

## A Survey on Internet on Things based Magic Mirror using Raspberry Pi 3B+

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### ABSTRACT

The Internet of Things (IoT) is a method where an object could transfer data through a network without the need for human interaction with humans or humans through a computer. IoT is known for its advantage in that can help us simplify human being's daily routines. Hence, the smart mirror discussed here is mainly for home automation systems. It is a concept of smart automation-based Internet of Things (IoT). This device allows users to gain information and also entertainment purpose for small kids. Relevant details can be found such as current time and today's date, actual weather. The Raspberry Pi is a medium of interaction between people and systems. The methodology used in this project is Evolutionary Prototyping which gathers the whole requirements of the device and designs the device in a quick able method. An instance is built to evaluate Improvements that will be made to the device via enhancing the prototype, as per to user's satisfaction. With Smart Mirror utilizing the Raspberry Pi framework, clients can deal with his/her every day schedule at a simple level just as addressing numerous challenges in overseeing house obligation.

**Keywords--** Automation system, Daily routine, Internet of things, Raspberry Pi, Smart mirror

### INTRODUCTION

Nowadays, IoT is the highest considering method regarding all the systems and devices. The use of data highway has been

seen everywhere where we go. Approximate till the end of the year 2020, there will have been up to 21 billion devices across the world that are connected with the 'Internet of Things' that means every human being can carry 8-10 IoT devices that have regularly connected to the Internet. Our manner of living is full of attached to the Internet that means the Internet has become the essential requirement of a human being [1]. The growth of the Internet will result in the growth of specific data which has needed to be processed and examined. Internet of Things offers unlimited opportunities to enhance able communicating between devices and data sending and receiving but this same term makes it highly vulnerable through the point of view of security. The smart mirror is wall mounted mirror it shows details such as daily news, actual weather, current date in the calendar, and other things like entertainment for small kids and many other things related to user's needs. The main goal for building a smart mirror is to use quality two-way glass, a high-frequency LCD monitor, a wooden frame to hold the glass and monitor [2].

In last year's more and more devices are attached to the internet. The internet has played a suspicious role in connecting more people across the globe. Devices are started to become smarter; cell-phones became smartphones and most essentially internet was connected to a collection of devices and the idea came to be known as the 'Internet of Things'. Our device aims to inspect other possibilities where this technology can be used. It aims at involving this technology in a simple mirror because in general people had spent a most considerable time in front of a mirror. We had seen clocks are arranged on

the wall, at airports, comparatively, we aim to bring this technology to our sweet homes. The smart mirror will help us in developing some off smart homes by using AI and finally locating a place in industries and many other places [3].

### RELATED WORK

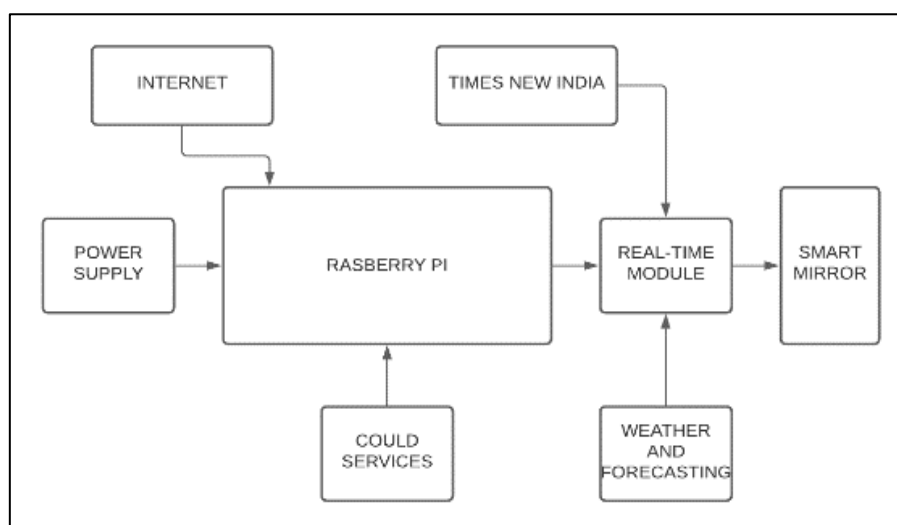
Research has been made on the device which is relatable to smart mirror devices. Here, are some projects and systems about smart mirrors discussed briefly their work and purpose. In 2003 Phillip unveiled their Mirror TV that was built using an equivalent principle that of smart mirrors. Their product was a traditional TV that was put behind a two-way mirror so that the TV would seem like a mirror when turned on and as a TV when turned on. They also had a choice to have the mirror be larger than the TV. A usage example presented by Phillips was to possess the youngsters to watch cartoons while brushing their teeth at an equivalent time [4].

