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Smart Mirror Using Raspberry Pi

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ABSTRACT: Smart mirror, which continues to grow vastly, plays an important role in future technology, providing both the functionalities of a mirror and the smart features that come with it to the users. The impact of such emerging technology would completely change the lives of people on a day-to-day basis. Everything is turning smart in recent years, such as smart homes and smart cities. The smart mirror is one such device where a normal mirror acts as a smart device. It has different modes namely the regular mode where the mirror will act as a normal mirror and the smart mode where the mirror accepts external commands and displays relevant results. The smart mirror can be built using the Raspberry Pi-4 model along with the touchscreen functionalities.

KEYWORDS: Smart Mirror, Information System, Internet of Things, Automation, Raspberry Pi, Raspbian OS

I. INTRODUCTION

The Internet of Things (IoT) is an arrangement of interrelated, web-associated objects that can gather and move information over a remote organization with no human intercession. IOT's major huge pattern lately is the rapid development of gadgets associated with the web. [1]The IOT sets out more open doors for more straightforward joining of the actual world into PC-based frameworks bringing about effectiveness enhancements, financial advantages, and diminished human efforts. In the customer market, IOT innovation is generally inseparable from items relating to the idea of the "smart home", including gadgets and apparatuses (like lighting installations, indoor regulators, home security frameworks and cameras, and other appliances) that help one or more normal biological systems, and can be controlled through gadgets related with that environment, for example, smart-phones and shrewd speakers. IOT can likewise be utilized in medical care frameworks. [1]The Internet of Things (IoT) is characterized as a worldwide framework for the data society, empowering progressed benefits by interconnecting (virtual and physical things dependent on existing and developing (new) interoperable data and correspondence advancements. Our way of life has advanced such that streamlining time is the main thing.

[2]The use of Smart devices is increasing day by day because of the vast improvement in technology. Every single day we tend to look in the mirror to check our attire and appearance. By this, we are psychologically interacting with the mirror. So, the idea of a mirror that can respond to any of your commands can excite anyone. [3]A normal mirror is improved into an insolent mirror and used as an information system to collect data. Multiple tasks can be carried out on a single user interface. The smart mirror device is suitable to check regular activities, important meetings, News updates, and Weather in a few seconds. The Smart mirror is an IoT-based intelligent system that can be used for the facilitation and enhancement of the user's awareness of various functions. By using this smart mirror the standard of living and the quality is changing drastically with the help of interactive computing systems and embedded systems. A Smart mirror can be used as a normal commodity that can change the perspective of a person towards the mirror

II. PROPOSED SYSTEM

This proposed Smart mirror is designed to perform various activities i.e., it displays time & date along with current weather, and daily appointments. [3]It can be used as a normal display mirror when the system is turned OFF. This system allows the users to use it even if their hands are dry or wet or dirty, daytime or night. The proposed system is further divided into two modules. They are:

- Hardware configuration module
- The Smart mirror display module

2.1 HARDWARE CONFIGURATION MODULE

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. Magic Mirror and also to control the

modules present in the mirror. [4] Raspberry pi which works as a CPU connected to the whole setup is provided with a power supply using a cable so as to supply power to every component. Raspberry pi is also connected to 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 an SD card, which is inserted in a Raspberry pi. This whole setup is settled down in a wooden frame to safeguard

2.2 SMART MIRROR DISPLAY MODULE

Whenever the system is turned ON, the Mirror displays information like time, date, compliments, current weather information, and daily appointments. [5] The modules that are displayed on the interactive modular smart mirror are: Time, Date, Current weather, and appointments or meetings scheduled.

III. SYSTEM DESIGN

3.1 BLOCK DIAGRAM

The system architecture of an Interactive modular-based Smart mirror is shown in Fig - 1. The 2-way mirror is the main object placed at the front of the whole setup. Then an LED display that shows the information to a user is placed just behind the mirror. The other physical devices are the Power supply, and cable to supply power to the whole setup from Raspberry pi and sd card. The whole code is dumped onto an SD card and inserted into Raspberry pi. The whole data is taken down by raspberry pi using an internet connection i.e., connected using either Ethernet (LAN) or wireless (Wi-Fi) connectivity.

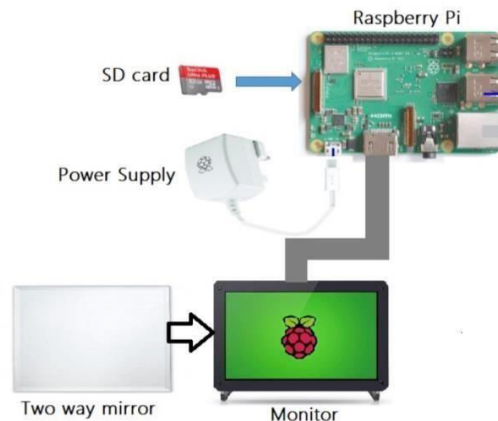


Fig-1 Block Diagram of Interactive Smart Mirror

3.2 ARRANGEMENT OF COMPONENTS

The component's arrangement is 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, an LED display is placed i.e., at the reflective side. These components are directly connected to the Raspberry Pi along with the power supply. Then this is positioned in a back frame

IV. IMPLEMENTATION

We plan to design and develop a kind of futuristic smart mirror that provides a whole new experience to the user. Our proposed smart mirror consists of a two-way mirror, monitor, and Raspberry Pi. A wooden frame will be prepared with LED attached behind the glass with raspberry pi. The power supply is attached to the raspberry pi which will power the monitor.

