IOT BASED SMART MIRROR

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Abstract: The Internet transformed our lives by connecting us to information and other people in the virtual world more easily. Mobile phones then became smartphones and since then this concept has erupted and transformed into the Internet of Things, things which connect us to everyday objects. There can never be the end of objects that could be made "smarter", some being more suited to this than others. For example, mirror provides a large surface ideal for displaying information. Most people have mirrors at home so the concept of a smart mirror is attractive and has been fantasized in many futuristic movies. Smart mirrors have recently started to be developed by people, with varying degrees of interactivity. This project describes how a smart mirror was built from scratch using a Raspberry Pi for the hardware and custom software built on top of Raspbian, a Linux distribution. The aim of the project was to create a Smart Mirror device that people could interact . In the proposed idea we present a Smart Mirror with various features to make sure that every minute of the user is utilized properly. The smart mirror is capable of displaying real time information such as live weather updates, local time of a particular location and also helps the person to get in touch with the current news happening around the world.

Keywords – Smart Mirror, Home Automation, Internet Of Things, Raspberry Pi, Python.

I. INTRODUCTION

Internet of Things (IoT) is a biological community of associated physical items that are easily available through the web. The 'thing' in IoT can be an individual with a heart screen or a vehicle with inherent sensors, for example objects that have been doled out an IP address and can gather and exchange information over a system without any manual help or intercession. The implanted innovation in the items encourages them to interface with the inside states or the outside condition, which thus influences the choices taken. This idea of IoT has been utilized here alongside two distinct environments like Android and Arduino. Atlast, a computerized shading controller is to be created with the assistance of these.

Numerous gadgets are being created which use ideas of interactive media correspondence, computerized reasoning, web of things (IoT) to upsetting the manner in which we play out our different everyday errands in our home, workplaces or even ventures. The greater part of us use reflects each day to take a gander at ourselves; we mentally connect with the mirror each day to check what we look like and how is our clothing while preparing for our work or schools. In this way, having a smart mirror that can react to your directions can energize anybody.

Efficiency and proficiency are two characteristics that are progressively setting up their predominance as catch phrases organizations are utilizing to showcase their items. The way that the item can perform various tasks or increment efficiency superior to anything the challenge has turned into a genuine moving point. This is because of the way that while compelling time the board is a basic factor in expanding creation of everyday life. The best time of the executives procedures include having the capacity to discover time where previously there was no time. Combination of innovation into individuals' day by day lives has made time that the executives conceivable. The utilization of items, for example, tablets, PCs, and cell phones have given individuals access to the devices should have been beneficial.

The smart mirror idea expected to incorporate innovation flawlessly into individuals' lives by putting it where everybody's normal in the long run impacts, the washroom. The objective of the savvy reflect is to build a client's profitability by sparing their time. The shrewd mirror gives a close easy ordeal that enables the user to simply stroll up and be welcomed with data.

IOT based Mirror aims at increasing the fundamental smart mirror with inserted insight like perusing news, date and time, holidays, current climate refreshes and so on and giving such information to the user while he/she prepares. The mirror will help the user in mechanizing their work and advancement of shrewd houses.

II. OBJECTIVE

The objective of this project is to make a mirror which does the smart things like it shows current weather, date and time, news, holidays etc. Due to use of smart mirror time can be saved.

III. LITERATURE REVIEW

While implementing a smart mirror, the first question which arrives is "What is the need of a Smart Mirror?" In the recent years technology has become an integral part in day to day lives. Technology has been incorporated in many electronic devices. But the motive of designing a 'Smart Mirror' is to bring technology in a traditional household mirror and making it smart. This brought in a new definition of a smart mirror: "a smart mirror is a mirror with additional features and functions, with the aim of introducing capabilities for human interaction".

There was always a need of designing a device which would help in planning for a day's activities by doing other household activities. A mirror is one such place where we visit often and thus can get basic details such as time, daily news and events, etc.

Internet of Things (IoT): The concept of smart mirror revolves around the development of Internet of Things (IoT). IoT is a network of physical devices, having electronic or software functions connected together to exchange data. The main aim of IoT is to create a virtual path for connecting all the devices connected to it. It provides a way of communication between people and things and between the objects itself.

