Assistance for Blind People

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Abstract— **This paper proposes a system for the blind by creating an AI assistance system. The system can assist the blind by guiding them towards their needs such as personal things and also identifying people. It can also read text using Deep Learning algorithms. Giving visually impaired people the ability to read printed text has been a topic of keen interest in education field and industry for the better part of the last century. We present a comparison of recent methods for text-reading for the visual impairment based on key features: adaptation for less-than-perfect imaging, target text, UI tailored for the visual impairment and method of evaluation.**

I. INTRODUCTION

AI is the most popular way of solving a lot of modern problems very easily.AI have helped many people in many segments such as car automations, home automations and much more. Here in this proposed project we have combined very sophisticated algorithms to achieve the automations such as person identification, human location in 3D space and much more. All these functions mostly use the input from the camera and output through sound so they can hear the sound.

2. LITERATURE SURVEY

Artificial Intelligence (AI) is intelligence exhibited by machines. In computer science the field of AI defines itself as the study of "intelligent agents". Generally, the term"AI" is used when a machine simulates functions that human's associate with other human minds such as learning and problem solving.
In the last few years, there has been an arrival of a large amount of software that utilizes elements of artificial intelligence. Subfields of AI such as Machine Learning, Natural Language processing, Image Processing and Data mining have become an important topic for today's tech
giants. Machine Learning is actively being used in Google's predictive search bar, in the Gmail spam filter, in Netflix's show suggestions. Natural Language Processing exists in Apple's Siri and Google voice. Image Processing is necessary for facebook's facial recognition tagging
software and in Google's self driving cars. Data Mining has become a slang for the software industry due to the mass amounts of data being collected every day. Companies like
Facebook and Google collect large amounts of statistics from users every second and need a way to interpret the data they receive.

3. AI ASSISTANT & HISTORY

Echo is three devices in one. It's a voice-controlled Wi-Fi and Bluetooth speaker capable of playing music from Amazon music, a Spotify premium account or a smartphone, tablet or computer connected via Bluetooth.
It's also a smart voice assistant called Alexa that's capable of answering queries, setting timers, doing calculations, telling you the weather or what's in your calendar and other bits you might expect from Siri, Cortana or Google Assistant. It also has third-party app integrations that allow users to interact with the National Rail app for train times and other similar services.
Finally, Echo is a smart-home controller that can turn devices on and off, set scenes and other internet of things functions just by saying: "Alexa, turn on the living room light."

4. SYSTEM DESIGN

A. Raspberry Pi The Raspberry Pi is a series of credit card–sized singleboard computers developed in the United Kingdom by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science. They develop free resources to help people learn about computing and how to make things with computers. Raspberry Pi's inception began in 2006. Two models were announced in 19 February 2012: Model A and Model B. Model B+ was announced in July 2014. Pi 3 Model B is announced on 29th February 2016 [5]. Raspberry pi is low cost minicomputer. It is possible to connect Monitor of PC as well as television to the Raspberry pi. Mouse and Keyboard can be connected to the Raspberry pi. All models having a Broadcom system on a chip, it includes an ARM compatible central processing unit (CPU) and an on-chip graphics processing unit. CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3. On board memory range from 256 MB to 1 GB RAM. Secure Digital (SD) cards are used to store the operating system and program memory. Most of the Raspberry pi board are having USB ports, HDMI post, DSI port, Audio jack, 40 GPIO pins, In-built Bluetooth, WIFI and so on.

