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SMART MIRROR WITH AI

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Abstract: The Internet of Things (IoT) allows devices to communicate with each other in different and important places at the same time. As the world is evolving with time even technology is taking a step forward from telephone to smartphone, clocks to smartwatches, wired devices to wireless devices, etc. This paper describes the design and implementation of 'SMART MIRROR WITH AI'. It is a mirror that acts as a reflective surface and as an interactive display at the same time. In this, we have added many features like Google AI, Time, Date, Holidays, Weather forecast, News, Telegram, Mail notification, Phone notification, Spotify, YouTube, Google Photos gallery, Motion Sensor, Real-time value of Stocks and Cryptocurrency & Home automation Controlled voice commands. These features included in the mirror provide convenience to the user.

Keywords – Smart Mirror, Raspberry Pi, Artificial Intelligence, Google Assistant, Internet of Things (IoT).

I. INTRODUCTION

In our daily lives, we use mirrors regularly for tasks like grooming ourselves for the day or trying on new outfits. Smart mirrors are customizable mirrors that project a computer display over a normal reflective mirror. It can be seeded with many features, some possible features include displaying the time, a calendar, picture, weather forecast, news, music, or other applications in your reflection. Adding up these features can help make you more productive or simply allow you to integrate more smart tools into your home. Internet of Things (IoT) is a term used to describe physical devices around the globe connected to the internet, the rising wave of Internet-connected things can be primarily based on the physical surrounding. Smart Mirror's goal is to enlarge the primary reflective mirror with embedded intelligence to combine day-by-day ordinary tasks like reading newspapers, getting stocks & crypto updates, climate updates, and many others. And presenting all that data to the user at the same time as he/she grooms themselves. The Smart mirror will assist in automating and developing smart homes. Along with the improvement of the era, various data/information can be found easily. The Smart Mirror machine which is based on the concept of the Internet of Things (IoT) is evolved mainly to permit users to manipulate and manage house appliances via voice commands. Many IoT-based devices from various fields can be connected to smart mirrors wirelessly and the data collected by devices can be used to show on smart mirrors.

The smart mirror is categorized in different fields like General, Medical, Sports, Academic, and Fashion field.

A. General Field

A smart mirror that acts as a personal assistant to solve the problems of lack of time that is faced by many people. It helps in displaying general information like time, weather, news, compliments, emails, social media notifications, etc. The smart mirror allows user to control home appliances and their activities too.

B. Medical Field

The main function of this type of mirror is to detect the facial expression and signs to discover the health condition of a person and display the health report using different measures like face tracking, emotion detection, heart rate, ECG and age estimation, etc.

C. Fashion field

In this, the smart mirror acts as a virtual fashion consultant, which can analyze, estimate and recommend the appropriate wearing and outfits. It provides the possibility for the users to virtually try multiple outfits or accessories in front of a mirror at home.

D. Sports Field

The main goal of these types of mirrors is to interactively support fitness and wellness exercises for the users. It also contains a multimedia player, home controller, etc. These mirrors also have alert functions which alert the user to wake up in the morning and do their exercises.

II. PROPOSED SYSTEM

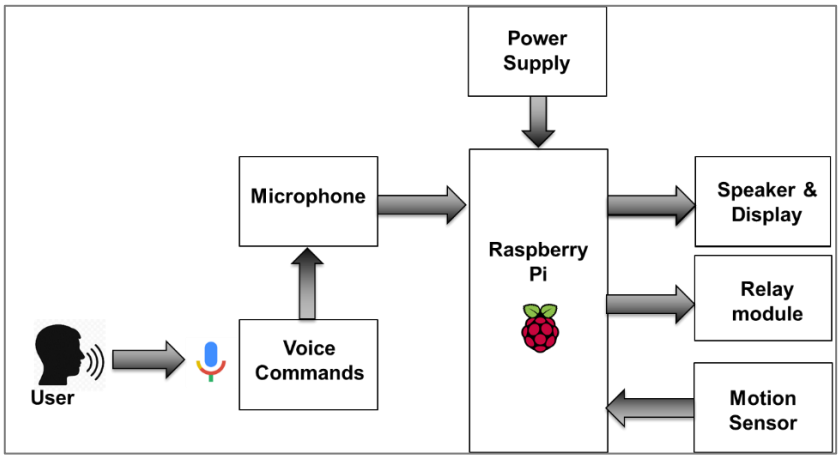

fig 1. Block diagram of smart mirror

In fig.1 block diagram of the proposed model is shown. The block diagram shows the main hardware connected which consists of Raspberry Pi, a Power supply to give power to the raspberry pi (5V/2.5Amp), a speaker and display connected via aux cable together for output of the system, and a motion sensor is used to detect the presence of the user to turn on/off the mirror display, a USB microphone is connected to the board to take input commands from the user and gives to the pi and a relay module is used to control home appliances via voice commands or through telegram bot.
A two-way mirror is used as a reflecting surface here, a specialty of the two-way mirror is that it is reflective on one side and clear on the other, giving the appearance of a mirror to the user but allowing people on the clear side to see through. Where there is light it acts as a reflecting surface. When a person stands in front of the system, the motion/PIR sensors activate the display hidden behind the two-way mirror. The smart mirror enables all the modules installed in it like Google AI, Time, Date, Holidays, Weather forecast, News, Telegram, Mail notification, Phone notification, Spotify, YouTube, Google Photos gallery, etc.

