is a still complex to that of an ordinary mirror, having a display inside a glass that one can interact with, using voice commands. The mirror works with the help of a raspberry pi. There are several displays or notice boards present that are difficult to operate manually. The problem of finding places in new buildings were too a concern.

This product acts as a solution for above problems. It also acts as an innovative and attractive object that can be placed in any surrounding. A product that can inhibit all the qualities of a regular personal assistant on androids or laptops with application-based knowledge along with the above-mentioned problems with some suitable speech detection modules and speech convertor engines, all in a small processing power operating system as that of a raspberry pi.

Putting the tasks above in a simplified manner, three basic functionalities that would be fulfilled can be given as,

1. Personal Assistant -

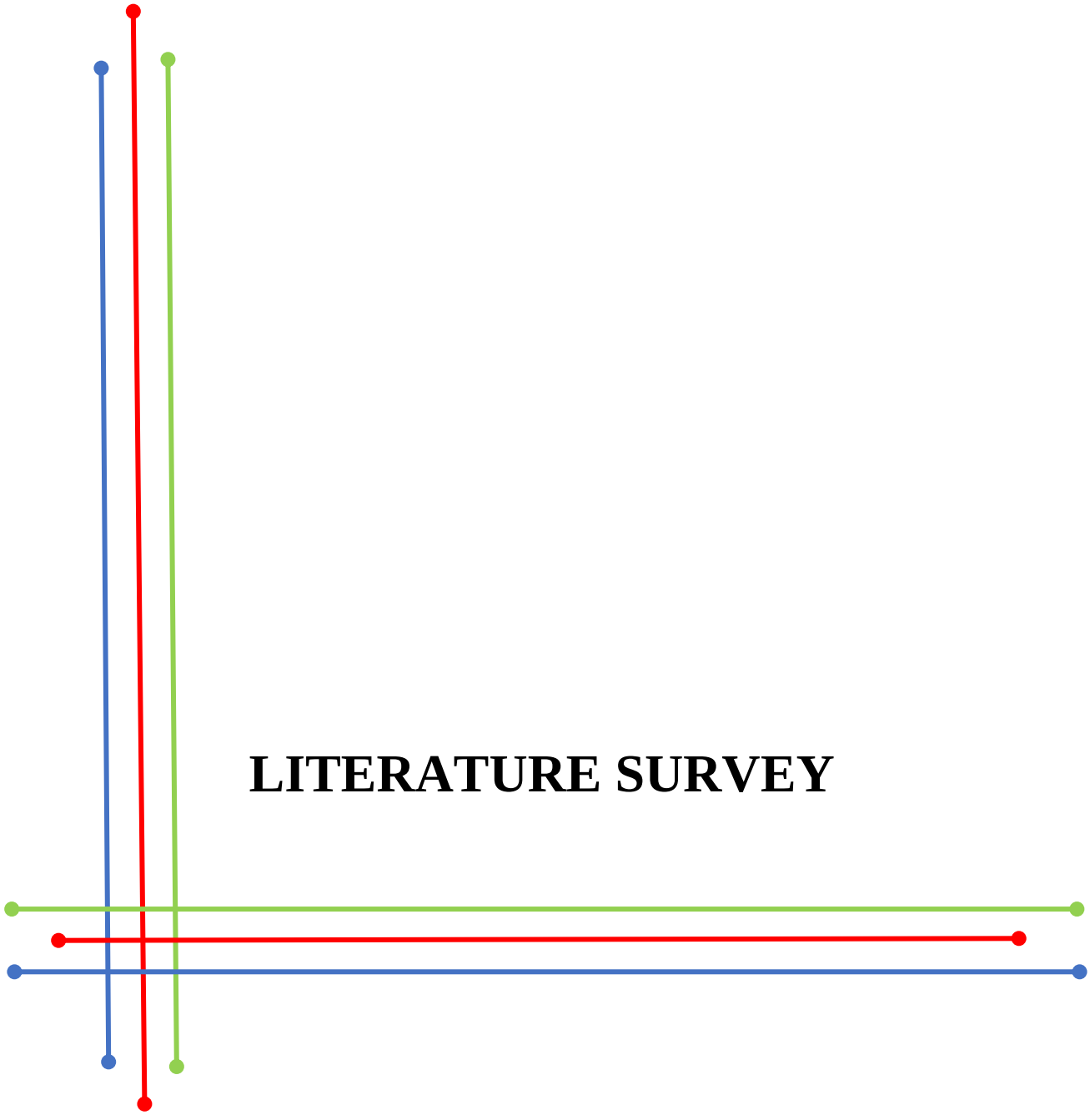
The mirror acts like a personal assistant. The mirror does various tasks like updating calendar, setting up reminders, updating date and time, displaying weather, daily news and other such general-purpose activities. It can respond to some of the commands like time, weather, news, e-mail, technology updates, college notifications, birthday, jokes, life.

2. Enquiry Centre -

Basic questions related to any workspace are fed into the database. Such queries can be answered by the mirror. This enquiry center can be very helpful to people who are new to any workspace. These queries will be regarding finding the direction to any particular classroom, locating any professor etc. This can be an endless module as we can configure as many questions as we need. Thus, this can differ based on the workspace in which you are using this mirror.

3. Notice board -

The mirror can be used for displaying various academic notices in the college. The product is linked with the admin of the administrator so that he can change the notice and information as and when required to be displayed. These notices are displayed according to various time slots.



LITERATURE SURVEY

Chapter 2

Literature Survey

Presentation and punctuality are two of the most valued qualities in modern society. However, it can be difficult to effectively prepare for the day while remaining knowledgeable about current affairs and still maintain a timely schedule. In the morning, it is imperative to prepare for the day in front of a mirror, which is often a slow process.

Additionally, factors such as the current weather conditions can influence how a person prepares for the day. Finding an efficient way to check all the factors that can affect how a person prepares for the day while also not adversely affecting the tasks that are performed in front of a mirror can be a challenge. The goal of our project was to create a product that will provide quick and easy access to the time, news, and weather while simultaneously allowing a person to go through their morning routine. Our product should enhance productivity while providing a functional and enjoyable user experience.

2.1 Overview of Existing Problem:

Michael Teeuw was the first to build a smart mirror and first to use a raspberry pi for this purpose. The first smart mirror blog was posted back in 2014, since it was a very new product it gained a lot of attention back then. This mirror is built on raspberry pi 2 and uses monitor as the display. It displayed weather and time importing these from various modules which were linked to real time websites. It was just an information panel which didn't have the capability to interact with the mirror. A module-based interface was created and displayed weather, news, time or daily comic strip.

Ryan Nelwan in the year 2016 gathered much interest and developed a smart mirror much similar to the one developed by Teeuw's. A new feature added to this was the touch feature which was a first of its kind. It serves mostly as a source of a entertainment system which a user can use the touch controls to run different programs or control music, but did not have artificial intelligence.

