International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 12 | Dec 2020 www.irjet.net p-ISSN: 2395-0072

Voice Controlled Raspberry Pi based Smart Mirror

Ms.Punithavathi.R[1]
Student
Department of Electronics and Communication Engineering, Christ the King Engineering Collage, Coimbatore, Tamilnadu.

Ms.Pavithra.L[2]
Assistant Professor
Department of Electronics and Communication Engineering, Christ the King Engineering Collage, Coimbatore, Tamilnadu.

Mrs.Kiruthika.S.V[3]
Assistant professor
Department of Electronics and Communication Engineering, Christ the King Engineering Collage, Coimbatore, Tamilnadu

---

Abstract - *This project expresses a novel design and implementation of an interactive mirror system, called "Smart Mirror". The Smart Mirror can be easily built by using one way mirror, concealed LED screen and microphone to make it interactive. The smart mirror makes use of the Google assistant software which allows us to activate multimedia devices through voice commands. Is has various application like displaying real time information updates and appliances control. The Smart Mirror was developed, starting with the software and finally integrating it with the hardware.*

Key Words: Raspberry Pi 3 B+, Monitor(LED), One way Mirror, Frame, Camera, Speaker, Microphone

1. INTRODUCTION:

In this world everybody keeps running behind the solace and comfort. Present day man has a diverse innovation for a similar purpose. Day by day, the world is moving towards automation, we often hear from technology entrepreneurs, futurists and some media outlets that media it will inform the time and date each time you investigate it.

It will be interesting if the Mirror¬outlets that automation will lead to a to the bright future. Recognizes the user and reminds the important meetings on that day. Our daily routine includes reading newspaper, getting stock updates, weather updates, etc.

This mirror is one step towards the intelligent mirror is made of raspberry pi as the host controller. In working condition, the system by raspberry pi is connected to the network through WIFI, and obtain the development of smart homes. Information about the weather forecast from the API network interface specified dressing index, time, date and other information, and then through the information displayed on the mirror.

The user can interact with the mirror, such as asking the mirror the weather, news, time, the mirror can automatically obtain the corresponding information network and broadcast. The designed intelligent mirror has the advantages of small size, simple operation, low cost, and has broad application prospects.

2. LITERATURE SURVEY:

In this paper, an intelligent mirror based on raspberry pi is designed for the home of Internet of things. The intelligent mirror is made of raspberry pi as the host controller. This mirror can display weather, time, current temperature, and web application for a college. The raspberry Pi is able to actively connect to the World Wide Web and can retrieve data upon the user's request. This product able to retrieve weather base on the current location of the user. The designed intelligent mirror has the advantages of small size, simple operation, low cost, and has broad application prospects. The interactive mirror recognizes different users through their personal corporate ID card, which allows them to have access to their personalized user interface. Indoor environmental conditions (thermal, humidity and light), personal physical exercise data obtained from wearable devices and general purpose information (e.g. weather and daily news). Additionally, motivational advice related to physical performance is supplied through request by applying speech-based recognition techniques.

In this project, the development of Smart Reflect took place - a software platform for developing smart mirror applications. The main features of Smart Reflect are threefold: **(1) It is modular, lightweight, and extensible; (2) It allows developers to sidestep the sand-boxed environment created by web browsers; and (3) It supports plug-ins written in any programming languages.** These improvements alleviate the hardware and software limitations inherent with the use of web browsers as a primary scriptable display method. In this paper, they described the design and implementation of Smart Reflect and compare it with other similar platforms. The virtual layout that will be prepared using HTML and CSS will be displayed on the mirror when it is turned on and will show calendar, weather and news headlines. The docker will contain the API of Alex (virtual voice assistant from Amazon) that will respond to the user's voice. The mirror will perform facial recognition which will be helpful for real time image zoom in and out. This will be one with help of Open CV and some java programming. The software will be programmed on java and python and Node is will be used as a server-side

