Intellectual Mirror

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Abstract: *During making this paper, we are visiting Analyse a sensible mirror, one amongst the numerous and a sophisticated development of IoT. the main motto of this paper is to review a various number of smart mirror designs that were featured with each and each information about the end-user's health, schedules, weather, clock, news feeds. The Smart mirror greatly reduce the time and ease the lifetime of the consumer. The concept of IoT and Machine Learning with most advanced cloud technology support in developing smart devices. This technology also adds cognitive and deciding skills for all the devices, thus making it smart. But one in all the most concerns on which these smart devices witness a significant fall is on maintaining the safety and with unethical safety measures.*

Keywords: *IoT, LCD display, Personal assistance, Raspberry Pi, Smart mirror.*

I.   Introduction

The digital era of cognitive automation and enhanced critical research with modern technology sophisticated the minds of innovators to speculate more in constructing advanced smart applications indulging various user-friendly features, advancement, easy-to-use, and many other merits. The more prominent scope of contemporary applications relies mainly on the smartness of collecting the input from the end-users and optimizing the quantified outcome with the event of information Science and Machine Learning. This innovation became effectively possible with the enlarged evolution of the net. This internet not only improved the essence of life with all modern globalization, but it also offered the agility to attach with the minds of humans along with its global presence. It also offers the power to witness numerous upgrades that are happening within the field of Electronics, automation, and also computation. The concept of the "Internet of Things" - a network of varied connected equipment possesses strong capabilities in understanding the physical surroundings to deliver better-calibrated usage for its users. The end-to-end IoT ecosystem comprises many web-enabled devices that collect, store, and process data with inbuilt sensors, processors, and hardware

II.   Literature Survey

2.1   FRAMEWORK FOR ANALYZING ARTICLE - 1

2.1.1.   A Mobile-Programmable Smart Mirror for Ambient of IoT Environments

This research paper clearly forecasts the event of the smart mirror with a more customized and personalized interface to boost the merits stack of functionality for the end-users. The paper also suggested a wise mirror that features various improved aspects in terms of scalability, adaptability, and cost-effectiveness [11]

2.1.2.   Purpose and Importance

The most objective of this paper is to supply a user-friendly multipurpose mirror with a far better interface and features to become an inevitable a part of} the day-to-day part of the end-users. This paper also followed a service-oriented approach to style the whole mirror architecture [11]. The key functionality of the proposed mirror directly co-relates to the adaptive model of the user's lifestyle with the newest sensor-based automatic face recognition, voice commands, and physical gestures [11]. The overall purpose of this review paper is to produce a possible design representation for the development of a sensible mirror interface with the concept of Ambient. Intelligence. Ambient Intelligence is one among the numerous structures within which citizenry are relatively covered with a wise interface that responds back to human actions [11]. The planning also follows the client-server model, within which the client is capable of interacting with the server. This communication helps to keep up a stable connection between the top mobile application and therefore the server database. The client mobile application also facilitates various user functions like new user creation, authentication, and other personalization [11]. The client application is additionally integrated closely with the smart mirror to supply customer identification [11]

2.1.3. Design Aspects

This model clearly defines all the developmental phases of constructing a smart mirror imposing the user comfort and supportive ecosystem [11]. More Information Oriented aspects were included with the design to provide access to interact with multimedia and the latest news feeds [11]. For different user tasks, more customized actions can be added to the mirror to differentiate those actions appropriately [11] It also includes numerous other services such as identifying various registered users and providing different response actions for the respective user. It also equips an instant and super-fast update mechanism to frequently change as per the user's gestures with Real Simple Syndication (RSS) feeds [11]

2.1.4. Functionality

The smart mirror model addressed in this paper has been categorized into two variants such as hardware requires infrastructure and a couple of dedicated mobile applications. And the second variant consists of a two-way mirror, a T. V screen, and a shadow box [11]. This application uses Bluetooth protocol which identifies the nearest user, which has been identified with the help of broadcasted signal, and the measurement of its distance is calculated by the received signal strength indicator (RSSI) of the nearby devices. The user device's MAC address will be added to the server during the initial registration process. During registration, the user should also document their name, email, and password [11]. A clear description of two variations of the mirror such as the mirror interface and features were explained for effective development [11].