The Interactive Smart Mirror consists of 3 modules that will perform over the normal Two-way mirror i.e., Clock, Weather, and Google Assistant. Whenever the mirror is turned on using a power supply the Raspberry pi takes it to the Raspbian environment. Then in the Raspberry pi terminal when the command "cd MagicMirror" will run, the Raspberry pi will be working under the MagicMirror operating system. Then again when the command "npm start" is given, the Magic mirror will be turned ON and the mirror will display the basic information i.e., date and time which is our

module 1(Clock).

Now 2nd module is setting up Google assistant for our system. We will install our Google Assistant module by entering the “npm install” command in the terminal. After the installation using our raspberry pi browser, we will log in to the google account.

For 3rd module i.e., Weather. The system also displays current weather along with the temperature that is felt by the human body of the city which is mentioned. But the user must register on 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.

V. FLOWCHART

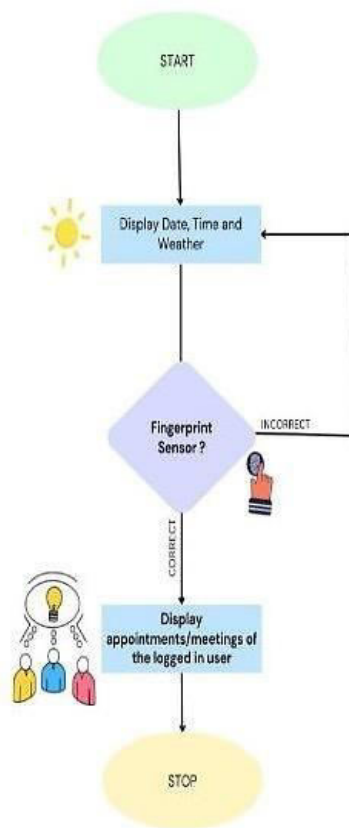


Fig – 2 Flowchart of Our product

VI. EXPECTED RESULTS SMART MIRROR MODULES

6.1 DATE TIME DISPLAY

The mirror displays the date time automatically Whenever the system is turned ON and also is placed at the same positions as provided.

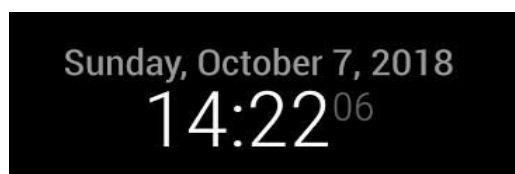


Fig- 3 Date time displayed on smart mirror

6.2 WEATHER DISPLAY

The mirror automatically displays the current weather of a particular city mentioned

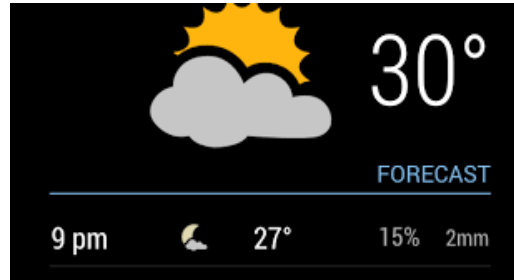


Fig – 4 Weather module displayed on Smart Mirror

6.3. DAILY APPOINTMENTS/MEETINGS

After fingerprint verification, the mirror will display the user's upcoming meetings/appointments scheduled.

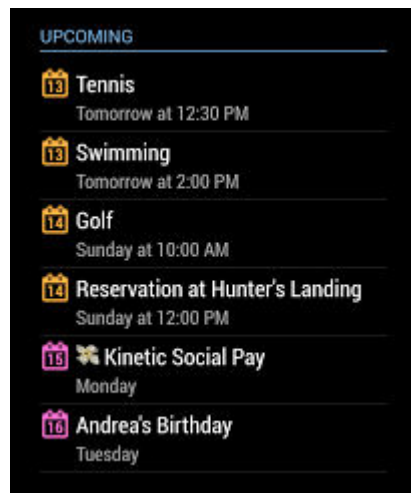


Fig – 5 Upcoming Reminders

VII. 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 the home. There exist many benefits of the smart mirror

VIII. FUTURE WORK

By utilizing a sensor, we can reduce 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. 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 smartphone 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, but rather an enhancement to the already common use of mirrors in most modern bathrooms. The mirror will do the thinking for the user. First, it will turn on and off by itself. Then, it will update the user's calendar schedule, to-do lists, Twitter, news,

and weather. The information wouldn't be thrown in the user's face, but unobtrusively displayed on the edges of the mirror to still allow the use of the actual mirror. The mirror provides common information most people check their smartphones or tablets for, such as weather, news, Twitter, and schedules. This allows the users to read, think, and plan their day while getting ready in the morning or night.

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