Later in 2005 Phillips declared their logical examination My Heart that based upon the prospect of an enlightening mirror. While their principle Mirror Television was basically a Television that has functioned as a basic mirror, the My Heart project needed to join a presentation to grandstand diverse clinical and other details. In any case, this task required body hardware to assemble and examine the data. The actual mirror basically conveys as an itemized show.

James Law Cyber texture developed a commercially sold smart mirror in 2011. This mirror is more in line with the smart mirror we have come to understand today. The product consists of a 21 "LCD-display covered by a 25" two-way mirror. The display can show weather forecasts, stream internet, TV, the present time, and various widgets. The smart mirror has numerous input methods like a remote controller, smartphone app, and onscreen virtual keyboard.

### PROPOSED METHODOLOGY

The proposed system is to style an interactive futuristic smart mirror with AI (Artificial Intelligence) using Raspberry Pi. In the proposed system, the power of the system to show details and supply details of an equivalent incorporates the idea of AI. Interactive computing, with wirelessly connected embedded devices that are getting used in various day-to-day activities. Based on this technology, many devices/products are now emerging and with this intelligence, it is providing comfortable, secure, and convenient personal services everywhere. The project aims to show all details of daily routine, daily news, and feeds, particular date, for the entertainment of kids Pokemon module is there. After this, we had made security for our glass that it would not damage the outer world by using a wooden frame as a cover to mirror (Fig. 1).



**Figure 1:** Block diagram of IOT based smart mirror using raspberry Pi.

### Raspberry Pi

Raspberry Pi 3 B+ was released in March 2018 with a 1.4 GHz 64-bit quad-core processor, Broadcom BCM2837B0, Cortex-A53(ARMv8) 64-bit SoC, 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN (Local Area Network), Bluetooth 4.2, BLE, Gigabit Ethernet over USB 2.0(Maximum throughput 300 Mbps), 4 USB (Universal Serial Bus) 2.0 ports, Full-size HDMI (High-Definition Multimedia Interface). CSI (Camera Serial Interface) camera port for connecting a Raspberry Pi camera. DSI show port for interfacing a Raspberry Pi touchscreen show.

5V/2.5A DC power input. 4-post sound system yield and composite video port. Miniature SD port for stacking your working framework and putting away information. Control over-Ethernet (PoE) uphold. The Raspberry Pi 3 Model B+ has undergone extensive compliance testing and meets the subsequent European standards. The dual-band wireless LAN comes with modular compliance certification. This allows the board to be designed into outcome with significantly reduced wireless LAN compliance testing, improving both cost and time to plug. The design flaw was fixed in revision 1.2 of the board, released in late 2019 (Fig. 2) [5].