A. Google AI

Fig 2, shows the google assistant module where the user can activate it by saying the hot word 'JARVIS' one can ask questions to it and can give commands to all other modules connected to the smart mirror.

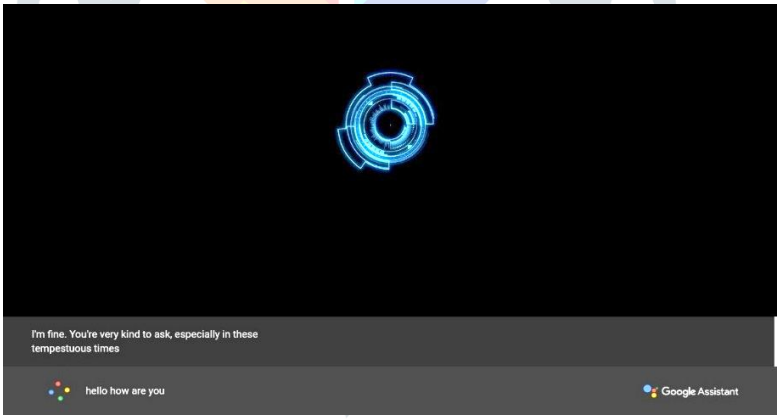

Fig 2. Google assistant module

B. Time & Date

Fig 3, the time & date module which shows information like current time, date, day, month, year, and upcoming holidays according to Indian Calendar with compliments like "Hi there", "You look nice", etc.

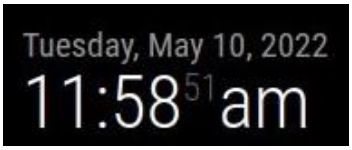

Fig 3. Time & date module

C. Weather forecast

Fig 4, shows the climate condition of the locality like temperature, sunset time, wind, etc. It shows the minimum and maximum temperature of the week and also notifies if it is going to rain or not.

Fig 4. Weather forecast module

D. News

This module in Fig 5, gives the latest RSS feed, from The Times of India. It gives the latest news about national, international, politics, sports, etc.

Fig 5. News module

E. Telegram

This image shown in Fig 6, is the Telegram bot module it acts as a remote control to the smart mirror and modules of the smart mirror. There are many inbuilt commands for every module we can even add custom commands to the telegram bot. We can give total access to multiple users at a time anywhere in the world with connectivity to the internet. Every time you receive a message a notification sound is played; it also has the feature of autohiding the messages after the maximum limit. Few commands and their functions and effects on the smart mirror are listed below.

- **/telecast** - Telecast a chat/photo to the smart mirror screen.
- **/clean** - Clean the messages telecasted before.
- **/spotify** - List of spotify commands to listen to music on the smart mirror.
- **/youtube** - List of YouTube player control commands to play videos on the smart mirror.
- **/screenshot** - Take a screenshot of the smart mirror with the modules on it.

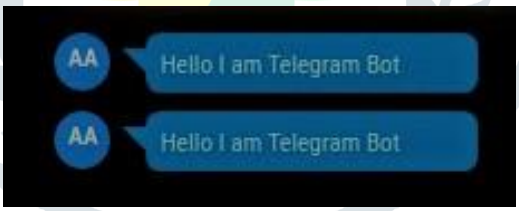

Fig 6. Telegram bot module

F. Mail notification

This module in Fig 7, shows the unread emails of the user it refreshes after every 1 minute in a table format we can set the maximum limit for displaying unread mail on the mirror for this case it is 5. Every time you receive a mail a notification sound is played; it also has the feature of autohiding the mail after the maximum limit.

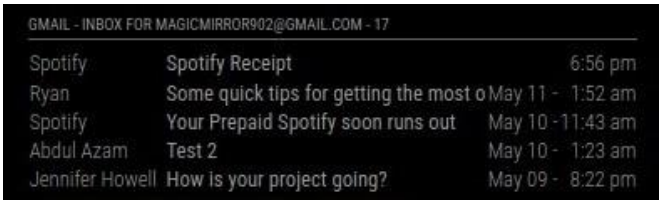

Fig 7. Unread mails module

G. Relay module

The relay module used in this system is a 5V DC relay, it is an electrically operated switch that is used to turn on or off the home appliances and backlight of the smart mirror which are working on high voltages via voice command or telegram bot like {'/screenon'} on telegram bot, {'turn on backlight', 'turn off backlight', 'turn on fan', 'turn off fan'} on google assistant, etc. They are designed to be controlled with low voltages of 3.3V or 5V, since GPIO pins of Raspberry Pi operate on 5V we are using a 5V DC relay to meet the requirement.

H. Spotify

Fig 8, gives the output display of the Spotify player module, this module can be accessed via Google Assistant, mobile phone, and Telegram bot. Songs and podcasts can be played on the smart mirror, a few commands and their effects on the smart mirror is mentioned below.