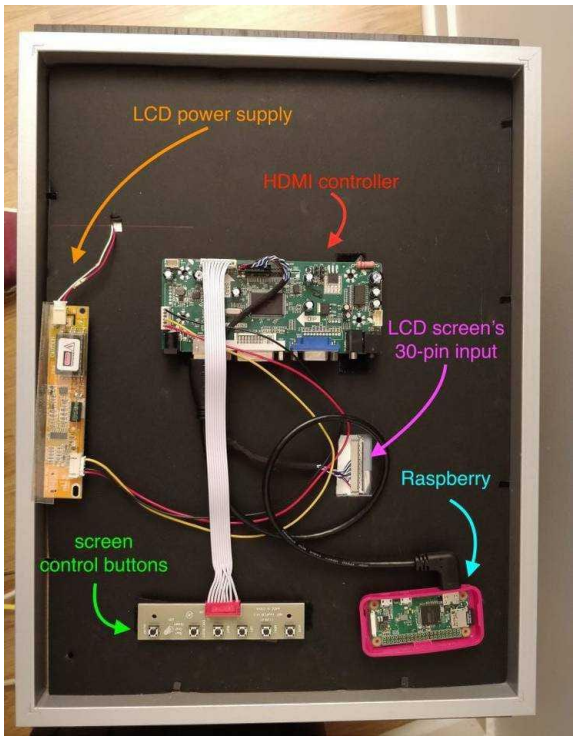
Language. The proposed smart mirror will perform some advanced features that are discussed in the next section of

this report. The proposed smart mirror will perform these tasks.

A normal two-way mirror and acrylic glass will display real time image. After activation the mirror will display weather, time and news. The mirror will automatically sleep if a person disappears from the front with the help of sensors.

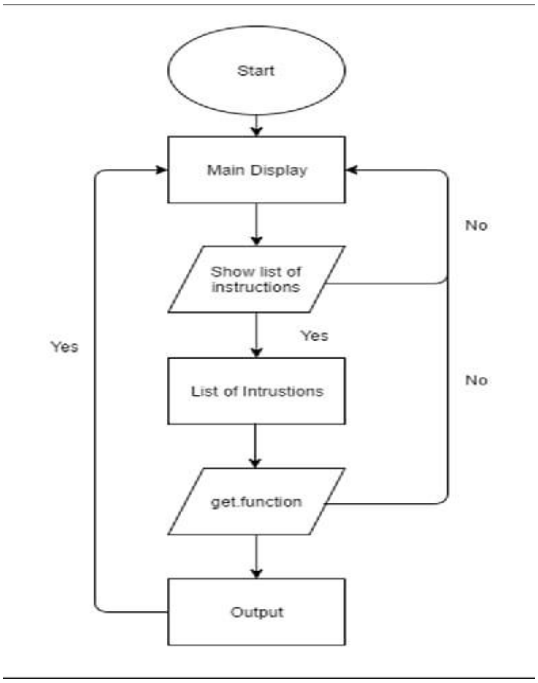
3. EXISTING SYSTEM :

The Smart mirror is a Raspberry Pi (low powered minicomputer) based display when connected to the internet it picks and displays the necessary information in the presence of the user. In the proposed system, Raspberry Pi 3 B+ is used which contains 1 GB SDRAM, runs on Linux platform and needs 700mA. A single sided mirror is placed on the LED screen which acts as a regular mirror when there is no light behind it or act as a glass window where information is displayed. Only when the user stands in front of the mirror the customized information will be displayed. In order to retrieve updated data from the web sources various data feeds can be used such as RSS feed. The personal schedule of events and the updated weather reports can be obtained by using Google Calendar API and Weather API. For displaying these useful information Winter a standard library GUI python module is used



A. Smart mirror user interface

B. Dataflow chart for voice controlled smart mirror



Whenever the system recognizes any voice, it automatically turns on and displays time, date and weather information on smart mirror and also gives voice response. Then if the user gives any related commands to the mirror using the voice assistant, it performs actions accordingly. The commands that are accepted by the voice control system are: time, weather, news, email, Google search engine and Google calendar. If there is no voice recognized by the mirror, it remains off and saves power of the system and CPU.

Steps:

Step-1: Start

Step-2: The main display is turn ON.

Step-3: If a voice is recognized.

Step-4: It displays time, date and weather forecast automatically on the mirror.

Step-5: It intakes voice commands of the user Instructions.

Step-6: The mirror displays information based on the voice commands. Step-7: Stop.

4. PROPOSED SYSTEM:

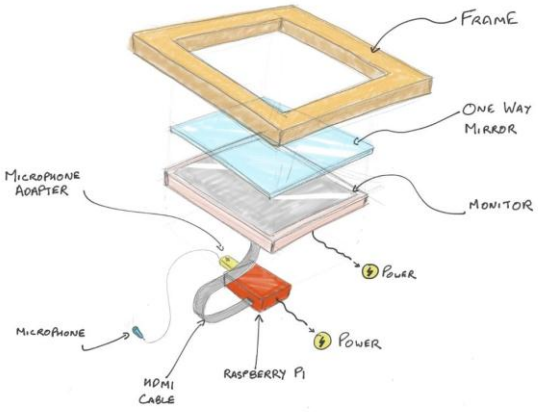
We plan to design and develop such kind of futuristic smart mirror which provides a whole new experience to the user. Our proposed **the smart mirror consists of a two-way mirror, monitor (LED), Raspberry Pi 3 B+, Microphone, Speaker, Camera, frame**. A wooden frame will be prepared

with LED attached behind the glass with all the sensors and the raspberry pi.