Hannah Mittelstaedt made a home mirror. It was posted on reddit website. The mirror used a smart phone as the display screen. Since it was an android tablet so features of android were used to display time, weather, date, remainders. The software made use of android widgets but can be modified easily as it is open source. Anyone can modify it and develop a new version. Home Mirror is a kind of smart mirror that is easier to build than other mirrors as it requires just two main components, any android mobile phone or a tablet and a mirror. However, this too lacked any kind of intelligence or interaction.

2.2 Motivation Behind Project:

As technology advances, we continue to find more and more uses for it that would previously be inconceivable. Originally, technology was primarily useful for performing tasks humans struggle with, but today it is used in even the most mundane tasks in an attempt to simplify our lives. With the technological revolution, we have been able to save time in a number of ways; however, as media consumption has increased, we also lose time. Due to this, saving time in our daily routines is always helpful. One way technology has been implemented to save time is by integrating computers into numerous elements in our home, thus creating “Smart Home” devices. The “Smart Mirror” project is based upon this concept.

The Smart Mirror will merge technology with a mirror to provide users information while they use their mirror. The primary motivation behind the smart mirror is to improve quality of life. Providing information to users in the most convenient way possible, it drives motivation behind the majority of technological development for smartphones and tablets. The smart mirror will provide convenient information to users on their mirror every day. Allowing the user to multitask by consuming media while preparing for the day will save people time nationwide. The goal of the mirror is to provide people with information they may require in the morning while getting ready for the day or at night before going to bed. This will save users time every day and help to ensure they are aware of important details for their day. A user will be able to check their calendar for any upcoming events, peek at the weather forecast, and not to mention, consult the mirror for traditional personal appearance adjustments. Motivation for this project stems from multiple sources. In the Iron Man films, the main character utilizes holographic displays around the home to perform a number of activities. A couple years back, Corning released a video about their product called Glass which is intended to allow a smart surface anywhere in the home.

While these examples, and a multitude of others, are well beyond the scope of this mirror, their realization also seems to be well into the future. One benefit to the smart mirror is that, while it does not provide the advanced capabilities of these examples, it is readily feasible. Another driving factor in this project is the fact that smart home technology has been developed for many parts of the home but smart mirrors are lacking. While there are plenty of tinkerer's projects posted around the web, no fully realized implementation has been marketed to users thus far.

2.3 Objectives:

A staple furniture piece found in every bedroom and bathroom; the mirror has provided a means for effective personal grooming for thousands of years. Our team has brought it into the 21st century with Smart Mirror. While the user is preparing themselves for the day, they will be able to glance at their mirror and instantly retrieve important bits of information such as the current time, date, and weather conditions. These simple bits of information are commonly sought after in the morning while getting ready for the day or at night before going to bed. Our Smart Mirror ensures that you remain at the forefront of the emerging smart-home revolution. You will take advantage of every opportunity to look at yourself in the mirror in order to be filled with weather information and today's date. With a brief look at the mirror, users will be able to check the current time, peek at the weather forecast, and not to mention, consult the mirror for traditional personal appearance adjustments. While the user is preparing themselves for the day, they will be able to talk to their smart mirror to see what reminders they had set for the up-and-coming week, what the weather will be like so they can dress accordingly, and set any calendar events they need to remember all while being able to listen to their favorite songs via Pandora Internet Radio.

The Smart Mirror will be a smart home implementation in the bathroom which is a room currently lacking technological innovations. Smart Home technology has been integrated to a number of rooms and interfaces throughout the home however the bathroom has been left mostly untouched. Almost every person spends some portion of their time daily in the bathroom. As a result, there is ample opportunity to present users with information that could improve their daily life.

The mirror will be able to present personalized information to users every morning as they prepare for their day. Ideally it will save users time by displaying information they would likely check in the morning. This will include information such as weather, daily schedule, news, and also the time so the user can keep on schedule. The information will be provided on the mirror in an unobtrusive manner, leaving the majority of the prime mirror real estate unaltered. This will allow the user to easily absorb the displayed information while going about their normal routine.

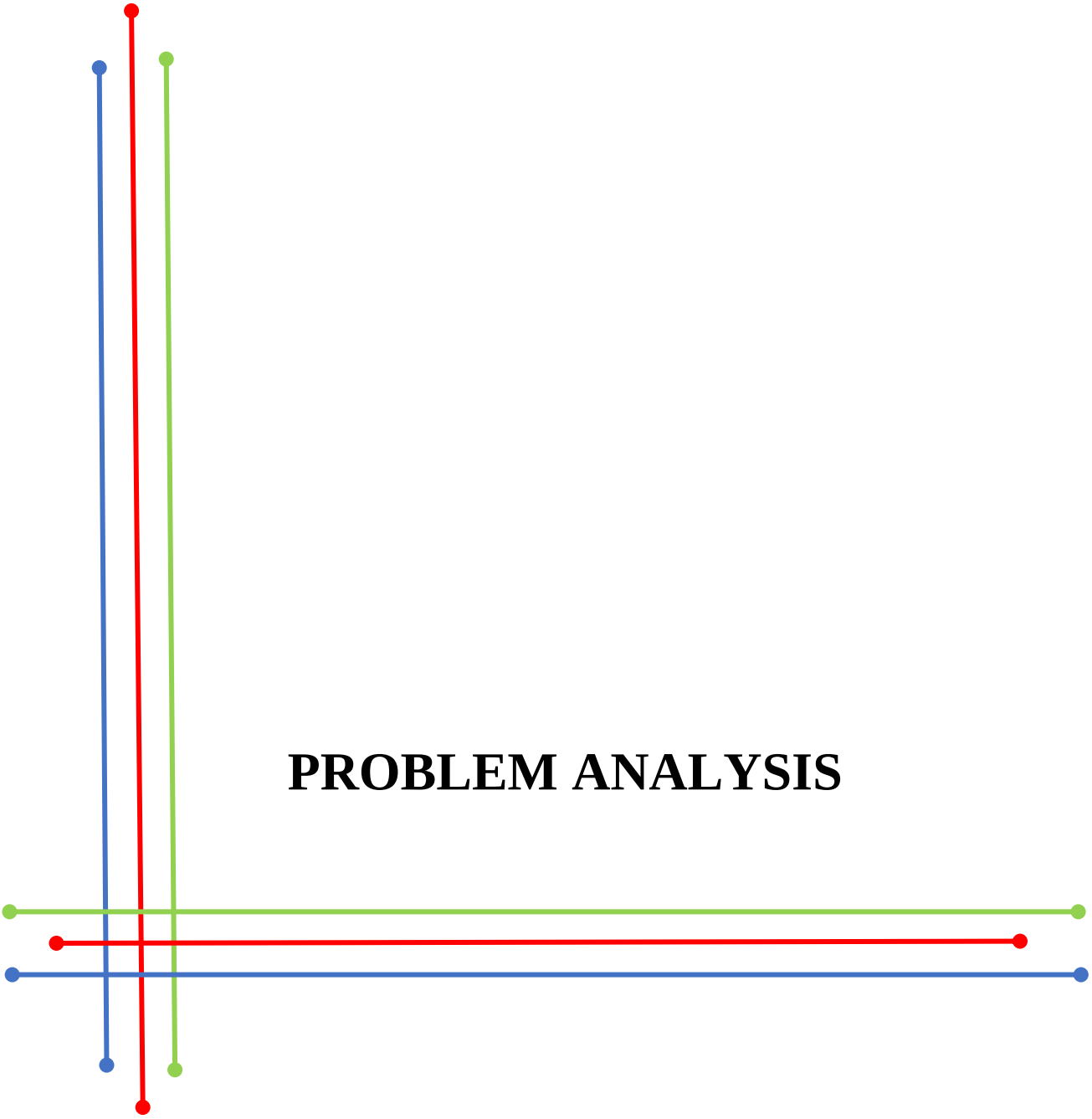
One of the prime objectives of the mirror is to be as user friendly as possible and to provide different options and customizability to different users. Due to this, all applications will be customizable by the user to present information in the way they deem best. Also, all applications will be able to be deactivated if the user deems them useless for their day-to-day life. This will allow the users to use the mirror in a way that fits their own unique circumstances without being bothered by features that they will not use. If the user ever changes their mind about a feature, they can simply enable it and continue use as normal with the feature included.

