

Smart & Interactive Mirror using PI

Mrs. Yogita V. Sawant¹ Abhishek M. Chougule² Shraddha V. Jadhav³ Pranali R. Heralage⁴ Gouri R. Fatale⁵

¹Assistant Professor ^{2,3,4,5}Student

^{1,2,3,4,5}Department of Electronics Engineering

^{1,2,3,4,5}D.K.T.E.'S Textile & Engineering Institute, Ichalkaranji, India

Abstract— A Smart mirror combines the uses of a conventional mirror with a digital aspect to bring updated information to the user directly on the two way mirror. A two-way mirror is an electronic display (monitor) behind the mirror glass. The display can show to viewer different types of information, such as weather, time, date, newsfeed and social media notifications (Facebook and twitter) with latest updates. Smart mirrors are not available as a commercial right now. Many members of the DIY community have taken on the challenge of building their own mirror. There are five main components of Smart mirror: the raspberry pi, two-way mirror, monitor, PIR sensor and a laptop. We have designed and built our own prototypes Smart mirrors. Day by day, the technology is advancing, there is a chance to develop a structure that could give continuous updates such as weather, news feed, and important notification on mirror while doing daily activities. This project work deals with design and development of a Smart mirror using Raspberry pi fulfilled with advanced feature of internet of things (IOT).

Keywords: Smart Mirror, Raspberry PI-3B

I. INTRODUCTION

Being on time and well prepared are two of the most valued qualities in modern society. However, it can be difficult to impressively prepare for the day while remaining knowledgeable about aging affairs and still maintain a timely schedule. In the morning, one can take much time to prepare for the day in front of a mirror, which is a slow process. The factors such as the weather conditions can influence how a person prepares for the day. Finding a suitable way to check all the factors that can affect how person prepares for the day while also favorably affecting the tasks that are performed in front of a mirror can be a challenge. The aim of our project was to create a product that will feed quick and easy access to the time, news, and weather while simultaneously allowing a person to go through their morning routine. Our product should raise productivity and also provide a functional and enjoyable user experience.

Intelligent mirrors are straight from science fiction. They are part of an bright vision of the future that imagines a world where screens and data are everywhere, ready to give you whatever information you need at while notice. The mirror provides a functional, user friendly and interactive UI to its user for accessing their personal schedules. It is displaying the current weather conditions, Date, Time, Greetings, Latest news headlines. The Intelligent Mirror would help in developing smart houses using IOT technology, as well as finding its applications in industries. Switching home appliances becomes easy with mirror. The beauty of home can be improved by using such type of smart mirror.

II. LITERATURE REVIEW

Few authors have implemented the smart mirror systems for different purposes. Prof. R. M. Dalvi et.al [1] developed Smart Mirror which could be used for the ambient home environment as well as for commercial uses in various industries. Lakshmi N.M. et.al. [2] Designed smart mirror is a system that functions as mirror with additional capability of displaying date, time, current temperature, weather, etc. Kanchan.S.Gorde [3], developed a mirror system which looks like a regular mirror but would have a screen inside and anybody standing would be able to interact with it. Prof. Jagdish A.Patel,et.al.[4] Designed and Developed a “Smart Mirror” which can be used in home, Industries like platforms. The system Collected Real world Machine Data and data would be transmitted from the Machine and Managed by the Raspberry Pi Board. Prof. P Y Kumbhar et.al [5] Developed smart mirror system which displayed the weather information, time and location information, current event.

III. SYSTEM HARDWARE

In proposed system we have used raspberry pi with other necessary hardware. Figure 1.Shows system block diagram. In this raspberry pi 3B act as a CPU for smart mirror. Motion sensor is an input to smart mirror CPU. This is used for motion detection of a person in the front of mirror. The output of our system are weather information, current date, time, greetings, Face book , Gmail and twitter notifications, etc. The mirror with attached monitor is the display device.

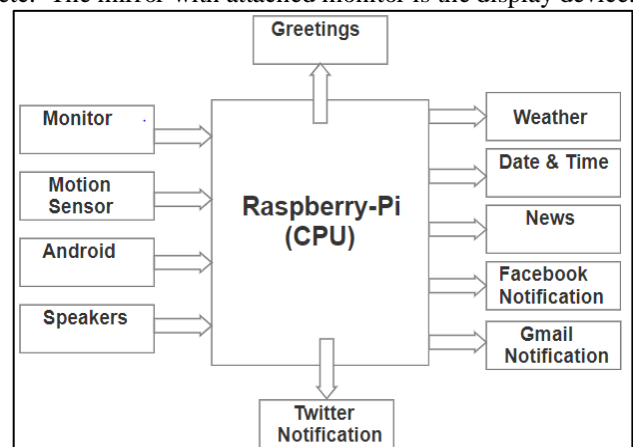


Fig. 1: Block Diagram of Smart Mirror System

A. Methodology

The working of each component in smart mirror is explained as follows:

1) Raspberry PI 3B

The Raspberry pi is the most important part of the system. It also refers as processing unit of the mirror. Python language is used to program the raspberry pi.