2.2. FRAMEWORK FOR ANALYZING ARTICLE – 2

2.2.1. *TOPIC: The SHAPES Smart Mirror Approach for Independent Living, Healthy and Active Ageing*

This paper clearly shows how smart mirrors are often helpful to elderly people. It ensures older people can tolerate no help from others. The mirror can sense any health-related issues and monitor them. From this smart mirror older adults can easily adapt to technology. they'll easily access the smart mirror with their commands. It can ensure adults use assistive technology [12]

2.2.2. Purpose and Importance

The main aim of this paper is to need the care of elders in terms of health in order that they'll easily live their life independently [12]. This also overcame the interface and control design by getting several feedbacks related to text size, font, colour and implemented to their themes [12]. Physical limitations are widespread in older persons, therefore disability, haptic degradation, and deafness must all be taken into consideration while designing the interaction [12].

2.2.3. Design Aspects

The modal was designed with Raspberry Pi because the computing unit computes data and displays it during a sensible mirror [12]. It has added presence sensors, door sensors, humidity, and temperature to detect patterns of activity and detecting for any vulnerabilities [12]. IMU sensors can detect falls and immediate response, so earlier we will make certain of it [12]. The depth camera is used for rehabilitation, facial rehabilitation, and physiotherapist monitoring [12]. RFID, Camera, and mic were accustomed contact doctors via video call [12]. A smart band is utilized to help to induce the hobby data [12]. The mic is used to interact with our assistance [12].

2.2.4. Functionality

Here many problems have been attested in the magic mirror so that users can experience comfort. There are different cycles in it to manage data like co-creation, co-design, co-experimentation, co-deployment, co-execution, and evaluation to give better outcomes from the smart mirror. In the magic mirror, there are unique features like calling a consultant to check their health, to detect any abnormal activities, and detect the health status by taking voice or facial status, the fall detecting parameters also give maximum results. [12]

2.2.5 Related work

In this area, there have been few explorations. Adding technologies to the mirror allows several jobs to be completed at the same time. The mirror was intended such that inhabitants might operate the smart home types of equipment and receive many services which can be upgraded through the user profiles. This lead to the improvement in the IoT and its applications [1]. Here the design was developed using Raspberry Pi, a Led monitor, and a two-way mirror which is made using an acrylic sheet. It displays weather data, temperature, and web applications like YouTube. They can retrieve the data about weather in different localities using the microcontroller connected to the internet [2]. In this, the main focus is on health and wellness in the workplace. The RFID reader recognizes different users through the personal corporate ID card to allow access to their personalized user interface. The mirror provides the workplace's environmental conditions, personal physical exercise data that can be obtained from wearable devices, and other general information. Motivational advice during the physical performance is also provided through a request by speech-based recognition techniques [3]. In this, the discussion was on the development of a futuristic smart mirror for the contexture home environment.

This mirror provides a medium of interaction to control the household smart appliances and access personalized services [4]. This paper proposed using smart mirrors to optimize our time in this hectic lifestyle. This mirror provides some pieces of information like the calendar, Time, weather, news, stocks, and so on when a person appears in front of the mirror which is detected using Infrared sensors and Wi-Fi connectivity [5]. In this paper, a Fit mirror for a healthier lifestyle has been experimented with. This mirror helps in providing a positive effect to the users by increasing their motivation, mood, and feeling of fitness [6]. Smart mirrors help in detecting some random facial emotions of people. It collects daily information about their daily emotions to monitor their health and mental status which can be viewed while dressing themselves in front of the mirror [7]. Down syndrome, which is the most prevalent genetic disorder among adults, creates problems regarding their capabilities and self-sustain to perform their daily activities. This smart mirror helps in assisting them to do their daily activities by giving excitement to satisfy them to develop positive body skills [8]. This smart mirror system which includes the 3D representation to the user with many makeups filter features. This system includes 3D face construction, Infrared Radiation (IR) based face tracking, and an OpenGL extensive viewer rendering approach where the user can view within reach outcomes of dissimilar makeup features without affecting the original face appearance [9]. This smart mirror is a type of system where the normal home mirror is adapted to act as a smart mirror in a triggered mode. It is built using Raspberry Pi4 model B, a USB microphone, LCD touch screen display, mobile phone, camera, and PIR sensor which runs on the programming language of Python. Simple frame difference approach used for the intrusion detection, YOLO machine learning technique with OpenCV implemented for human monitoring [10] .