Home automated smart mirror is another domain which has IoT applications. Though applications of IoT are diverse, but this paper helps in using IoT for making life easier. The mirror has the ability to display date and time, news updates, weather conditions, calendar(holidays), etc. With the help of IoT, a mirror can be upgraded to perform as browsers. We can get access to news. The machine required for computing is a raspberry pi which does not require large space.
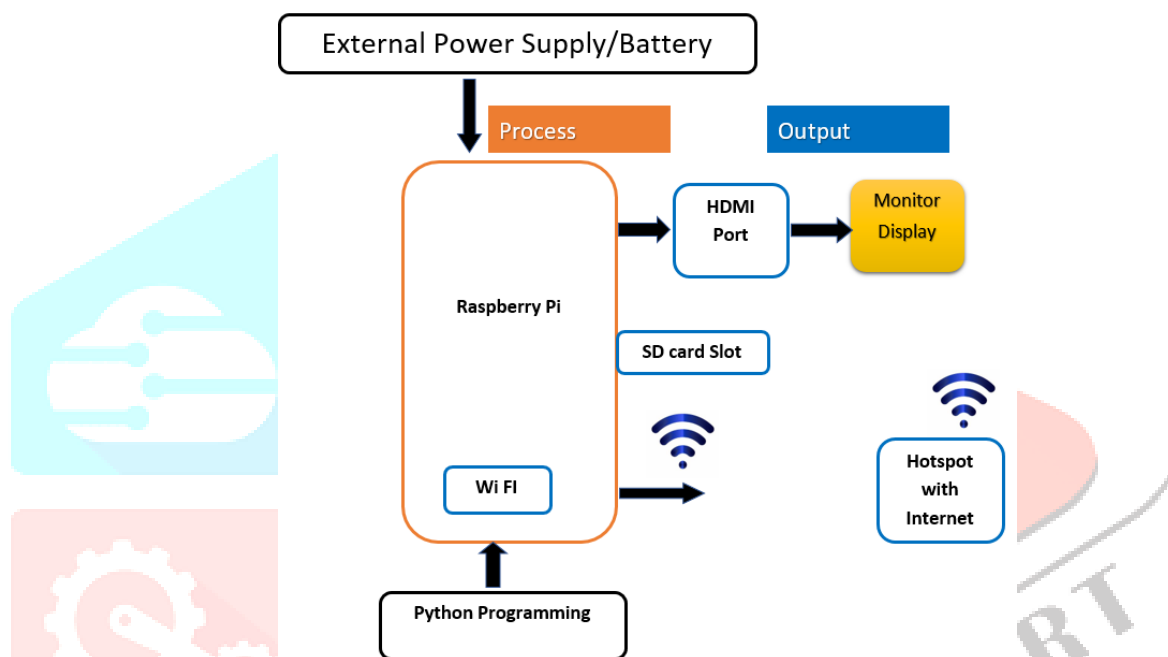
IV. PROPOSED SYSTEM

Fig – 1: Block Diagram Of Smart Mirror

The proposed system is to design and implement an interactive futuristic smart mirror using Raspberry Pi 3. Interactional computing, with wirelessly connected embedded devices that are being used in various day– to–day activities. Based on this technology, many devices/products are now emerging in the market and with this intelligence it is providing comfortable, secure and convenient personal services everywhere. The project aims at creating a smart system for users where it display's basic details like date, time, news and weather.

V. SYSTEM DESIGN

5.1 Hardware
5.1.1 Raspberry Pi

The Raspberry Pi is a credit-card sized computer that is capable of doing just about anything a desktop PC can do. From internet surfing and word processing, to playing Minecraft or acting as a media player, the Raspberry Pi's capabilities are very much extensive. With plenty of graphics processing power, the Raspberry Pi 3 is capable of streaming Blue Ray - quality video. If you are looking forward to incorporate the Pi into your next embedded design, the 0.1" spaced 40-pin GPIO header gives you access to 27 GPIO, UART, I2C, SPI as well as both 3.3V and 5V power sources.

The raspberry pi 3B+ is used to connect with internet using IOT circuit through the use of a wifi module. This allows us to acquire data through the IOT platform. We use in order to connect our system to the internet and get news feeds, public holiday's calendar, current weather, date and time. Thus we demonstrate a futuristic IOT smart mirror with display.

5.1.2 LCD Display

An LCD display is a flat panel display, that uses an array as pixels for a video display. Their brightness allows them to be used outdoors where they are easily visible in the sun store signs and billboards, and in recent years they have also been commonly used in indicating destination signs on public transport vehicles, as well as variable-message signs on Highways.