Some features of raspberry pi are as follows:

- The Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- It has 1GB RAM
- The BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet are available.
- It has 40-pin extended GPIO and 4 USB 2 ports
- The 4 Pole stereo output and composite video port
- Full size HDMI are available
- CSI camera port is used for connecting a Raspberry Pi camera
- For operating system and storing data Micro SD card is used
- It upgrades switched Micro USB power source up to 2.5A

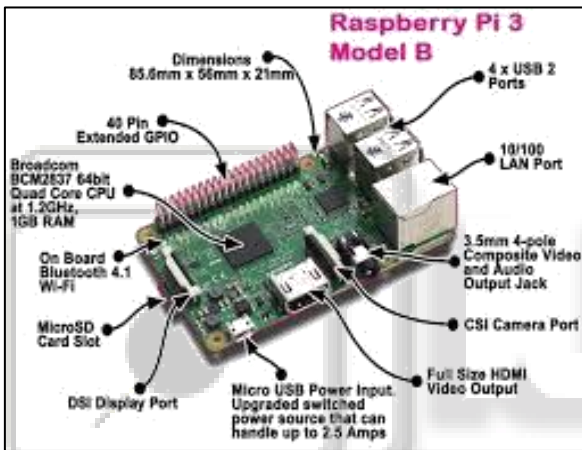


Fig. 2: Raspberry PI 3 Model B

2) Monitor

A monitor is the visual output device which is connected to the tower of computer. Monitor can display picture and images in real time. We are used 13" inch monitor display.

3) Two Way Mirror

Two way mirror work on a principle of light intensity. If the light intensity is the same on both sides of the glass, the mirror will look like a normal piece of a glass. But when the light is bright on one side of glass, and much darker on the other side, the glass will look like a mirror to the people on the brighter side. This thing is also happens when you try to look out from a window at night. The people which are outside can see us. But we can only able to see our reflection. Like all mirrors, two way mirrors have a reflective coating. However, reflective coating of regular mirror is thick and returns all the light that strikes it.

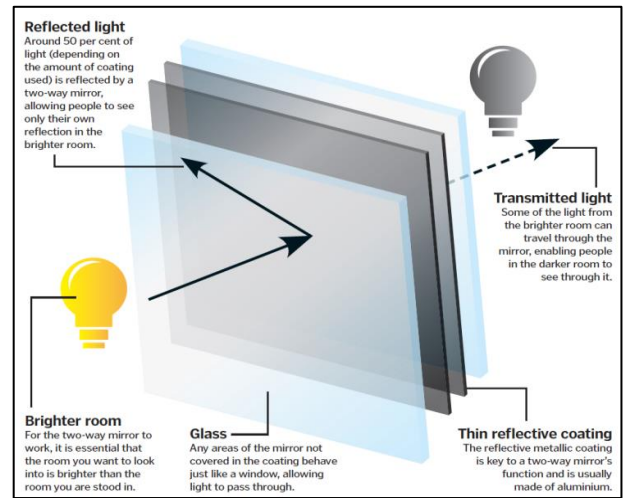


Fig. 3: Working Principle of Mirror

4) Motion Sensor

The motion sensor detects the presence of human body. When the person comes in the close proximity the PIR sensor, it detects the person's body heat. This sensor is small in size, low power, and chip and easy to use. When it detects motion, sensor gives digital output.

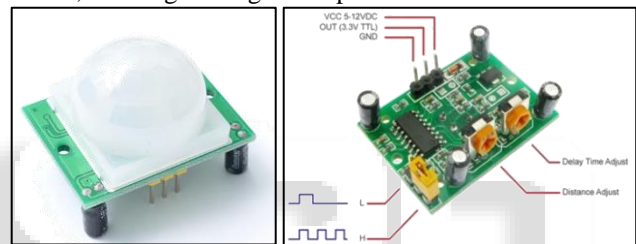


Fig. 4: PIR motion Sensor

IV. WORKING

The heart of this system is raspberry pi. The pi works as a processing unit for the mirror. The motion sensor is attached to the raspberry pi. at One of the I/O ports. Also speaker is connected to the raspberry pi to other port. The PIR sensor initially gives digital output zero, when motion is not detected. When any person comes in the front in the mirror it will gives digital high output and then monitor screen is get turned on through software running behind. As soon as the mirror screen turns on, the greetings in terms of sound will get arrived with the help of speaker which is connected to pi. Also current date, time, weather, news feed and social media notifications get displayed on smart mirror. For accessing news and weather API s like Forecast, Google news etc. is used. The final working images of proposed system are shown in figure 5.