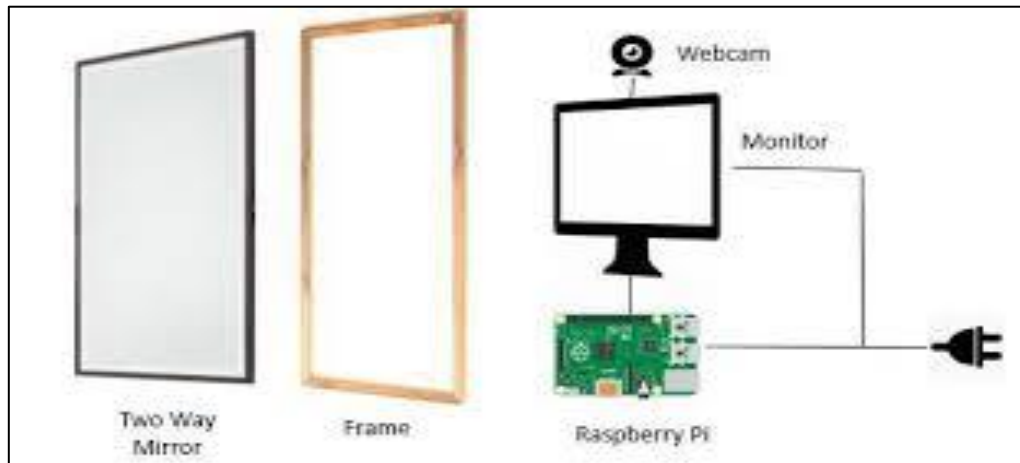


*Figure 2: Raspberry Pi 3B+.*

### One-Way Mirror Film

A 2-Way mirror might be an integral mirror that is modestly transitive and to some degree intelligent the view of single direction transmission is accomplished when one side of the mirror is brilliantly lit and subsequently the opposite side is dull. The objective of planning the mirror is to supply a characteristic interface inside the encompassing home

climate for getting to different administrations like area-based climate, time, schedule, and so forth likewise as give admittance to utilizing Voice Services. The undertaking incorporates downloading the Raspbian OS (Operating System) upheld Debian and separating the picture on the SD card, embeddings the cardboard inside the Raspberry Pi SD opening an at that point playing out the predetermined advances (Fig. 3) [6].



**Figure 3:** One-way mirror.

### LCD Panel

A LCD board is a yield gadget that shows data inside such a photo. The screen typically comprises of show gadgets, circuit circles, and electric stockpile. A LCD board put down behind the glass reflect is utilized to address to the client the normal interface. LCD

(Liquid Crystal Display) screens are level board show which utilizes a variety of daylight transmitting diodes inside such a pixel for show screen. They are permitted to be used in reevaluate because of the brilliance where they are regularly obvious to the sun store signs and bulletins (Fig. 4) [7].



**Figure 4:** LCD panel.

### Raspbian Operating System

Raspbian is the Best All-Around Operating System. Raspbian is that the “official” OS of the Raspberry Pi and, since, of that, it is the one the vast majority will need to begin with. Raspbian might be a form of Linux fabricated explicitly for the Raspberry Pi.

Raspbian might be a free OS upheld Debian upgraded for the Raspberry Pi equipment. An OS is that the arrangement of essential projects and utilities that make your Raspberry Pi run. Not many advances will apply to the establishment of this Smart Mirror by utilizing Raspberry Pi [8, 9]. In the first place, we need to introduce the Raspbian stretch, at that point

boot the Raspberry Pi. Eliminate the SD card from your PC work area and spot it into your Raspberry Pi. Interface your console, mouse, HDMI link, and, in conclusion, the Pi's electrical cable. From that point onward, you will currently see the Raspbian Pixel work area interface. This "Brilliant Mirror" should be Wi-Fi-empowered so it can interface with the web, thus, that we can get to it distantly through VNC (Virtual Network Computing) Viewer to set things up. In the upper side right of your screen, push on the organization like symbol. Select your organization enters your Wi-Fi secret phrase, and snap OK After that, discover the IP address so this can be associated with it from any normal PC and complete the rest establishment from that point. Finally, we start our "Savvy Mirror" on framework boot with showing up of all highlights that incorporate [10, 11].

## RESULTS

As we had seen in the comparison table that every mirror is working on different technologies and platforms. These mirrors also differ in functionalities and users. We had proposed a mirror that works on a common architecture and also had all the required functions for users

## ADVANTAGES

1. Attractive Light Box: Ordinary lightbox is just aboard.
2. Very Low Power Utilization: It consumes very low power.
3. Easy to Relate: It grants the user to interact with the system using different means.
4. User-Friendly: It will be one among the primary Smart Mirrors you will interact with and also one of the primary smart mirrors to allow you to install apps as per our choice.

## DISADVANTAGES

1. The limitation is that the application biological system is at present little, the glass may be more intelligent, however, it is frequently effortlessly changed swipe signals are now and again questionable.

2. The equipment and programming more withdraw in light of the fact that current the identifier and receivers are attached to the product and it is regularly hard to shape the OS to work with various equipment.

## CONCLUSION

Smart mirrors can possibly upgrade the client experience of getting to and connecting. With the assistance of this literature survey, we aim at designing a sensible mirror that gives an ambient environment between users and, therefore, the internet. It will help the users in their daily activities. The smart mirror also can be implemented in various industrial and residential applications. Hence, IoT proves bent be a crucial technology for creating household appliances smart.

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