SMART MIRROR: THE NEW FUTURE

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Abstract: This paper describes the designing and implementation of a voice controlled wall mirror, called "SMART MIRROR". It is a device that works both as a mirror and an interactive display displaying multimedia content such as time, date, weather and news simultaneously. The user can interact using voice commands. The Smart Mirror consists of various functionalities like real time data and information updates, voice commands, face detection/recognition using LCD monitor, microphone and webcam. The user can interact with Smart mirror using voice commands. The Smart Mirror is based on Raspberry pi 3 B model, through facial recognition and speech recognition model, mirror can identify the user. Using Machine learning algorithms the mirror can give user recommendations to utilize his time more effectively. Users will be able to control appliances in the home using relays.

Keywords – Artificial Intelligence, Machine learning, facial recognition, Internet of Things (IoT)

I. INTRODUCTION

Internet of Things (IoT) is a term used to describe "technologies, systems, and design principles associated with the emerging wave of Internet-connected things that are based on the physical environment. Smart Mirror aims at augmenting the basic reflective mirror with embedded intelligence to combine daily routine tasks like reading newspaper, getting stock updates, weather updates etc. and providing all that data to the user while he/she gets ready. The Smart mirror will help in automating our work and development of smart houses. Along with the development of technology, various information can be found easily and the emergence of the concept of Smart Mirror Smart Home has become increasingly widespread. The Smart Mirror system which is based on the concept of Internet of Things (IoT) is developed specifically to allow users to manage and control house appliances through voice recognition.

In this case, managing house appliances has been identified as the main problem faced by most people. There are just too many things to be done at one time and at certain point, users are not able to multitask such daunting chores. For example, when a to-do-list with a number of house chores has been recorded on a paper, but the paper is lost because it is misplaced. Another example is when users are too busy managing their daily activities until some trivial-yet-critical things are forgotten such as switching off the lights in a room, which can eventually lead to energy wastage. To deal with this situation, Smart Mirror is developed to provide convenience for users in managing things and control the usage of electrical appliances in the house with network connection between the lamp and the device.

II. RELATED WORK

Apurva Joshi et al. proposed IOT BASED SMART MIRROR WITH NEWS AND TEMPERATURE, The objective of the paper is to develop smart mirror that interact with user and provide information such as news, temperature [1]. The smart mirror is designed using Raspberry PI, microphone, lcd display and a two way mirror .The user interacts with the mirror through the microphone and the results would be displayed on screen. The information provided is very limited which can be further extended and doesn't provide user privacy.

GOKILA R et al. proposed HOME AUTOMATION USING SMART MIRROR WITH RAPBERRY PI, Intelligent mirrors, which today continue to operate and will take their place in future technology, provides their users with both mirror and computer-aided information services [2]. Raspberry pi understands the user command via the microphone in the mirror, the built-in microphone, and the speaker is used to communicate with the mirror. The mirror display information such as time, calendar and headlines. With the onset of technology more information can be displayed such as mails, traffic updates, To-Do lists and user security can be added through facial recognition.

Ravi Kiran et al. proposed IMPLEMENTATION OF HOME AUTOMATION SYSTEM USING SMART MIRROR, This paper presents the design and creation of a Smart Mirror that is innovative and very interactive [3]. With artificial intelligence in public settings for ambient home automation and industrial applications in the enterprise as well. This programme collects the data of the real-world computer and displays it to the user based on his / her requirements. The Raspberry Pi module takes full care of the Smart Mirror. This Smart Mirror is implemented using some of the peripheral devices such as the LCD screen, microphone, speakers and two-way acrylic sheet. The Smart Mirror displays information such as weather, news, traffic updates through voice commands. The mirror provides very precise and essential information but lacks at providing user security. The potential of this mirror can be further extended by controlling home appliances.

Preeti Rani et al. proposed DESIGN AND DEVELOPMENT OF SMART MIRROR DISPLAYING REAL-TIME SENSOR DATA, The paper outlines an idea to make the home smart to save time [4]. The Internet has transformed the lives of users through connecting us to information and other individuals more easily. The smart mirror is equipped with sensors such as

temperature and humidity to display local temperature and humidity to the location. The author also uses the mirror as a notice board for educational institutes to display various notices. Voice assistant can be implemented to provide interaction between user and the device to clear any query.

Nihal B.S et al. proposed VOICE CONTROLLED SMART MIRROR WITH RASPBERRY PI, Everything is getting smart in this advanced world. According to the researches, there has been a significant development in the use of intelligent gadgets over the last 10 years [5]. All these electronic gadgets include web-related equipment and programming. The smart mirror is designed by using ALEXA as a voice assistant to perform interactions with the user. The device is able to display information such as news, technical parameters of the Raspberry Pi such as RAM and ROM usage. The project is designed using a 3rd party application which would increase the cost of the device. The device can be further enhanced through the usage of camera.

