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MIRRO-COOL SMART MIRROR

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Abstract - *Most of the traditional product used in household appliances had become more familiar to the user, they have to use the repetitive device which they won't get any interaction from it, make to feel loneliness and less secure in that environment. In this modern era the home appliances are become smarter than the past decades because of the remarkable growth in technology especially like IoT based platform where almost all the appliance are smarter than the previous generation for example door lock, window, refrigerator, fans etc., In household appliances where the appliances are integrated on the single embedded system, which had become smarter in order to give human interface easier and provide more secure in order to use in the particular interval, which consumes less area, less power and highly reliable to the product. This paper presents about Mirro-cool Smart Mirror which used to display an information required for the user like time, event, mobile notification, displaying E-mail, weekly schedule, To-do list, Birthday reminder, calendar, newsfeed with voice recognition and face recognition features. The Face recognition feature made Smart-Mirror more secure by providing particular information only to a particular user by a user-based module swapping system.*

Key Words: Raspberry Pi, Smart mirror, Display Unit, IoT, Modules.

1. INTRODUCTION

At present, more and more close to the life of intelligent products are emerging, smart TV, smart watches to now appear again smart mirror. The Mirro-Cool Smart Mirror is designed by using 24-inch display, positioned vertically, which can be mounted behind a one-way mirror allowing only brightened elements on the screen to be seen by the user and other black user interface on the screen make one-way mirror to act as a normal mirror. The intelligent mirror is the principle of one-way perspective, the actual picture in the form of specular reflection transmitted to our vision. The picture displayed behind the mirror can also be transmitted to us through the mirror, so as to achieve the effect of showing the pattern on the mirror. The mirror contains speaker which is used for application notification sounds, playing music's and to play other user required information from the cloud.

The Mirro-Cool Smart Mirror has a set of standard applications that provide important information to the users like weather, to-do lists, news feed, birthday reminder, calendar schedule, compliments, mobile notifications and clock. It has voice control through a voice recognition system developed into the user interface. The voice control feature makes interaction with the to-do list based on the particular user, using face recognition feature. The voice control is activated by setting a particular command provided by the user. In our project voice command is made as "Smart Mirror". The Mirro-Cool Smart Mirror will get activated when a particular user comes in-front of the mirror using camera and that user will get information and events from the mirror which has been scheduled in to-do list and that provide security by not sharing information to another user.

2. PROPOSED ARCHITECTURE

2.1 Power supply

A power supply is given by 12v adapter to power on the Raspberry Pi and LED display. The adapter converts the Alternative current into Direct current to run Raspberry Pi and Screen of the mirror. In our project we used normal mobile charger for power supply.

2.2 Raspberry 3 B+

The microcontroller used in this project is Raspberry Pi 3B+. It is of 1GB LPDDR2 SDRAM and Dual-band 802.11ac wireless LAN makes better performance and can get fast response in a real time.

2.3 SD Card

The need of Secure digital Card is for booting the Operating System in Raspberry Pi. Since Raspberry Pi does not have inbuilt memory. So, in this project 32GB SD card is used for booting and also store the data programs to run the Smart Mirror.

2.4 HDMI Cable

Short for High-Definition Multimedia Interface it is a cable and connector capable of high quality and high bandwidth streams of audio and video from Raspberry Pi to the LED

display. Since Raspberry pi does not have inbuilt screen and hence, we have to use external display unit.

2.5 LED Display

An LED display is a flat panel display, which uses an array of light-emitting diodes as pixels for a video display. We used a LED TV that is placed behind the mirror, this LED TV is a 24-inch size and it will display customizable module such as clock, newsfeed, calendar etc. based on the result of voice recognition and face recognition output.

2.6 Microphone

A microphone is a device that converts sound vibrations in the air into electronic signals or scribes them to a recording medium. Microphones enable many types of audio recording devices for purposes including communications of many kinds, as well as music and speech recording.

2.7 Speaker

Speaker is used to get the reply from the Smart Mirror as a user is giving vocal commands to a software program as an input using microphone.

2.8 Wooden Frames

To design a prototype, we used wooden frame. It is possible to keep all the components of the project inside this wooden frame. So, it makes the Smart Mirror as a perfect product with clean compact design.

2.9 One Way Mirror

One-way mirror is a reciprocal mirror that is reflected on one side and transparent at the other. The perception of one-way transmission is achieved when one side of the mirror is brighter and the other side is dark. This allows viewing from darkened side but not vice versa.

2.10 Camera

Camera is an instrument for capturing the images. Here in this project Raspberry Pi camera is used for face Recognition feature. The Pi camera detects a person and based on the user Smart Mirror interact with that particular user.

3. IMPLEMENTATION AND WORKING

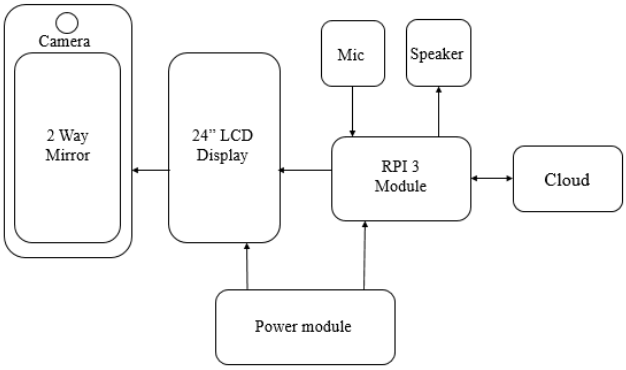

Figure 1.1: Block diagram of Smart Mirror.