Since this project is designed to be as unobtrusive and as user friendly as possible, all control of the mirror will be accomplished via voice commands. This has been decided due to the fact that voice commands will intrusive on a user's daily routine. As you go about your morning or evening in the bathroom, you tend to utilize your hands a lot, thus, touch controls or gesture controls would simply inconvenience users. Due to this observation, voice controls seem the best fit to allow user interaction with the mirror. One issue with voice controls we will attempt to avoid is the necessity for a strict list of commands. The voice controls will be implemented in a way such that interacting with the mirror seems like talking to an intelligent agent rather than rattling off a list of scripted commands.

The Smart Mirror is designed to utilize a persistent internet connection. The mirror will fetch the weather conditions and news headlines, for instance, periodically. The time and date are set according to the Raspberry Pi's internal clock which is synced upon connecting to the internet. The voice commands do not rely upon the internet connection. While the Smart Mirror relies on a constant internet connection to fully function, a loss of internet connectivity is not fatal to the mirror's operation.

In the event that the internet connection is lost during the moment when the internet-dependent data are fetched, such information on the mirror will be hidden to signify that the internet connection has been lost. The time and date do not require a persistent internet connection after the initial synchronization has occurred.

Lastly, the mirror will need to include safety measures to ensure use in a bathroom does not cause irreversible damage to the mirror itself. The mirror will monitor the temperature and humidity of the internals of the mirror housing and, if these levels hit certain thresholds, the mirror will act to avoid damage. Under unsafe situations, the mirror will either attempt to bring the temperature or humidity down by turning on an air movement system such as a pair of fans or, if the temperature and humidity levels run too high, the mirror will simply shut down.