The power supply is attached to the raspberry pi which will power the LED monitor and the sensors. Once the mirror is activated, it will connect to the docker which contains all API and software needed to run the mirror. This will require internet access which will be provided by the Wi-Fi module (LAN can be also used) on the raspberry pi.

Smart mirror –Raspberry PI 3 B+ Module

In the proposed system, the user can directly interact with the Google Assistant with the voice commands and apart from getting access to the news, date and time, temperature uses can also get access to the financial information like the Cryptocurrency details value of Bitcoin, Ethereum and Ripple. This information wouldn't be thrown directly on the face of the user but displays the information on the edges of the screen to allow the user to use it as an actual mirror.



Raspberry PI 3 B +

The Raspberry pi is a little, credit card sized PC that controls the entire thing, showing the Magic Mirror interface and running the Google Assistant, the voice-control system. The Raspberry Pi is a solitary board PC which includes a quad core Arm cortex A-5 processor, with the capacity to run Linux based working system. The Raspberry Pi 3 has a coordinated LAN port which can be utilized to associate with the web5. It accompanies GPIO (Broadly useful Input Output) pins which can be used for interfacing it with wide input and output devices. Debian based on Raspbian OS is installed on the Raspberry Pi.

Camera

A web camera is another important part of the project wherein the user voice commands are taken as input by the web camera via the Raspberry Pi. Without the Web Camera, the Raspberry Pi can neither take the commands as input nor can even process it.

LED Monitor

An LED display is a flat panel display, which uses an array of light-emitting diodes as pixels for a video display. Their brightness allows them to be used outdoors where they are visible in the sun store signs and billboards, and in recent years they have also become commonly used in Destination signs on public transport vehicles, as well as variable-message signs on Highways.

One Way Mirror

The One Way Mirror is also known as two way mirror. It is made of acrylic and sits flush over the screen, permitting the designs on the screen to come through while keeping up the monitor impact6. The thicker mirror (3/16") is used to avoid the "funhouse mirror" impact. When one side of the mirror is brighter and the other is dark, it allows viewing from the darkened side but not vice versa. If there is white text over a dark background the white letters will be seen as an overlay with the user's reflection in the background**.**

Microphone

The mode for voice commands to reach the Raspberry Pi is the Microphone It processes the voice signal into the electrical signals using acoustic effect and delivers the input required by the Raspberry Pi.

Frame

The frame provides house for every component necessary to build the smart mirror. It is made of wooden blocks and clamps are provided in appropriate places to hold the devices in position. It gives the smart mirror a visual treat. The frame could be designed as per the user wish.

Speaker

Speaker is used to get the output from the Google Assistant. User's query will be answered through the Google Assistant via, speakers.

OUTPUT:

The output is generated from the smart mirror in the form of voice as well as text feature. Mainly the output contains the basic features of a smart mirror like weather, time, calendar,

holidays etc. The output is also generated through the assistant that we use through voice commands as input. The output and input generated through the smart mirror can also be seen in graph though the analytics feature provided by the assistant.

RESULTS:

The following are the images that depict the output from the smart mirror displaying the date, time, calendar, news, Cryptocurrency details and current song playing on Spotify.

CONCLUSION AND FUTURE SCOPE:

Conclusion

Our system integrated the concept and methodologies that have been implemented in many existing systems a smart mirror system. It is a novel application of creating a smart interacting system. The system is reliable and easy to use, in this interactive system; we have been concentrating on an interactive system for home.

There exist many benefits from the smart mirror. A service-oriented architecture has been adapted for the development and deployment of the various services, where the mirror interface, the news feeds all use Web service communication mechanisms. By utilizing sensor, we can reduce the power consumption since the mirror will display information only in the presence of a human.

The future prototype is ripe with potential and probably robust in terms of functionality. It uses voice commands to switch between each views and gestures to interact with content. Rather than confined to a home we can implement the functionality to a glass material. So that it can have a wide range of applications like one can setup this functionality to a glass table, which he used in office. This will help him to know about notifications from many sites at the same time in a single screen. Another application is that this functionality can be setup in public places.