An LCD display is used because of minimal power consumption, maximum crispness, and to prevent mirror glow at night. The required information for the user will be displayed on the LCD display.

5.1.3 Two-way Mirror

This is probably the vital part of the hardware as it is responsible for creating the futuristic effect and is the biggest part of the smart mirror. The two-way mirror is made of acrylic and sits flush over the display, allowing the graphics on the display to come through while maintaining a mirror effect too.

5.2 Software
5.2.1 Etcher

Etcher is a software that is used to burn the OS image to make it compatible to install into storage disk, here we installed Raspbian.

5.2.2 Raspbian

Raspbian is the main, important and basic software for Raspberry Pi devices, officially supported by the Raspberry Pi Foundation. Indeed, it is an operating system, based on Debian and optimized for Raspberry Pi hardware.

5.2.3 Python

Python is an explicate high-level programming language for general-purpose programming. Python attributes a vigorous type system and automatic memory management. It reinforces multiple programming paradigms, including object-oriented, imperative, functional and procedural, and has a large and comprehensive standard library.

VI. ARRANGEMENT OF COMPONENTS

The components arrangement is as shown in Fig - 2. The 2-way mirror is positioned at the front of the setup right after the front frame which places every component right. Behind the mirror, LCD display is placed i.e., at the reflective side. These components are directly connected to the Raspberry Pi along with the power supply.
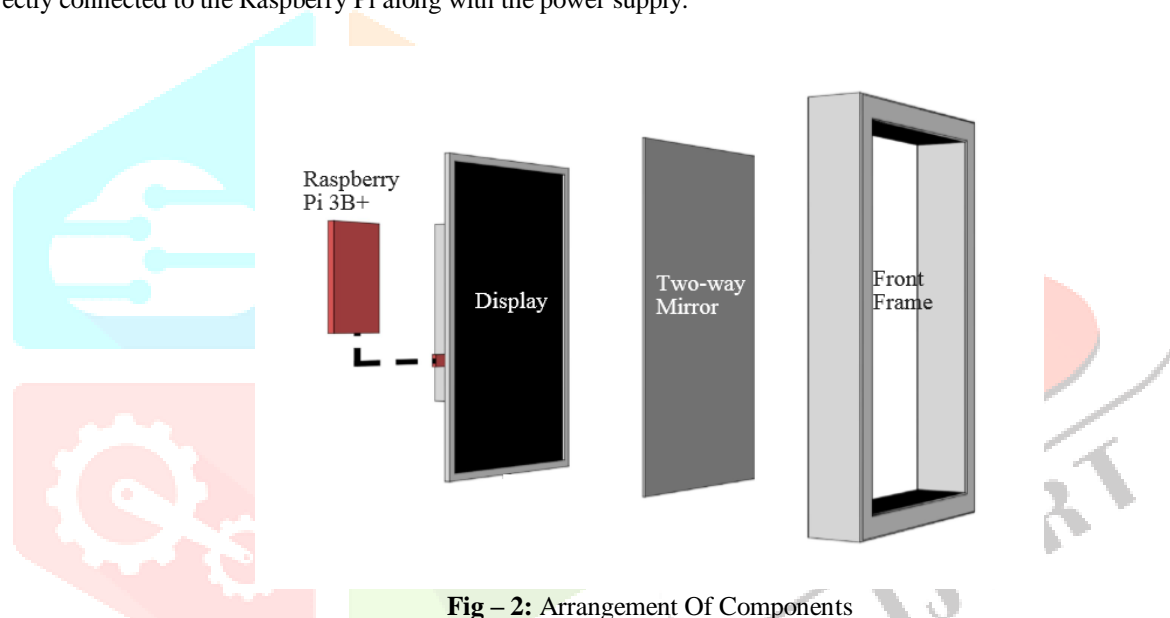

Fig – 2: Arrangement Of Components

VII. IMPLEMENTATION

The Smart Mirror consists of various kinds of modules that perform over the normal Two-way mirror. Whenever the mirror is turned ON with a power supply, the Raspberry pi takes it to the Raspbian environment. It directly displays the basic modules of Time of the corresponding location, Date, and Compliments based on time and are of random that are given within in the code, News feed and headlines which are updated from time - to - time and are also taken from the one of the famous News articles: "Hindustan Times" and it also displays the updated time and date. If the News was updated on same day, it displays as "so and so hours or minutes ago". The system also displays Current Weather forecast along with the temperature that is felt to a human body and is based on the city which is mentioned.