1. On Telegram
   - **/spotify play** - Resumes the music on spotify player.
   - **/spotify pause** - Pause the music on spotify player.
   - **/spotify next** - Play next track in the playlist.
   - **/spotify stop** - Stop music.
   - **/spotify volume** - Volume control value between 0-100 is required.
2. On Google Assistant
   - **Alan Walker Faded on Spotify:** The assistant will search Alan Walker and the title Faded on the Spotify player and play it on the smart mirror.
   - **playlist Top Hit on Spotify:** Assistant will search the playlist Top Hit on the Spotify player and play it on the smart mirror.

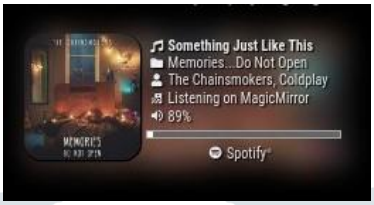

Fig 8. Spotify module

III. Result

As I have mentioned above about different types of smart mirrors, we proposed a general-purpose smart mirror with all the modules and functionalities a normal user needs. Fig 9, shows the actual output of our smart mirror with all the modules like Google AI, Time, Date, Holidays, Weather forecast, News, Telegram, Mail notification, Phone notification, Spotify, YouTube, etc.

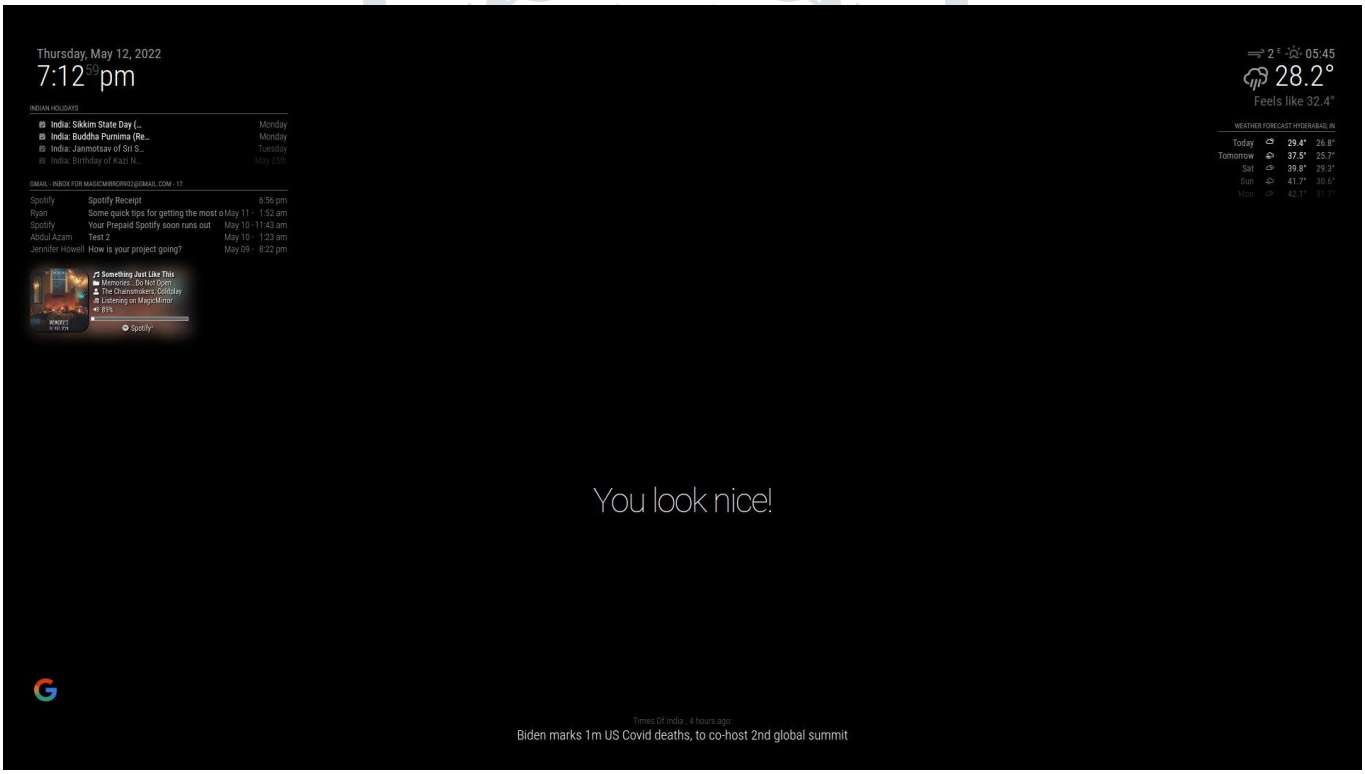

Fig 9. Smart Mirror final result

IV. Conclusion and Future Scope

As the smart mirror is a new concept in the emerging technology field, there are many future possibilities and advancements in the smart mirror. In the future, it can be made more interactive by using touch screens instead of normal displays. Also, it can be made capable of calling another user via Wi-Fi and many more. It can be made more futuristic by adding facial expression reading and finding skin diseases and more in the medical field.

V. Acknowledgment

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