SMART MIRROR USING RASPBERRY PI

[1]Shuaib Basha, [2]Manojkumar Pillai , [3]Chandrashekar Nair, [4]Venkatraman Poojari,
[1]Student, [2] Student, [3]Student, [4] Student,
Department of Electronics and Telecommunication,
SIES Graduate School of Technology, Maharashtra, India
[5]Madhuri Kulkarni,
[5]Assistant Professor
Department of Electronics and Telecommunication,
SIES Graduate School of Technology, Maharashtra, India

Abstract : In this project, a working prototype of a smart mirror is to be designed and implemented. Our smart mirror is intended for personal, non-commercial use, and currently we aim to configure the mirror for a single user. The smart mirror will consist of a display attached to a common mirror, which will be powered by a Raspberry Pi, which is one of the most popular miniature computers used in IOT applications. Thus, our aim with this project is to upgrade the ubiquitous common mirror, so to speak, to better serve the growing demands of a life of geared for productivity, by bringing personalized information straight from the internet to the user at a moment's notice. As aforementioned, our project will be a prototype; far less powerful than what we are convinced the future of our project is capable of being.

IndexTerms **- Smart Mirror, Raspberry Pi, IOT, Prototype, Personal use.**

I. INTRODUCTION

Smart mirrors are straight out of science fiction. In most contemporary works of art and other illustrations that depict the future, one can find screens everywhere, which display relevant information directly to the user in a responsive and interactive manner. While our project is, undeniably, a step towards making this vision a reality, it is worth emphasizing that the smart mirror is intended to be more a tool for improving everyday productivity that will find use in the present than a feeble attempt at realizing fantasy.

The initial motivation behind our choice for this project was to create an IOT system that would be useful for the user every day, as opposed to many IOT projects that focus on security or other kinds of intermittent use cases. Transforming a mirror was the unanimous decision, for plenty of reasons. The common mirror has been around for more than 6 millennia, and while there have been significant improvements in its structural and reflective properties, the functionality of the mirror for domestic use has remained restricted mainly to personal grooming. This combined with the fact that most households have a sufficiently large mirror makes it the perfect item to be transformed into a data display system.

On a related note, effective time management has become a mantra for conceptualization of modern products. The fact that a product outperforms its competitor in helping the consumer save their time gives it a significant edge and captivates the markets attention. The primary objective of the project is to help the user improve his efficiency by providing essential data where the user is already accustomed to being in a neat and convenient manner, which would otherwise require an array of devices and manual access efforts.

II. RELATED WORK

The proposed smart mirror represents a natural interface that facilitates access to personalized services. This is an attempt to contribute to this design of a smart mirror-like interface as well as the smart environment in which the interface is used for interaction in the following, we briefly comment on some related research in this direction. Philips Home Lab is a test bed for creating perspective and context-aware home environments. Among several projects, their work on creating an intelligent personal care environment uses an Interactive Mirror in the bathroom to provide personalized services according to the user's preferences. For example, children can watch their favourite cartoon while brushing their teeth. The mirror can provide live TV feeds, monitor the latest weather, and so on. The mirror is a combination of one or more LCD flat screen displays specifically combined with a mirrored surface and connected with a central processor to provide the intended services. The Interactive Mirror serves as a motivation to provide ambient feelings in the home environment. The work in proposes a Magical Mirror as an interface to provide basic services. The intended services to offer are interactive TV, specific weather data, and searches. Unlike our work, it promotes the use of ontology to personalize the services. However, conceptually, our work has similar objectivity to what the Magical Mirror intends to perform, except that we present a working prototype, whereas some of the functionalities in the Magical Mirror have been presented only by simulation. In addition, we use open standards like web services to communicate with the devices and customize various personalized services for the user, which is not present in the design of the Magical Mirror. In comparison to the works described above, our work is different in that we aim to develop a

working system for providing services in the ambient home environment based on open standards and off-the shelf technology, where the smart mirror is the interface to access/control various data feeds, various information services.

III. PROPOSED WORK

The mirror is eventually a technologically augmented interaction device. The objective of designing the mirror is to provide a natural interface in the ambient home environment for accessing various services such as location based weather, time, calendar etc. as well as provide access to YouTube, Soundcloud, maps etc. The project includes downloading the Raspbian operating system based on Debian and extracting the image on SD card, inserting the card in the Raspberry Pi SD slot an then performing the required steps. We plan to deliver a working prototype i.e. design and development of a futuristic Smart Mirror on Raspberry Pi 3 for the ambient home environment as well as for commercial uses in various industries. Most people have mirrors at home, so the concept of a smart mirror that you can interact with is attractive and can be fantasized by anyone. At times no one has time to read the newspaper or switch on the TV right in the morning to check the news headlines or the weather forecast. If a mirror serves to this purpose, one can imagine the amount of time it will save and be of such a great use. The device was to look like a regular mirror but would have a screen inside. The project which would collect real world machine data such as location based latest news and headlines, weather reports, and as well as show us the local time. The data would be transmitted from the machine and would be managed in a central database. We have also worked on including Artificial Intelligence in the Smart Mirror wherein a Voice enabled assistant will cater to the needs of the user.