PROBLEM ANALYSIS

Chapter 3

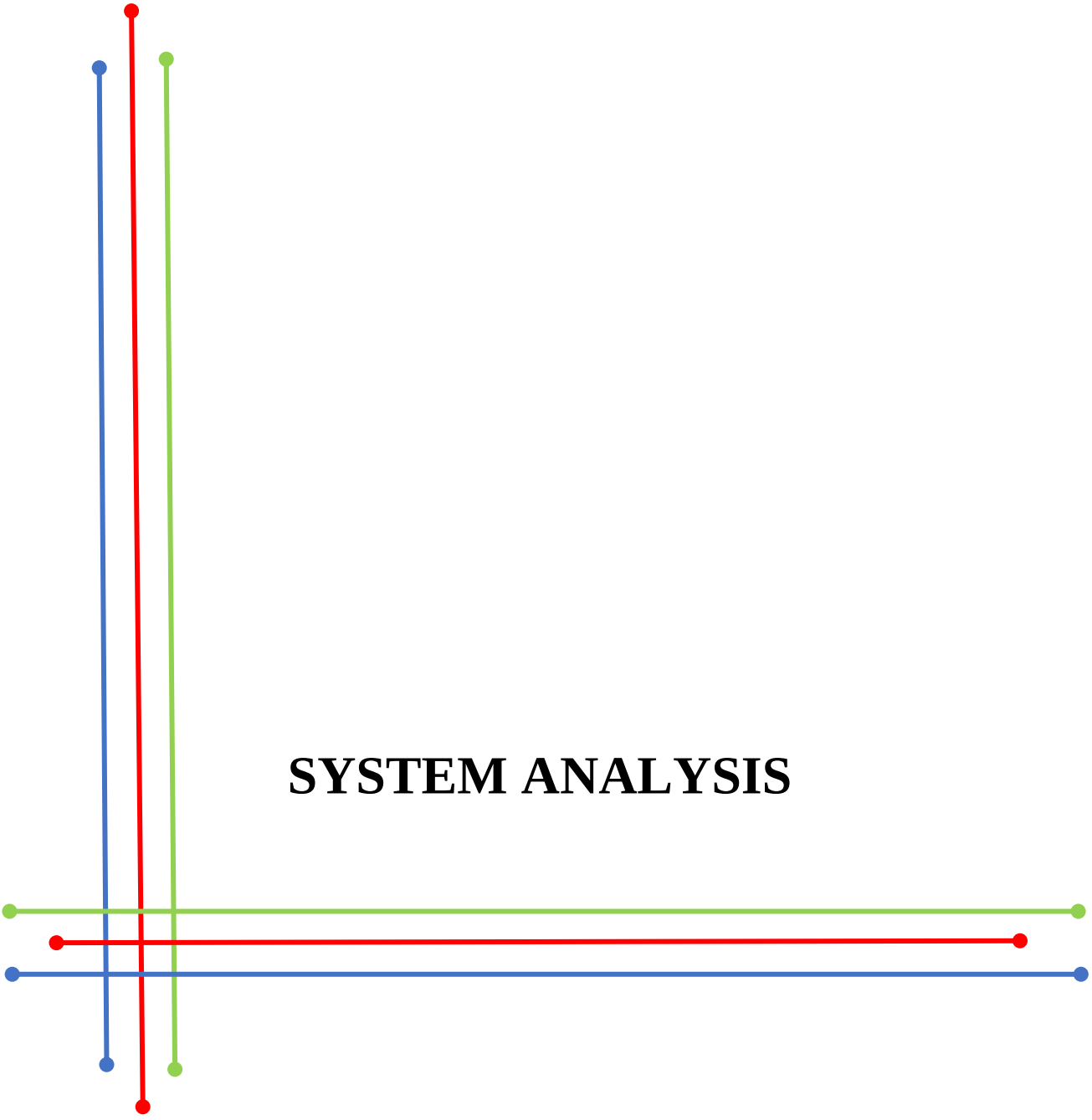
Problem Analysis

The world we live in today has become a place of the fiercest competition, whether it is in sports, entertainment, or the job market. In order to be the best, one needs to allocate an extraordinary amount of time to their goals with little distraction. However, the advent of information technology tends to act like a dual-edged sword when it comes to work productivity; sometimes one can use the ease of information to help them complete a task, but it can also provide significant distraction. Ultimately one strives to be their best, but the interruption of keeping up with the daily news, or preparing for incoming weather can hinder one's progress. Taking time throughout the day for these various activities can be extremely distracting and greatly cut into performance.

Along with information, people greatly value their appearance, spending approximately an hour a day in front of the mirror during their morning and night routines. This is a significant amount of time where important things are taking place, but the mind is not working. It would be extremely useful to spend that time on the phone or computer completing any of the tasks mentioned above, but unfortunately it is difficult to do so while preparing for the day. A product is needed that can allow a person to efficiently complete everything they need to do to prepare for the day, all in one place and at the same time.

The goal of the Smart Mirror is to provide a single easy to access location for a person to receive all the information that could affect how they prepare for the day. Through the use of LCD displays and a one-way mirror, weather, time and date, and news are available at a glance. Additionally, a user-friendly interface, accessible from any WIFI enabled device, allows the user to easily setup the connection to their home WIFI, change the location from which they receive the weather, and select a source from which to receive the day's headlines. By building these features into a mirror, which most people will already be using in their morning routine, it is possible to present this information in such a way that it will seamlessly blend together with the task of morning grooming.

Another major problem is, placing the mirror in bathroom for various purposes like getting ready, checking weather, etc. as every electronic device has the fear of being hacked, placing it in bathroom would be a great risk if the device is hacked and would affect the user's privacy.



SYSTEM ANALYSIS

Chapter 4

System Analysis

PC Specifications:

For the smart mirror, a computer will be required to process and display all information to the user. The software for the mirror will be implemented via Universal Windows Platform programs which means they will function on any computer running Windows 10 or Windows 10 IoT. However, during development, the mirror will utilize a Raspberry Pi 3 Model B as the primary computer. All sensor components will be run through an MCU and fed into the Raspberry Pi. The hardware specifications of the Raspberry Pi 3 Model B are shown in Table

Raspberry Pi 3 Model B	
CPU	Broadcom Quad-Core ARM7 900MHz
Memory	1GB SDRAM
Power Supply	5V micro-USB
Wi-Fi Module	802.11b/g/n
Video	HDMI 1.4
Audio	3.5mm Audio Port
USB	4x USB 2.0
GPIO	40 pins extended GPIO

Table 1. Raspberry pi 3 specifications

Video and Audio Specification:

For display purposes, a thirty-two-inch television will be utilized. The constraints on the television are flexible, requiring simply a single HDMI input to display the information presented by the Raspberry Pi. For audio implementation, there will be three primary options: the first will be speakers via the television, the second would be internal speakers, while the third would be external speakers.

The first two options would be housed within the mirror itself. Speakers in the television would receive their signal from the HDMI which provides video. Internal speakers not connected directly to the television can receive audio via the 3.5mm audio jack on the Raspberry Pi. Finally, external speakers may be utilized but would require a third-party Bluetooth dongle connected to on the Raspberry Pi's USB slots.

For the hardware architecture, a computer monitor, a one-way mirror, a Raspberry Pi model 3B, USB microphones, jack speaker are used. Everything was put together in a wooden frame. The entire structure is divided into two wooden parts constructed as a box type structure. The behind part holds the display screen and the Raspberry Pi and is used to support the device so that it can be hung on a wall. The forward portion of the box type structure is made using the glass which is made to fit entirely in front the screen. The major components that are used (the one-way mirror glass, display, Raspberry Pi, microphones and frame).

1. One-way mirror:

The glass used at the front end of the box is probably the most important part of the device or hardware as it is this that is responsible for creating the futuristic and artistic effect and is the biggest part of the smart mirror. Here for it to attain the qualities of reflection and refraction, a dark background surface is needed in which light parts or portions will be visible normally.

2. Display:

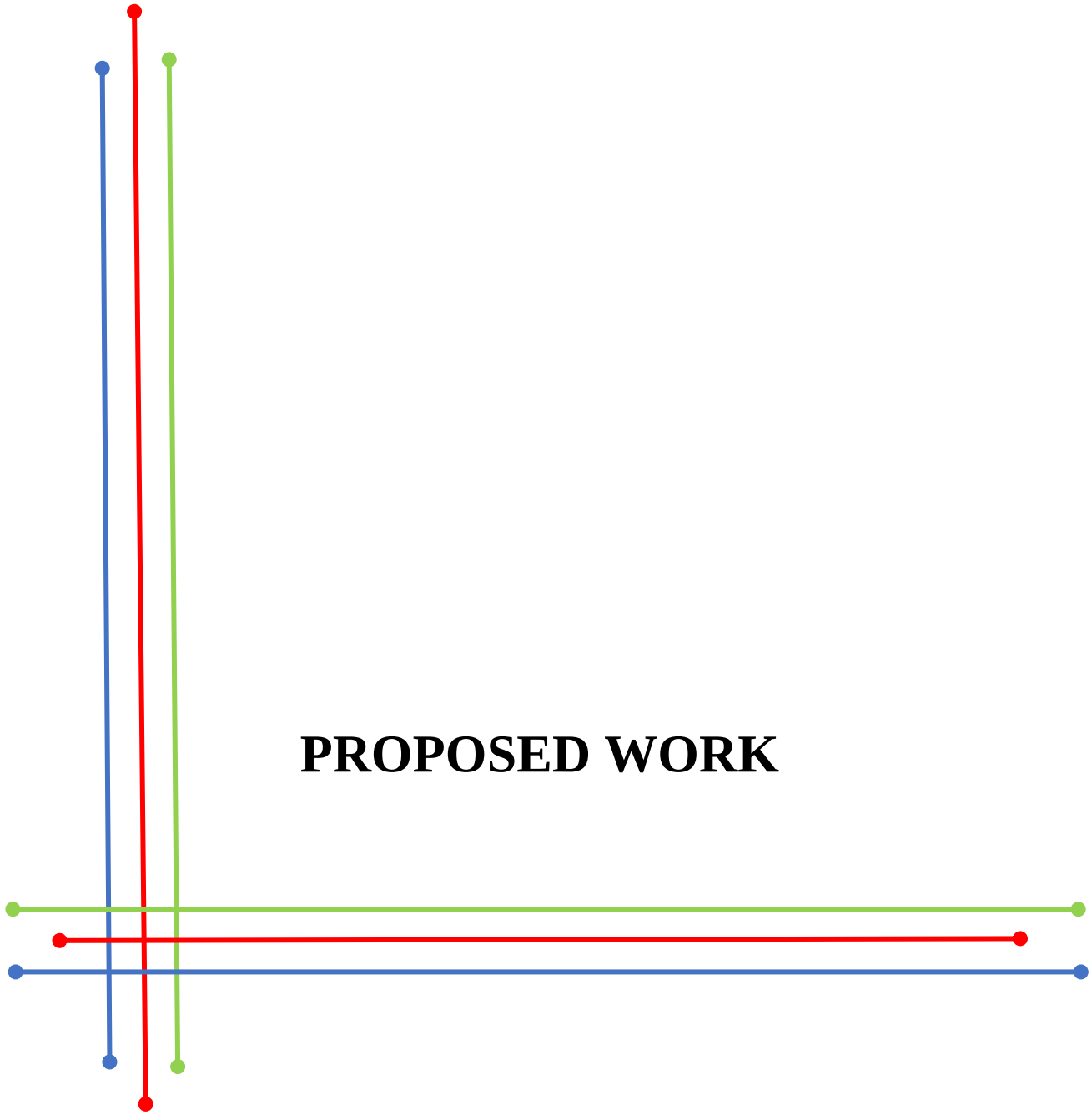
For the display a monitor is used, comes with a remote control which is useful to easily turn off the device's screen. The monitor is much smaller than the mirror so a black sticker is used to cover the parts of the glass which are not covered by the display. An HDMI to VGA cable was used to connect the display to the Raspberry Pi for video and audio.