Figure 1.1 explains about working of smart mirror. In this Raspberry pi acts as a CPU, which process the information fetched from the sensor and cloud, process, executed actions are performed by actuator. Cloud acts as a data center, where all the related information is fetched based on the IP address using HTTP protocol to the Raspberry pi. When the camera detects and recognize the person smart mirror initialize its working, which displays all the relevant information clock, calendar and events, newsfeeds, compliment, whether forecasting, weekly schedule, mobile notification, To-do list etc. Smart mirror can be interfaced through mic module to get the information from the cloud which is relevant for the user. When the user speaks to the voice assistant, the microcontroller connects to the cloud using IP address and give the information required to the person. The challenging task is to display the processed information from the cloud the display unit is work on electron browser. Electron browser is a framework which is used for desktop application.

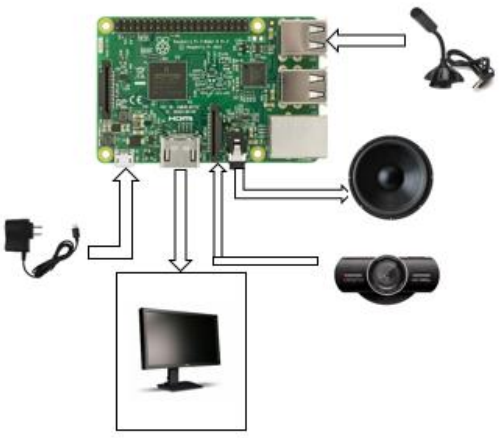

Figure 1.2: Connection between Raspberry Pi and I/O Devices.

For security purpose camera is used to detect a person to know the person is owner of that mirror or any unknown

person. After detecting person, it displays to-do task, mobile notification, E-mail to that person. Whenever the person goes away from the mirror all the confidential information will be hidden and acts like a normal mirror.

4. RESULT AND CONCLUSION

Figure 1.3: Mirro-Cool Smart Mirror prototype

Mirro-Cool Smart Mirror gives information of time, date, weekly schedule, accurate temperature and humidity, Mobile notifications, To-do list, Music, compliments and latest news while looking and grooming in front of mirror.

Smart mirrors have great potential to enhance user experience of accessing and interacting with information. Based on the user's mood it can perform the task like playing music, telling joke, displaying relevant videos of song, cooking recipe's and news etc.

The snapshot in figure 1.3 is the final prototype of Mirro-Cool Smart Mirror project.

The screenshot of Electron browser of Mirro-Cool Smart Mirror is shown in Figure 1.4. It shows different modules of Voice recognition, Date and Time, Music, Calendar, To-do list, Weekly schedule, Weather forecast report, News, compliments etc.

The Smart Mirror not only allows users to see relevant information effortlessly, they can also be integrated as a theft detection system. If any unknown user it detects it captures the picture of that particular user and upload it to the user cloud like Dropbox, Google drive etc.

Mirro-Cool Smart Mirror saves time and makes it easier to access information and thus reduces the use of smart phone usage to get relevant information. The user required information will be displayed on the screen based on particular user of this mirror.

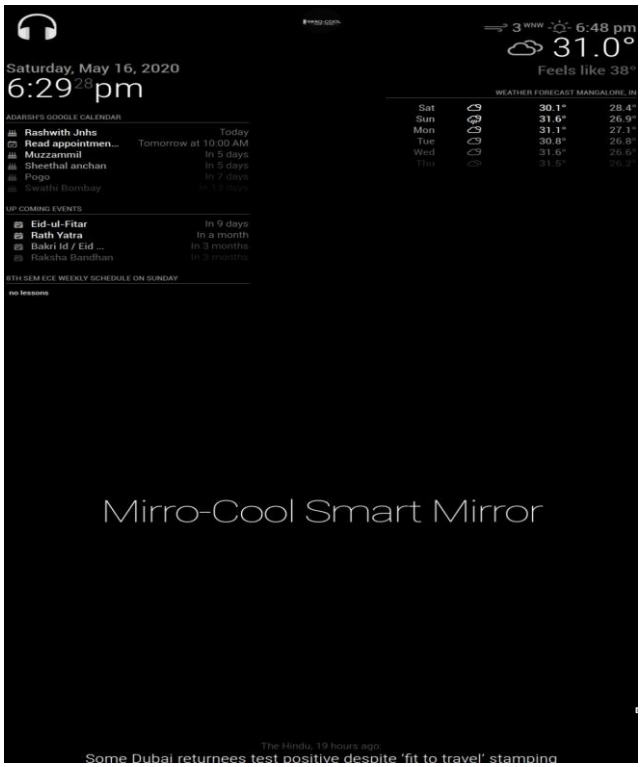

Figure 1.4: Screenshot of Electron browser of Mirro-Cool Smart Mirror

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