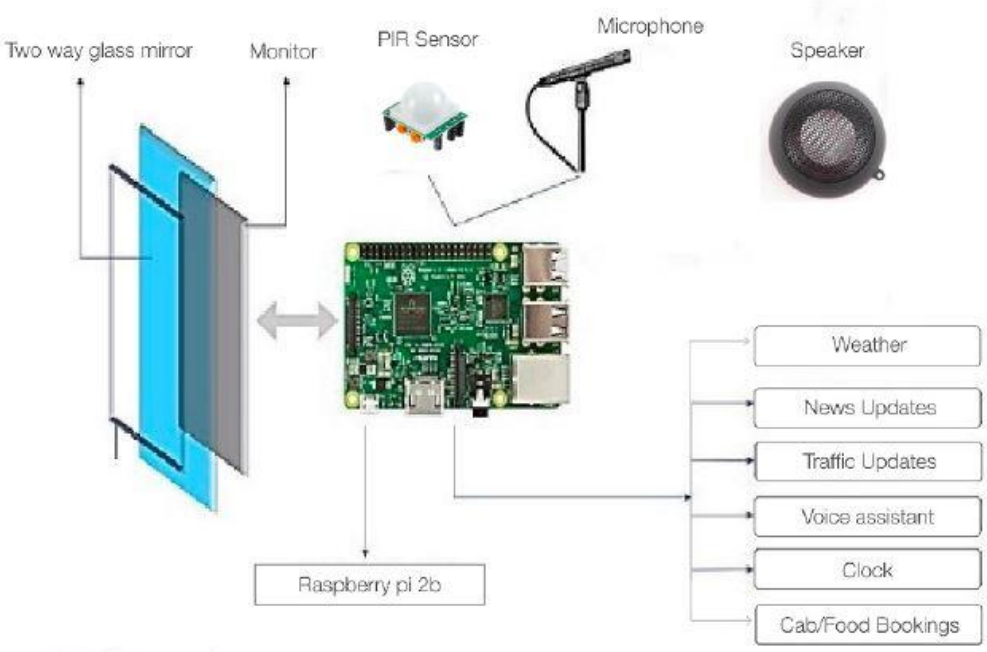

Fig -1: Work Flow

IV. IMPLEMENTATION

The two-way mirror is a mirror that has reflective surface on one side and also becomes transparent for light with high intensity. The mirror allows the light from the display to pass through it along with having properties of mirror at the front where the user can watch himself / herself in the mirror at the same time. Monitor is used to display User Interface programmed for the Mirror. The monitor is connected to Raspberry Pi via HDMI interface thus providing display as well as
Voice output.

The raspberry pi is the most important part of the mirror, it forms is the processing unit of the mirror. The Pi is like motherboard having all the required property which forms a great CPU. The programming of Raspberry Pi is done in Python language. The programs developed and compiled on windows and then can run on Pi. The Pi also has its own inbuilt IDE to program in languages like C++, Python, C, Java, etc. Installation of OS on Raspberry Pi is a very simple process. First you have to download NOOBS along with Raspbian which is great OS of Raspberry Pi for beginners. Many IDEs available to do programming for Python but what we found was PyCharm Community is free and good among them who serve our requirements.

An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor. When an object, such as a human, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again.

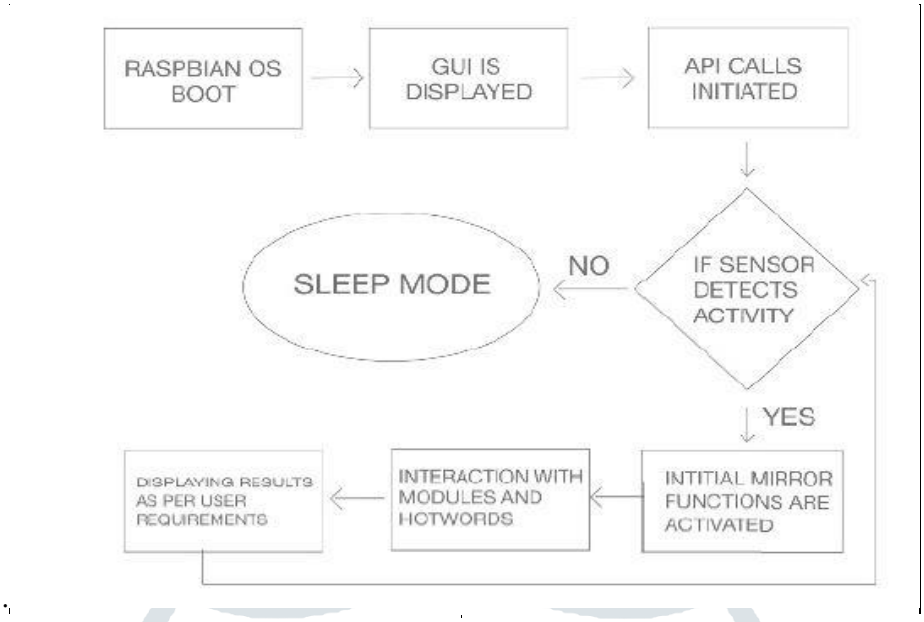

Fig -2:Flow Chart

The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. A stereo input microphone will be used to obtain input from the user. The microphone will be connected via serial USB port in the raspberry pi. An economically benign microphone will be chosen for this project, as the quality of the users voice will be irrelevant to a good extent for the processing of speech input.

V. CONCLUSION

The Smart Mirror when put into production will play an important role in better time management and daily productivity. It gives instant gateway to information in an environment which is time saving and convenient. The main motive behind this project is to reduce time expenditure for accessing information from multiple outlets by consolidating the data and displaying it at a convenient place, in an interactive manner, thus providing a new merger of user and technology that does not entail its own set of burdens, as is seen to be true with most new technology. The minimum aim for this project is to display the most commonly required data , and to incorporate humidity safety and a minimal voice controlled browsing facility. However our aim for the future of this project begins at expanding the voice controlled utility, as well as interfacing more sensors and allowing the user to select the data they wish to see.

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