3. Microphones and Speakers:

One mode of interaction with the smart mirror is through microphones. USB microphones is used because the Raspberry Pi does not have a regular microphone input.

4. Raspberry Pi:

The Raspberry Pi is a single board computer developed by the Raspberry Pi foundation in the UK. The Pi does not work out of the box. It lacks a hard drive and it does not come with a preinstalled operating system. To install an OS microSD card prepared with an OS image is needed. And because the software that runs on the mirror is coded on the same device at least a screen, a keyboard and a mouse are required.



PROPOSED WORK

Chapter 5

Proposed Work

5.1 Jarvis Model:

Every device today seems to have a ‘smart’ version of it. There are smart watches, smart TVs, smart fridges, smart speakers, and even smart lights. Our model is a smart mirror called "Jarvis -The Smart Mirror". This device can be modified according to the user’s requirements. It is created using python platform and AI algorithms. The technology is driven by a Raspberry Pi or Windows PC, combined with voice recognition technology. It is built to be used for displaying the time, weather, calendar, news, and social media updates. The magic is created by placing a transparent mirror over a screen such as a tablet, monitor, or TV.

The basic design of a smart mirror starts with the glass that is to be used. One-way glass is the recommended type as it lets the graphics on the display come through clearer. Vanity Vision glass was used as it is an optimal choice for building smart mirrors. Upon uploading the code to the device, the widgets of time, date, real-time weather and news updates were visible through the front of the glass while reflecting the user’s image on the mirror.

Jarvis is a simple personal assistant for Linux, MacOS and Windows which works on the command line. He can talk to you if you enable his voice. He can tell you the weather, he can find restaurants and other places near you. He can do some great stuff for you.

A smart mirror is a device that displays a user's own image on a screen as if that screen were a mirror. Smart mirrors are available as mobile phone applications, with some allowing users to modify the appearance of their hairstyle, make-up or accessories. The technology is also used in online shopping and in-store shopping to show people how an item of makeup, clothing, handbag or accessory might look on them. Some major retailers use the technology to provide virtual dressing rooms to customers. These smart devices are used to enhance in-store experience, provide product information to customers and to display marketing and promotional messaging.

Many color contact sites feature a similar virtual try-on environment to simulate the look a user will achieve when actually wearing the contact lenses. The best product in this domain is Purple Patch from Wifin Technologies. The Freshlook color studio, and Colorful Eyes eye color changer are both examples of color contact sites that feature this cutting-edge technology.

The big advantage of a smart mirror is the ability to display useful information without needing to open apps or do anything. You simply look at your smart mirror and the information is there. For example, imagine the mirror in your bathroom is a smart mirror. Every morning you probably wake up and stand in front of that mirror as you brush your teeth or prepare for the day. Imagine while you go through your morning routine you can look at your mirror and see a traffic report, weather forecast for the day, and your day's schedule. Being able to take in all of this useful information without interrupting your normal routine is very liberating. You can customize your mirror to display anything you find useful like, want a news feed for specific topics? or want to see stock price movements or want a daily quote to inspire you every morning to go for that run. One can fully customize your smart mirror as it modules can be made open source.

This product has great potential mostly in luxury markets due to current high costs. As of today, do-it-yourself electronic hobbyists produce most smart mirrors, aside from a few small companies. It is extremely interesting to people and that they would be interested in purchasing one for self. Smart mirrors can be produced quite easily depending on how complex one wants to make it. Each smart mirror can be modified by using number of commands as per requirements given by the client, thus makes the project user-friendly.

5.2 Login:

When it comes to setting up a Smart mirror in business, offices or work location, number of users may require the access of the smart mirror in order to display time table, notices for students or a meeting schedule for office employees etc. In such a case the managing authorities will be provided with login credentials by using Raspberry Pi VNC server and VNC viewer with which multiple clients may connect to a VNC server at the same time.

The VNC server is used to administer laptops and desktop of managing authorities with the help of VNC viewer. It is a graphical desktop sharing system that allows you to remotely control the desktop interface of one computer (running VNC Server) from another computer or mobile device (running VNC Viewer). VNC Viewer transmits the keyboard and either mouse or touch events to VNC Server, and receives updates to the screen in return.

You will see the desktop of the Raspberry Pi inside a window on your computer or mobile device. You will be able to control it as though you were working on the Raspberry Pi itself. VNC is platform-independent – there are clients and servers for many GUI-based operating systems

VNC Connect from RealVNC is included with Raspberry Pi OS. It consists of both VNC Server, which allows you to control your Raspberry Pi remotely, and VNC Viewer, which allows you to control desktop computers remotely from your Raspberry Pi as you want to.