III. Proposed Work

The smart mirror could be a two-way mirror that's integrated with a display at the rear of the glass. It will help the user what's the schedule, to-do list, news, and weather, etc… the smart mirror provides the same information as the smartphones or tablets like weather, news, and schedules. while using a smartphone the user him/herself prepares for the condition, where comes to the smart mirror it will tells the user in a planned manner. when it comes to the smart mirror it must be smart enough to protect itself from any type of the temperature conditions like humidity levels. it allows the user to note down the notes or to remind any daily tasks via google assistants regardless of the day, time and night. this mirror provides quite common information that's available on the smartphones and also wants to display the playlist of the user's Spotify account. it performs all the tasks in the cinch. This display will list information on site, and weather. Integrating IoT in an exceeding mirror gives us many advantages. This will make sure the data would be easily accessible. And so, the private assistance integration is going to be simpler to user for real-time interaction.
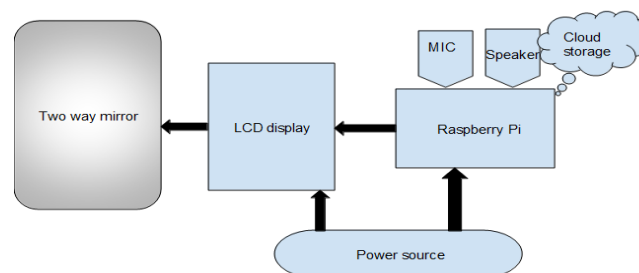
IV. Design Aspect

Fig.1. Block Diagram of Smart Mirror

5.1. Hardware requirements
1. Raspberry Pi
2. Two-way mirror
3. LED Display
4. Mic
5. Speakers
6. VGA to HDMI cable

5.2. Software requirements
1. Raspberry pi software
2.Node.Js for the magic mirror
3. python for voice assistance

5.3. Working

Two-way mirror

Two-way mirror is the mirror that can showcase both sides to the users. The mirror can reflect for the surface and it when bright light contacted its surface it will pass the light through it. The mirror will show the person in front and allow the lights from the display to pass through the mirror and UI of the mirror will visible.

Led Display

Here both the screen and speech output is connected to Raspberry Pi with the HDMI port. LCD display is display that can connect through VGA cable, so we are using VGA to HDMI converter

Raspberry Pi

The Raspberry Pi plays the most important role in making of this mirror. It also acts as a processing unit. Raspbian OS give us combability to use mirror interface. The Pi comes with 4 USB port, 2 HDMI port, 1 ethernet port and power supply port. It has inbuilt Wi-Fi and Bluetooth card that we can use for connectivity.

Software Part

For the software part Node.js is used for the interface of the intellectual mirror. Raspbian OS is the OS that has the base of Debian OS. Python is used for the google assistant. For triggering the intellectual mirror we use the code npm.

V. Result

Fig.2 shows the output of the date and time to the user after installing date and time packets which is written in the form of Node. Js, here the user can be able to see data and time interface through the glass firm.

Fig. 2. Image of the smart mirror with Date and Time

Fig.3. Weather

Fig.4. Calender

VI. Conclusion

The smart mirror also acts as a sensible home management platform, it can be a future technology that provides user which can be easily used for the interface of smart mirror which provides them access for customizable services in a highly attractive way. While doing other things at the identical time the key advantages are that this can be a completely unique sort of smart gadget that won't see on a daily basis which it's fantastic. The mirror is both an everyday mirror and a mirror that displays daily alerts to the authorized user. The user may access a spread of feeds or notifications on the mirror, including Facebook, Gmail, and news. The mirror can also be wont to show information like the time, weather, and date. This smart mirror also act as an private assistant which displays crucial alerts and serves as an information hub. Voice commands is also wont to interact with the mirror. A Passive Infrared sensor is additionally included, the proximity range inside of the

mirror is activated to the user through a screen. This cuts down on electricity waste. Small size, easy operation, low cost, high degree of user-friendliness, customizable computer program, and plenty of other characteristics make smart mirror design ideal for a range of applications like college, home, and offices. In general, the suggested smart mirror system includes a variety of features that allow users to receive customized information service

Future Scope

Within the future, there's an unlimited scope due to its unique usage and timesaving aspect. If we take a look at everything with a sensible mirror. within the future, our shopping is going to be easier with the assistance of smart mirrors. we are able to easily check how the dresses and cosmetics look while wearing them without buying them with the assistance of algorithms. Smart mirrors make everything easier.

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