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Raspberry pi is having its own operating system. Raspbian, Ubuntu mate, snappy Ubuntu, Pidora, Linutop, Arch Linux ARM and so on are the various operating systems used for the Raspberry pi. Raspberry pi supports different programming languages like C++, Python, SQL, and HTSQL. C++ uses Arduino.HTSQL (Hyper Text Structured Query Language) to provide a web interface to a database that is easy to query via the web browser. It also supports java, java script, php and so on. The Raspberry Pi has four distinct power modes [6]: The run mode – the central processing unit (CPU) and all functionality of the ARM11 core are available and powered up. The standby mode – the main core clocks are shut down (the parts of the CPU that process instructions are no longer running) although the power circuits on the core are still active. In this mode, known as ''Wait for Interrupt'' (WFI) mode, the core can be quickly woken up by a process generating a special call to the CPU called an interrupt. This interrupt will stop any current processing and do what the calling process has asked for. The shutdown mode – there is no power. The dormant mode – the core is powered down and all caches are left powered on.
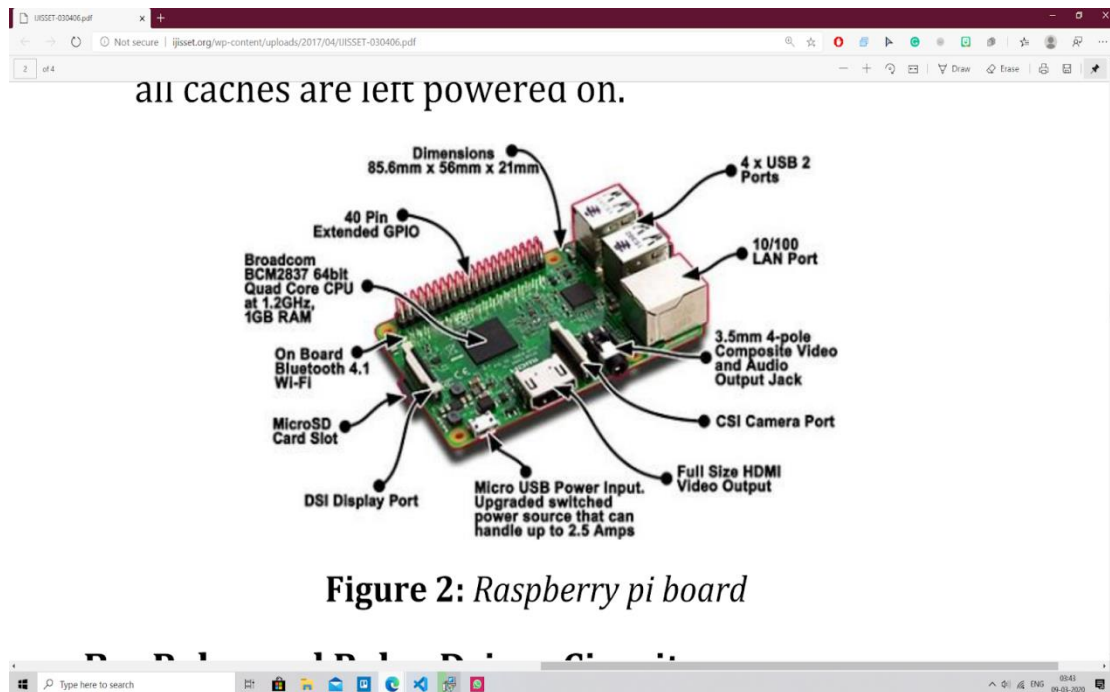

Figure 2: Raspberry pi board B.

RELAY

Relay and Relay Driver Circuit Relay is nothing but it is the electromagnetic switch. Relay allows one circuit to switch another circuit while they are separated. Relay is used when we want to use a low voltage circuit to turn ON and OFF the device which required high voltage for its operation. For example, 5V supply connected to the relay is sufficient to drive the bulb operated on 230V AC mains. Relays are available in various configurations of operating voltages like 6V, 9V, 12V, 24V and so on. Relay is divided into two parts, one is input and other is output. Input side is nothing but a coil which generate magnetic field when small input voltage is given to it.

Relay having three contactors: Normally closed (NC), Normally opened (NO) and common (COM). By using the proper combinations of the contactors electrical appliances may turn ON or OFF.
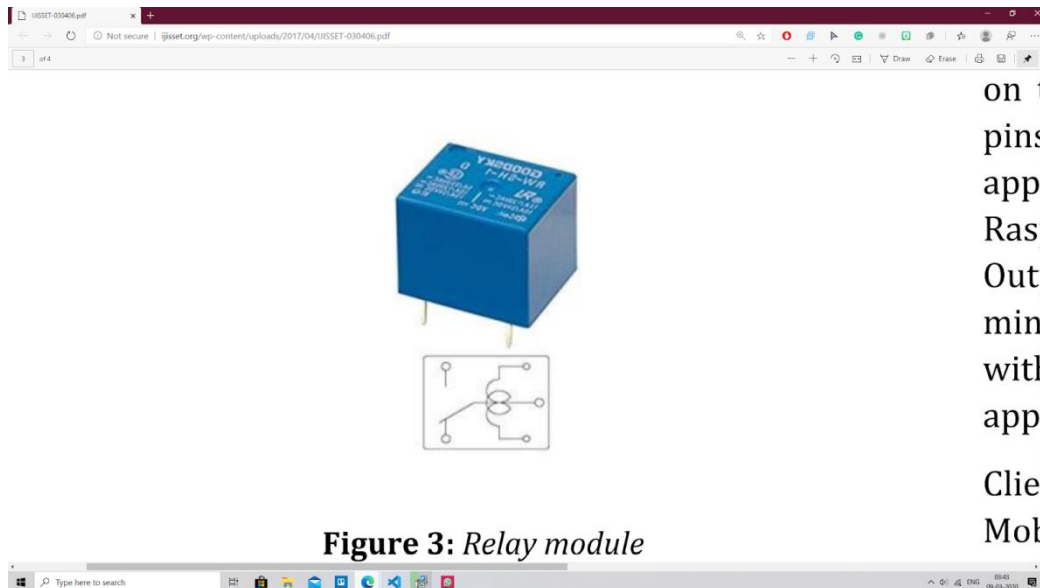
Figure 3: Relay module