You must enable VNC Server before you can use it. By default, VNC Server gives you remote access to the graphical desktop that is running on your Raspberry Pi, as though you were sitting in front of it.

However, you can also use VNC Server to gain graphical remote access to your Raspberry Pi if it is headless or not running a graphical desktop. With this Smart mirror can be used at a time to add, remove or edit any task assigned by a team of managing authorities keeping in account the user's privacy and institution data security.

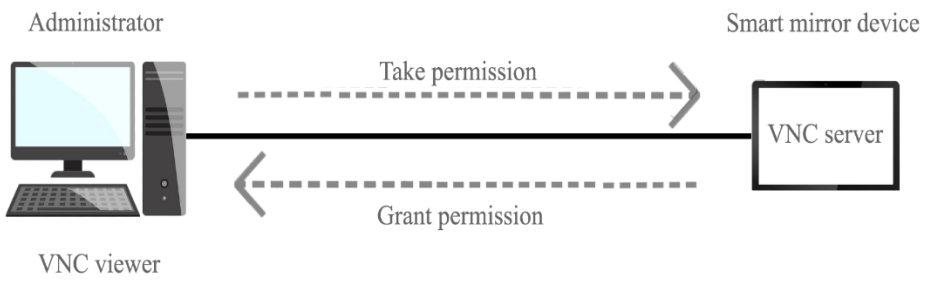


Fig.1. Login

5.3 Dataflow Diagram:

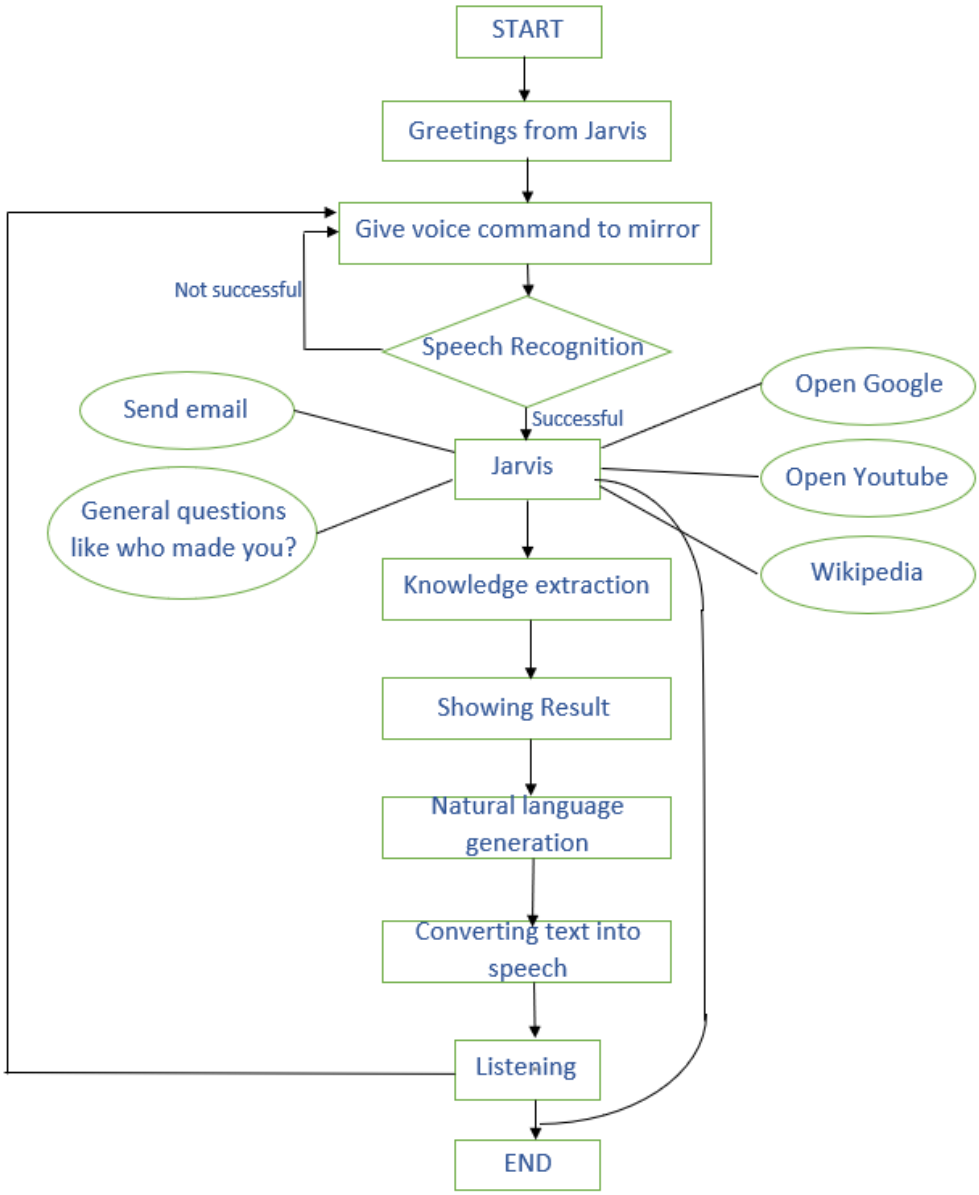


Fig.2. Dataflow diagram

5.4 Flowchart:

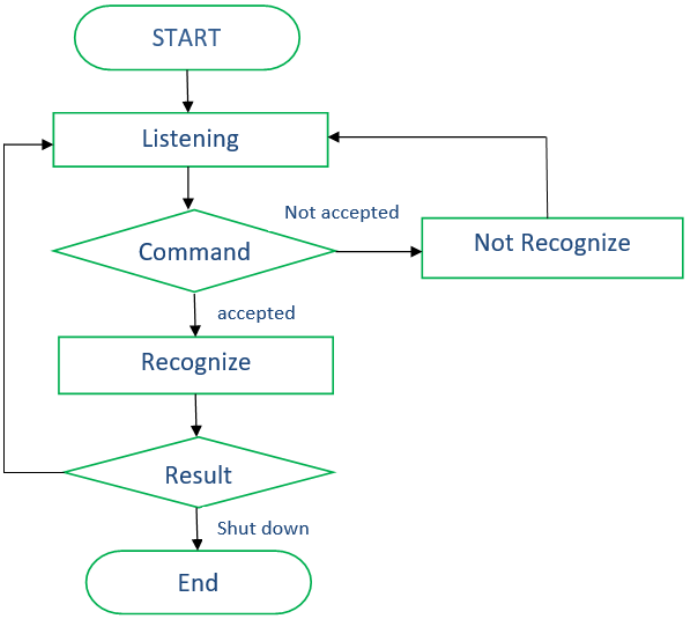


Fig.3. Flowchart

SYSTEM REQUIREMENT

Chapter 6

System Requirements

6.1 Software Requirements:

All the software runs on raspberry pi 3 and there are many OS to choose from. We chose to Raspbian which is the official Linux distribution from the raspberry pi foundation because it has a lot of support and documentation. To install it we had downloaded it from the official raspberry pi website and copied it to our microSD card. After the insertion of the card on the raspberry pi start it and follow the setup instruction which are quite simple. Once Raspbian was installed, the first thing to do is to update the distribution with the latest packages, then configured the basics of the OS as for instance the keyboard layout to match the keyboard.