A. Algorithm

- 1) By turning on raspberry pi it will get information from the network API which are interfaced.
- 2) If anyone in front of mirror it displays the greeting.
- 3) In next step it will display date, time, weather, news, etc.
- 4) If no one is present it works like normal mirror.

B. Flow Chart

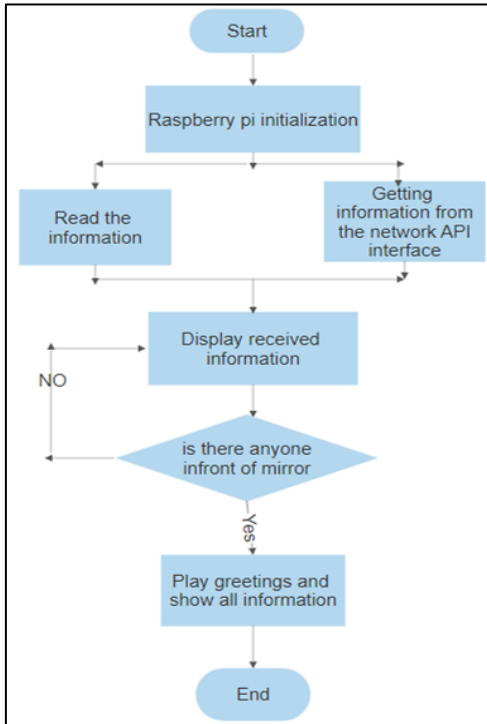


Fig. 4: Work Flow Diagram of Implemented System

Figure 4 shows the work flow diagram of implemented system. First step is raspberry pi initialization which is carried out by setting up the raspberry pi. Daily news, time, weather and social media notification it accessed using network API interface. It display the information on screen. If motion is detected using motion sensor.

V. RESULT & DISCUSSION

The implemented work include the development of smart mirror. This work combines the idea of mirror with technology which tends to display the useful information like date, time, weather, current news headlines, greetings and social media notification etc.

Aesthetically the mirror looks exactly as we had envisioned it, and the trim we ended up using was in fact better than the original design. Our only regret in this area is that the project is very heavy and bulky. Future vision would need to work on reducing weight and slimming down the product. Overall project met most of its goals and we are happy with its success. The results obtained from implemented work are as below.



Fig. 5: Final Working Image of Proposed System

VI. CONCLUSION

Smart mirrors are very interactive and advanced system which facilitates user to get relevant information at ease. The system implemented in our paper is low cost and displays all the mentioned information quickly and saves user time .To make it more interactive touch screen displays may be used .Geo location ,Google Alexa and some more feature can be added.

REFERENCES

- [1] Khurd Aishwarya .S , Shweta .S. Kakade ,Prof. R. M. Dalvi "Smart Mirror", International Journal for Research in Applied Science & Engineering Technology (IJRASET) ,Volume 6 Issue XI, Nov. 2018
- [2] Lakshmi N M, Chandana M S, Ishwarya P, Nagarur Meena, Rajendra R Patil, "IoT based Smart Mirror using Raspberry Pi",International Journal of Engineering Research & Technology (IJERT), Conference Proceedings,Vol 6,issue 13,NCESC - 2018
- [3] Kanchan.S.Gorde, "Raspberry Pi powered Magic Mirror", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering(IJAREEIE) , Vol. 6, Issue 12, December 2017
- [4] Prof. Jagdish A.Patel, Jayshri T. Sadgir Sonal D. Sangaleharshada A. Dokhale, " A Review Paper Design and Development of a Smart Mirror Using Raspberry Pi", International Journal of Engineering Science Invention (IJESI) Volume 7, Issue 4, April 2018
- [5] Prof. P Y Kumbhar, Allauddin Mulla, Prasad Kanagi, and Ritesh Shah. "Smart Mirror Using Raspberry pi",International Journal For Research In Emerging Science And Technology,Vol.5,Issue 4, April 2018
- [6] L.J.SlaterGitHub/MichMich/MagicMirror(2016) Retrieved 20 April 2016.