C. Mobile Devices Mobile devices are noting but small computing devices. They are small enough so that we can operate and hold in hand. They are also having their own operating systems. Mobile device can be move from one location to other. Example of mobile devices are: Smart phones, Laptops, Tablets and so on.
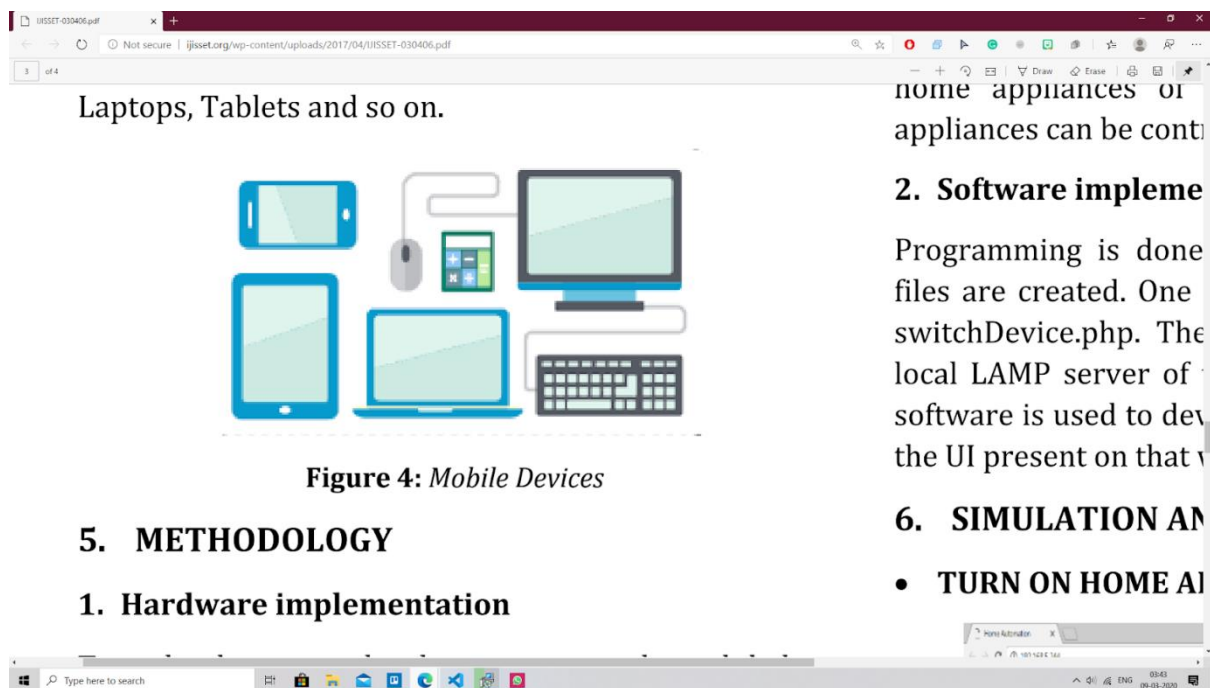
Figure 4: Mobile Devices

5.SERVO

The first servomotors were developed with synchros as their encoders.[7] Much work was done with these systems in the development of radar and anti-aircraft artillery during World War II.[8]

Simple servomotors may use resistive potentiometers as their position encoder. These are only used at the very simplest and cheapest level, and are in close competition with stepper motors. They suffer from wear and electrical noise in the potentiometer track. Although it would be possible to electrically differentiate their position signal to obtain a speed signal, PID controllers that can make use of such a speed signal generally warrant a more precise encoder.

Modern servomotors use rotary encoders, either absolute or incremental. Absolute encoders can determine their position at power-on, but are more complicated and expensive. Incremental encoders are simpler, cheaper and work at faster speeds. Incremental systems, like stepper motors, often combine their inherent ability to measure intervals of rotation with a simple zero-position sensor to set their position at start-up.

Instead of servomotors, sometimes a motor with a separate, external linear encoder is used.[9] These motor + linear encoder systems avoid inaccuracies in the drivetrain between the motor and linear carriage, but their design is made more complicated as they are no longer a pre-packaged factory-made system.