Python:

Basic coding of the device is done by using python. It is the backbone technology used for the device.

Artificial Intelligence:

It is used for stimulation of human intelligence process by machine. We are using it in our project for speech recognition.

6.2 Hardware Requirements:

Fig.4. Raspberry pi 3

It is a single board computer develop in UK. To install an OS, you need a micro-SD card.

This is probably the most important part of the hardware because its responsible for creating the futuristic effects and is the biggest part of the smart mirror.

Fig.5. one-way mirror

Fig.6. Speaker

A speaker is a transducer which converts an electrical audio signal into a corresponding sound. Here we can connect the speaker direct to the raspberry pi using 3.5mm jack.

One mode of interaction with the smart mirror is through microphones. The microphones were used to power the voice recognition capabilities of the device. USB mics had to be used because the raspberry pie does not have a regular mic input.

Fig.7. Microphone

RESULT

Chapter 7

Result

Fig.(a). Smart mirror display

When we switch on the smart mirror, it displays time, weather, etc. as shown in above image.

```
Listening...
Recognizing...
user said: date

Today's date is  19 6 2021
```

Fig.(b). Output of date command

When user asks for “today’s date”, smart mirror will reply that “Today’s date is ….” as shown in above figure.

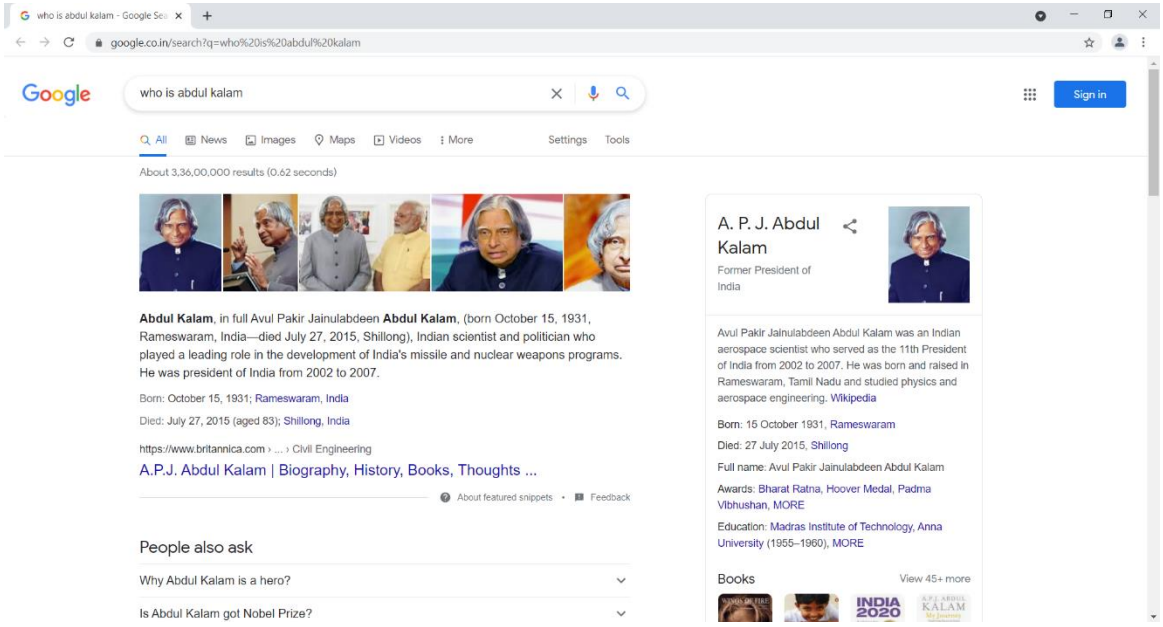


Fig.(c). Output of Open Google command

When user gives command “Open Google” then smart mirror will ask for the topic to be search and then opens google as shown in above figure.

```
Listening...
Recognizing...
user said: time

Current time is  08:27:44
```

Fig.(d). Output of current time command

When user asks for current time then smart mirror will reply by saying “Current time is ….” as shown in above figure.

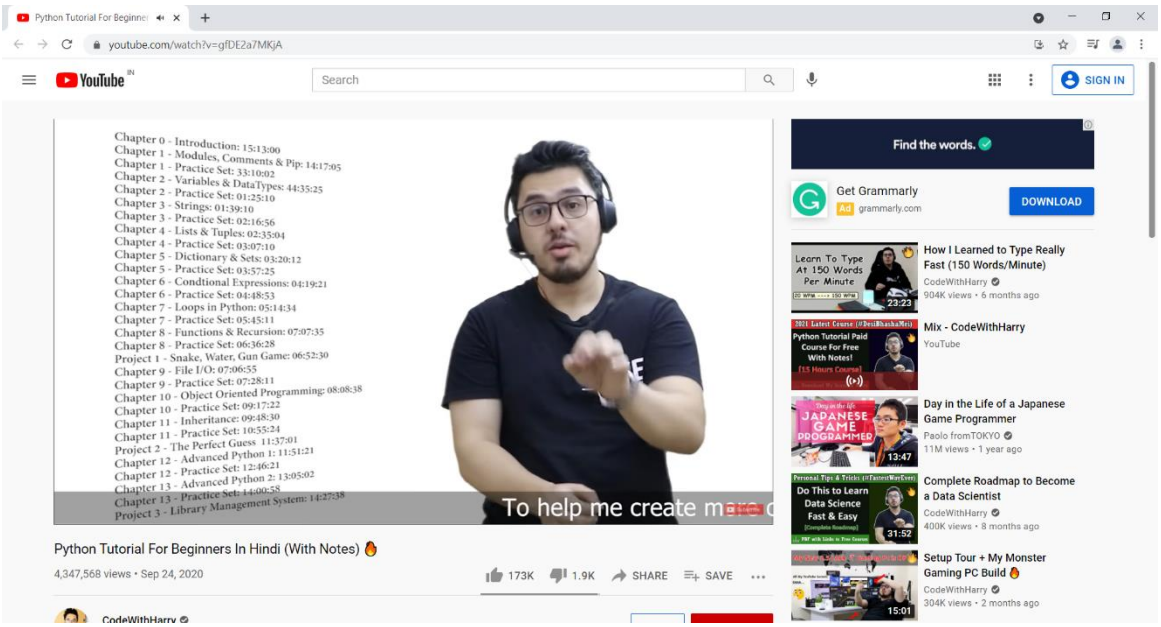


Fig.(e). Output of Open YouTube command

When user gives command “Open YouTube” then smart mirror will ask for the topic to be searched on YouTube and then opens YouTube as shown in above figure.

```
Listening...
Recognizing...
user said: send email

What should I say?
Listening...
Recognizing...
user said: hello how are you

Whom should I send?
Listening...
Recognizing...
user said: Tanushri

Email sent successfully
```