Future Scope

The scope of this study is to develop an efficient and cost-effective solution for the development of a Smart Mirror to reduce and possibly eliminate the need for the user to make time in their daily morning or nightly routine to check their PC, tablet, or smart-phone for the information they need. The mirror will provide the information with little to no effort from the user with the goal of not being a burden that he or she must maintain. The mirror wouldn't be another activity, rather then enhancement to the already common use of mirrors in most modern bathrooms.

REFERENCES:

[1] Y. Sun, L. Geng and K. Dan, "Design of Smart Mirror Based on Raspberry Pi," 2018 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS), Xiamen, 2018, pp. 77-80. doi: 10.1109/ICITBS.2018.00028.

[2] M. M. Yusri et al., "Smart mirror for smart life," 2017 6th ICT International Student Project Conference (ICT-ISPC), Skudai, 2017, pp. 1-5. doi: 10.1109/ICT ISPC.2017.8075339.

[3] O. Gomez-Carmona and D. Casado-Mansilla, "SmiWork: An interactive smart mirror platform for workplace health promotion," 2017 2nd International Multidisciplinary Conference on Computer and Energy Science (SpliTech), Split, 2017, pp. 1-6.

[4] Piyush Maheshwari,"Smart Mirror: A Reflective Interface to Maximize Productivity" International Journal of Computer Applications (0975 –8887) Volume 166 – No.9, ay 2017.

[5] Divyashree K J, Dr. P.A. Vijaya, Nitin Awasthi,"Design And Implementation Of Smart Mirror As A Personal Assistant Using Raspberry Pi".

[6] https://ece-eee.final-year-projects.in/a/2926-smart mirror-a-glance-into-the-future.html.

[7] Lakshami N M, Chandana M S, Ishwarya P, "IoT based smart mirror using RaspberryPi".

[8] Y. Sun, L. Geng and K. Dan, "Design of Smart Mirror Based on Raspberry Pi," 2018 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS), Xiamen, 2018, pp. 77-80.

[9] Muhammed Mu'izzudeen, Yusri Shahreen Kasim, Rohayanti Hassan, Zubaile Abdullah Husni Ruslai, Kamaruzzaman Jahidin, Mohammad Syafwan Arshad, " Smart Mirror for Smart Life", in IEEE Conference publication, 2017.

[10] Khurd Aishwarya .S, Shweta .S. Kakade, Prof. R. M. Dalvi, "smart mirror", in IJRASET, Volume 6 Issue XI, Nov 2018.

[11] M. Anwar Hossain, Pradeep K. Atrey and Abdulmotaleb El Saddik, "Smart mirror for ambient home environment", in 3rd IET International Conference on Intelligent Environments, 2007.

[12] A. S. A. Mohamed, M. N. Ab Wahab, D. B. L. Arasu, S. S. Suhaily, "Smart Mirror Design Powered by Raspberry PI" AICCC '18: Proceedings of the 2018 Artificial Intelligence and Cloud Computing Conference, Pages 166–173, December 2018.

[13] An Interactive Smart Mirror based On IoT Platform. Retrieved from Prasanthi Kakumani 1 Haritha Akkinen 2 G. Lakshmi 3 PVS Lakshmi 4 Scholar Asst Professor Asst Professor Professor Thttp://www.ijetmas.com/admin/resources/project/paper/f2017050 11493628942.pdf.

[14]]Smart Mirror High Level Design. Retrieved from Teagu Kohlbeck, Chris Rectenwald, and Benny Richmon http://seniordesign.ee.nd.edu/2017/Design%20Teams/smartmir/HighLevelDesign.pdf.

[15] M. M. Yusri et al., "Smart mirror for smart life," 2017 6th ICT International Student Project Conference (ICT-ISPC), Skudai, 2017, pp. 1-5.

BIOGRAPHIES :

"Ms. Punithavathi.R studying final year B.E degree in Electronics and Communication Engineering in Christ The King Engineering college, Coimbatore, Tamilnadu, India."

"Ms. Pavithra.L received her B.E degree in Electronics and Communication Engineering form Sasurie academy of Engineering, Coimbatore. M.E degree in VLSI design from Info instate of engineering, Coimbatore. Her major research in VLSI designing. She is currently working in Assistant Professor in the department of ECE in Christ The King Engineering college, Coimbatore, Tamilnadu, India. "

"Mrs. Kiruthika.S.V working as Assistant Professor in the department of ECE and she has started her career in the department of EEE. She is interested in the field of communication and digital image processing and she published international and national journals."