This system doesn't only consist of the basic modules but also have various advanced and latest modules which are integrated onto one display screen. It has a Weekly Weather forecast module which displays the weather conditions of one whole week. But the user must register in the open weather website and provide the API (Application Programming Interface) key as well as the location ID to display the weather conditions based on the particular city. It also has a Calendar with Indian Holidays.

The two-way mirror is positioned in front of the whole setup, facing non – reflective side (dark side) to the front and the display made of LED is positioned at the reflective side (bright side) of the mirror. Raspberry pi which works as a CPU connected to the whole setup is provided with power supply using a cable so as to supply power to every component. Raspberry pi is also connected with Ethernet / Wi-Fi to receive Internet that is used to update information every minute. To work in raspbian OS, it is installed and dumped onto SD card, which is inserted in a Raspberry pi. This whole setup is settled down in a wooden frame to safeguard.

The modules that are displayed on the interactive modular smart mirror are: Time, Date, Current weather, Weekly weather forecast, Compliments based on time, News feed, Calendar with Indian holidays.

Advantages

- A 2-way mirror displays like a real-time reflecting mirror (i.e., normal mirror).
- As the system is enabled with various no. of modules, the usage of phones and all electronic gadgets are reduced.

Applications

- Automotive, consumer & household, medical & healthcare, and advertising & retail.
- In addition, there are numerous opportunities available in automotive sector through the use of advanced electronic technologies such as Wi-Fi connectivity, integrated sensor systems to further improve road safety.
- The main features the Smart Mirror would have would be showing basic weather and time information. We would also be able to play music in some way.

VIII. RESULTS

Smart mirror modules: The below figure (see Fig - 3) displaying every module in one screen i.e., Time, Date, Current weather, Weekly weather forecast, Compliments based on time, News feed, Calendar with Indian holidays.
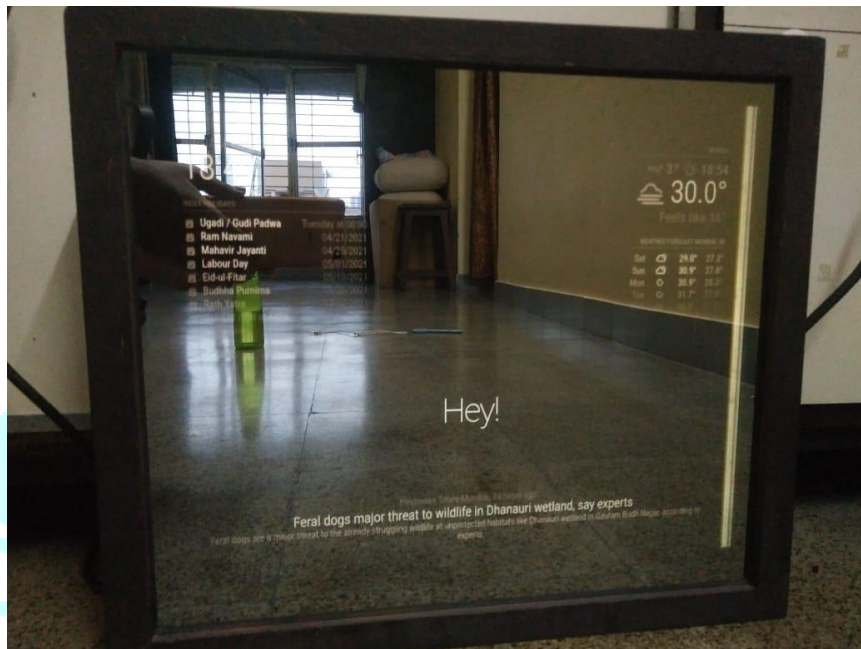

Fig – 3: Mirror Displaying All The Modules

IX. CONCLUSION AND FUTURESCOPE

The main strength of this project is that this is a new kind of smart device that people don't see every day and it looks very spectacular. The platform has a very simple API that makes it very easy for users to interact.

The idea of smart mirror was created to give swift access to information in a convenient and time-saving environment. All other aspects of the mirror's design developed from these ideas and inspirations.

This Smart Mirror system broadens the features of a mirror into a Smart appliance which helps an individual to lead an easier and smart life. It displays lots of information. In future, this Smart mirror can be equipped with Face recognition system so as to make the system as a home security system. Also Voice assistant and Voice Recognition system can also be incorporated.

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