Fig.(f). Output of Send email command

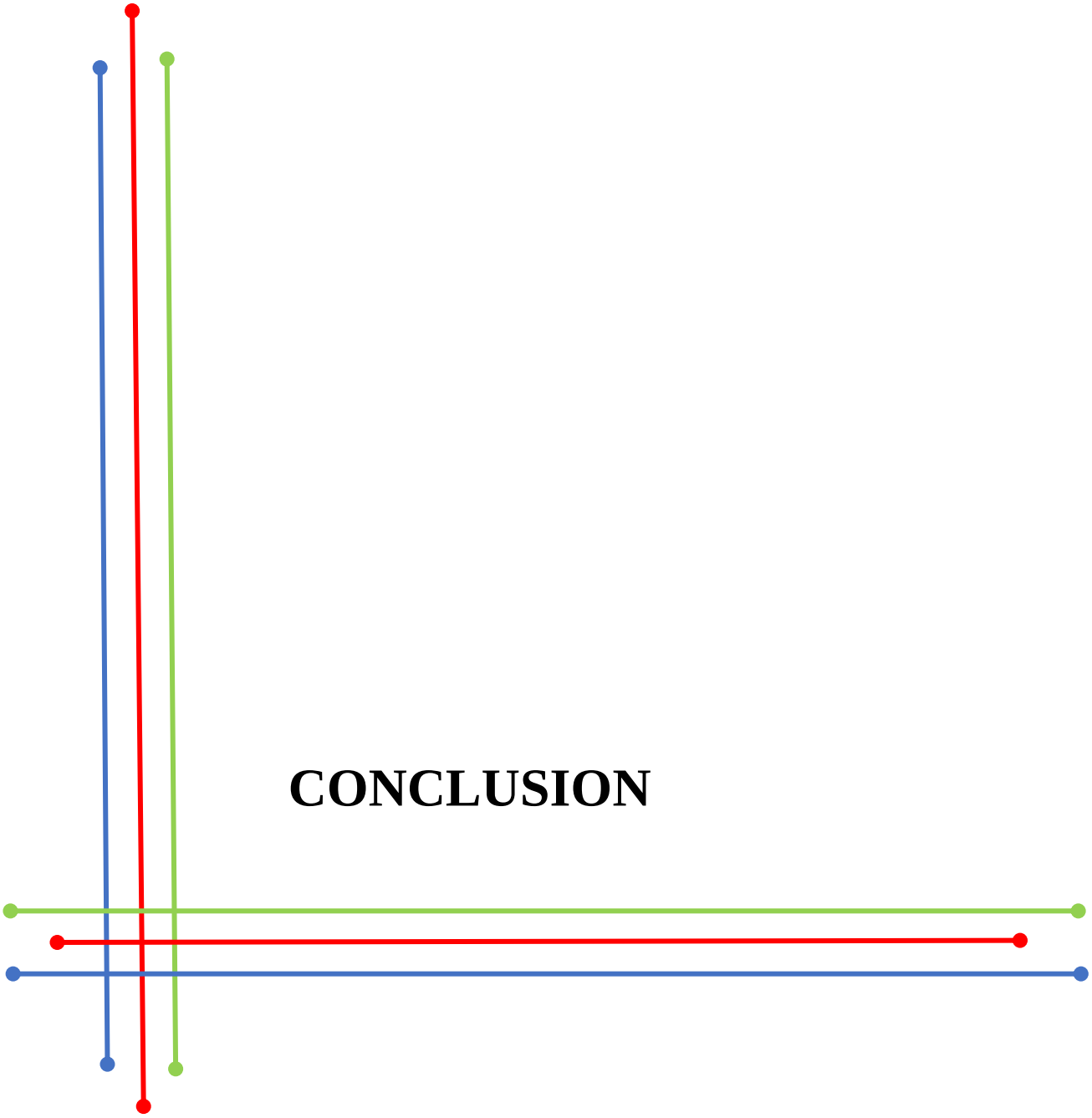
When user gives “Send email” command, smart mirror will ask for the recipient and the content and then send the email as shown in above figure.

```
Listening...
Recognizing...
user said: Wikipedia what is python

Python is an interpreted high-level general-purpose programming language. Python's design
 philosophy emphasizes code readability with its notable use of significant indentation.
Listening...
```

Fig.(g). Output of Wikipedia command

When user gives “Wikipedia” command along with the topic to be searched on Wikipedia, smart mirror will reply with information as shown in above figure.



CONCLUSION

Chapter 8

Conclusion

The smart mirror which acts as a smart home control platform is a futuristic system that provides users with an easy-to-use mirror interface, allowing users access to customizable services in a highly interactive manner, while performing other tasks simultaneously. The main strengths are that this is a new kind of smart device that people don't see every day and it looks very spectacular. The mirror works both as a normal mirror as well as a mirror showing daily notifications to the authorized user. There are lots of feeds or notifications that the user can view on the mirror like Facebook, Gmail, news etc. The mirror is also used to display time, weather, date etc. The mirror also acts as a personal assistant as well as displays important notices and is also an enquiry center. The user can interact with the mirror using voice commands. Also, a PIR sensor is attached which turns on the screen only when the user is in the proximity range of the mirror. This reduces power wastage. Smart mirror design has the advantages of small size, simple operation, low cost, high degree of user friendly, personalized user interface and many other advantages which is suitable for many applications like college, home, offices etc. Overall, the proposed smart mirror system incorporates various functionalities to grant users access to personalized information services.

FUTURE SCOPE

Chapter 9

Future Scope

Nothing is perfect and complete and there is always a scope of improvement in each and every product. Everything needs to be updated or upgraded on a timely basis to cope up with the current technology. Apart from up gradation there can be many other features as well which could add up to the proficiency and ability of our smart mirror. There are many future scopes for this paper and hopefully it will emerge into biggest benefit in the field of artificial intelligence. The most basic feature can be smart mirror-based home automation which will provide a natural means of interaction by which we can control the household appliances like switch on/off light and fans through basic voice commands. Majorly, since we are using this mirror in college environment, basic functionalities like barcode scanner or finger print sensor can be integrated to fulfill basic tasks such as college attendance or program registrations etc. This could include registering in programs by scanning of ID cards.

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