5. METHODOLOGY

1. Hardware implementation To make the system hardware we gone through below block diagram. The whole block diagram is divided into two sections, first is Server side and other one is client or user side.

Server is created on the Raspberry pi with the help of LAMP (Linux, Apache, MySQL, PHP). Two PHP files are created and stored on the Server that we have created on the Raspberry pi. Raspberry pi is having 40 GPIO pins. These pins are used to control the home appliances. Relay are connected to the GPIO pins of the Raspberry pi through the Relay Driver Circuitry. Output of the GPIO pins is 3.3V.
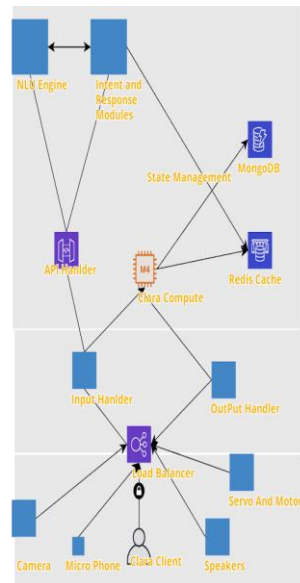

Figure 5: Block diagram of system Server side is totally installedAWS server.

In order to drive Relay minimum 6V voltage is required so this can be obtained with the help of Relay driver circuitry. All home appliances are connected to the Relay. Client side is nothing but a User side. Users need to use Mobile device to access the Raspberry pi through the internet.

Mobile devices connect to the internet and send the image data to the server for analysis.

The servo is connected to the arduino which can control the servo for direction and an Audio chip connected to Rpi is used to make audio output.

And a AI chatbot can trigger actions based on the user input through the voice.

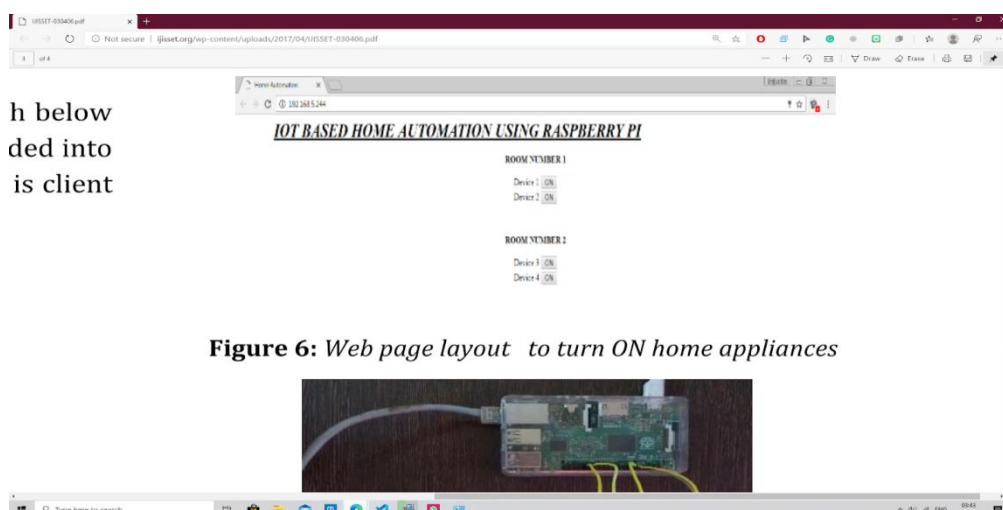## 6. SIMULATION AND RESULT RECOGNITION OF VOICE AND SERVO CONTROL.

Figure 6: *Web page layout to turn ON home appliances*

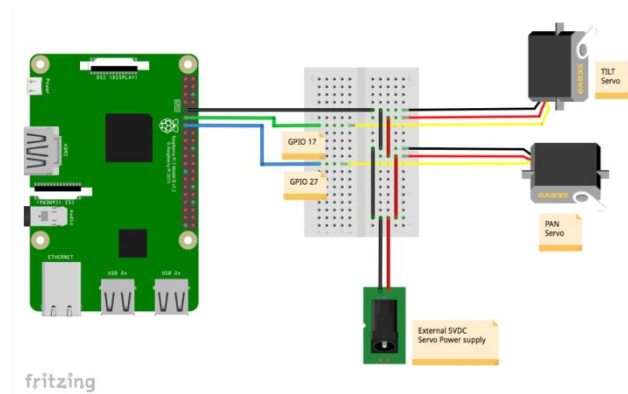Figure 6: A stimulation Layout for the system

Figure 7: Output for above fig.6

7. CONCLUSION

The work for blind assistance is completed. It is possible to operate the system directly through voice or a fully automated system too.

By this Blind can control the system through voice control.

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