Roopa Sabri et al. proposed SMART MIRROR USING VOICE INTERFACE, This project is designed with the intention that people spend quality time in front of mirror [6]. The mirror is designed using a two way mirror, raspberry pi 3B+, and Alexa. The mirror would constantly display information on the screen. The client can interact with the mirror through the help of Alexa voice assistant. The mirror would either display information or give voice feedback according to the client query. The device lacks at providing user privacy, customized user interface could be provided. Mirror can be further updated by providing control of home appliance.

Mayuri katole et al. proposed NOVEL APPROACH OF DESIGNING OF A SMART MIRROR USING RASPBERRY PI, This project presents the design and development of an interactive multimedia futuristic Smart Mirror for the ambient home environment as well as for commercial uses in various industries [7]. The project is implemented as a personalized digital device equipped with peripherals such as Raspberry Pi, microphone, speakers, and LED monitor. It would display information such as weather, news headlines. Using speech recognition techniques the client can interact with mirror through verbal commands. The mirror cannot distinguish between multiple users as it lacks facial recognition. The device can be further updated to provide control of home appliance, battery backup can be provided in case of power failure.

The limitations of the existing smart mirrors are they display limited information (news, weather, and calendar) on the mirror when the user stands before it. They don't provide a secure interface to the user (such as Facial and voice recognition features). And, they do not have options to choose a customized (user can opt for choice as they wish) user interface. The existing smart mirrors are not optimized to the optimum, more updates can be added such as battery backup, home appliances control.
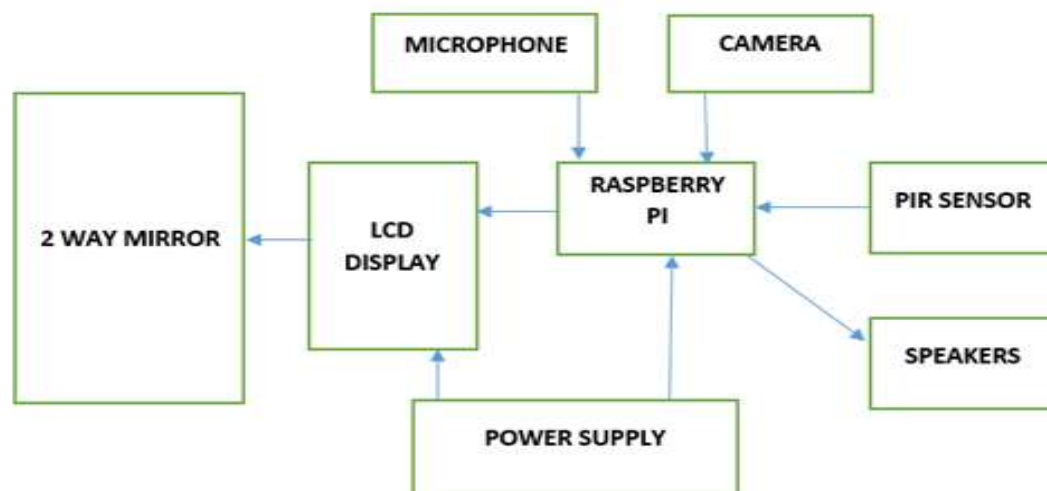
III. PROPOSED SYSTEM

Fig1. Block Diagram of Smart Mirror

The figure shows a schematic view of the proposed smart mirror. This paper aims to display useful information (such as news, weather, mail, traffic updates) on the mirror, which would help the user to obtain information without distracting from his work. A secure environment would be established for clients through facial recognition. Users can customize their interface to meet their needs (such as social media, current affairs).

The mirror consists of Raspberry Pi which is the main Processing unit, Motion sensor used to detect the presence of the user, Pi camera used to authenticate the user, Microphone to get user input, Raspbian voice assistant to interact with the user, Two-way mirror to function as both mirror and display unit, LED screen to display the information, speakers to play audio output.

When a person stands in front of a mirror, the motion sensor detects his presence and turns the camera on. The camera would recognize the user and display his personalized interface (e.g. to-do lists, calendar, news). The user can use voice commands to interact with the mirror. The smart mirror would respond by displaying information on the mirror and providing the user with voice feedback. The user would be able to perform additional tasks, such as listening to music, get real-time traffic updates, and view social media. The user can also turn on and off other electrical devices.

IV. CONCLUSION

Smart mirror design has the advantages of small size, simple operation, low cost, a high degree of the user-friendly, personalized user interface, and many other advantages which is suitable for many applications like college, home, offices, etc. Overall, the proposed smart mirror system incorporates various functionalities to grant users access to personalized information services.

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