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Smart Mirror: A Journey to the new world

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Abstract: A Smart Mirror is the most recent in innovative home stylistic theme and in the market. In view of the client studies and model execution, we present the improvement of an enhancing machine that fuses intelligent administrations of data, offered through a UI on the surface of a mirror. Our work depends on the possibility that we as a whole take a gander at the mirror when we go out, so for what reason wouldn't the mirror end up smart. It is a custom mirror establishment that is both a mirror and a display. It takes information from the web including time, climate, stock reports, quotes and more to stay up with the latest. The smart mirrors, which continue to work today and will take place in future technology, provide users with both mirror and computer-assisted information services to the user. These systems can be connected to the Web, and the information in certain locations on the mirror may transmit data. In the smart mirror system performed in the working scope, using the Raspberry Pi 3 micro-controller card, the weather, time and location information taken from the Web services, the activity calendar information of the user, the phone rings information and the camera image is included. Some enhancements can be controlled via the microphone in the smart mirror, with the help of the voice commands.

Key words: *Smart Mirror, Raspberry Pi, Node JS*

I. INTRODUCTION

With the help of technological developments, many of the products used today can be connected to the Internet and become smarter. In recent years, smart mirror technology has taken its place in the category of smart products. The smart mirror technology closely followed by the companies in the fashion world is expected to be used not only in the fashion world but also in many areas in the coming years. Image processing etc. The development of intelligent mirror technology can be achieved using methods. The intuitive registering, voice innovations, computerized reasoning are giving straightforwardness in the life in greatly moored and advantageous way. The brilliant mirror is a change over a run of the mill reflect with interconnected keen contraptions and advances with installed insight which offers advance usefulness, for example, time, news, climate, booking a Uber ride, showing maps, etc.

Machine Learning will give self-learning and self-adjusting highlights to the mirror which will keep the mirror refreshed and progressively responsive. It goes for incorporating this innovation in a mirror, on the grounds that when all is said in done individuals invest a lot of energy before a mirror. The principle objective of this venture is to build up a shrewd mirror gadget and also a working framework to keep running on comparative gadgets. The gadget was to resemble a standard mirror yet would have a screen inside and we would have the capacity to communicate with it utilizing voice directions, hand signals and face acknowledgment. The working framework would bolster running applications and would give a straightforward API to outsider designers to make their very own applications for the Smart Mirror. The fundamental highlights the Smart Mirror would have would demonstrate essential climate and time data, having the capacity to include alerts, updates. We would likewise have the capacity to play music here and there and see pictures through Instagram, for instance. The product should have been intended to be particular and responsive all together fit equipment.

Considering the studies on smart mirrors, it can be seen that there are many different usage areas. For example, when; with the help of the sensors located in the smart mirror, the body's 3D model can be removed and any detailed information about the body (height, weight, etc.) can be given. Conditions related to health status can be monitored via smart mirrors. Daily exercise information can be provided to the user by adding exercise movements that the user should do. Image processing techniques are mainly used in these studies.

Smart mirrors offer different possibilities for the user as far as they can be developed. Intelligent mirrors, which also provide the current traffic situation, are included with the added location information. A Smart mirror is a gadget that

capacities as a mirror with extra ability to show sight and sound information, for example, Content, pictures, and recordings. This gadget enables clients to get to and collaborate with logical data, for example, climate information, flawlessly as a major aspect of their everyday schedule. The principal highlights of Smart Mirror are triple: (1) It is measured, lightweight, and extensible; (2) It enables designers to evade the sand boxed condition made by internet browsers; and (3) It underpins modules written in any programming dialects. These upgrades lighten the equipment and programming restrictions natural with the utilization of internet browsers as an essential scriptable showcase technique.

Figure 1: Smart Mirror

The proposed shrewd mirror will be worked by Raspberry Pi and will additionally involve Google Voice Kit, web-cam, screen and enchantment reflect dashboard with two-way reflect. The objective of the venture is to make a Smart Mirror gadget that individuals could cooperate with yet in additional build up the innovation so it would give you a chance to introduce and build up your own applications for it.This mirror will help in creating savvy homes and give an interesting domain to the clients. When a man comes before the mirror, it shows the data that is being bolstered from the telephone. This information or data incorporates logbook, time, climate, news channel, notices, etc.

Our system additionally examines about the face acknowledgment and its application in control instrument in home. It incorporate voice acknowledgment framework which will guarantee that reflect works at our very own directions and performs them according to require. This gadget could obviously be utilized as a conventional mirror including all the above highlights that make everyday life less demanding and quicker, which is a vital piece of home mechanization too.

II. SMART MIRROR WORK

The work on intelligent mirror is the work done in the field of Internet of Things (IoT) which has long imagined humanity and has been gaining in the last decade for technological developments. Intelligent mirrors, introduced by science fiction films, are now among the most intelligent home technologies. Mirrors combined with Android or IOS programming infrastructure show that development is not limited. An exemplary smart mirror application is shown in Figure 1. The touch screen on the smart mirror can also be activated to increase the range of applications. By adding multimedia systems, contribution to the development of smart mirrors can be provided.

Intelligent mirrors developed by many large firms have started to see a trend in the technology market. Intelligent mirror software is created and shared for different programming language on a GitHub platform. Developing technology companies include Apple, Microsoft, Samsung and Google. Smart mirrors used in bathrooms serve as both information and images to the user. . The designed mirrors have two modes. In power off mode, the smart mirror acts as a standard mirror. In the power-on mode, the smart mirror becomes a display device.

The mirror can include a touch screen to allow direct user interaction but in future aspects. It allows users to review electronic news, information and programs while doing other brushing, hair styling and make-up treatments in front of the mirror. He can read the news headlines, respond to e-mails, review and edit the appointment calendar

III. SYSTEM ARCHITECTURE

Python and JavaScript (Node.js) programming tools were used. JavaScript is a script language developed by Netscape. It provides JavaScript interactive and dynamic web pages. JavaScript is written between the HTML codes and sent to the browser. Browsers can process and interpret these codes so that the HTML objects on the screen are replaced and feature changes are made. Node.js is a JavaScript library on the basis. The most obvious difference from JavaScript is that it allows JavaScript codes to be run on the server [3]. Real-time applications can also be used. It is also used in embedded systems since it is independent of the platform. The reason why Node.js is preferred in this study is that it is based on a modular architecture. Modules designed for every need can be used in projects. The most important step of modularity is the package manager.

This package manager, called Npm (Node Packaged Modules), allows the project to be able to move specific to each project without allowing the error to handle the dependencies of the project and its dependencies. Npm Node.js for various scripts to automatically load, list, delete, update, such as providing the process; it is an application running on the console.

In this study, which is based on Raspberry Pi, the Python. Python is a widely used high level general-purpose language.

Its design highlights the code readability and the syntax that allows to expose concepts in fewer lines of code than would be possible in languages. Python carry an easy abstract. It features a dynamic system and automatic memory management, has large and comprehensive standard library. Python interpreters are available for the installation for many operating systems also allowing Python code execution to a wide variety of systems. Python code can be packaged into executable programs for some operating systems, allowing the action of Python based software to use on Python is an objective, interpretable, modular and interactive programming language. Developed with Node.js programming language.

IV. SMART MIRROR DESIGN

In this study, one Raspberry Pi3, one LCD monitor for mirror, two-way acrylic mirror, one microphone for voice commands and one camera for selfie is used for smart mirror equipment. Figure 5 shows the front and rear face views of the smart mirror that is designed.

The intelligent mirror program, developed by NodeJS programming, operates in two types of commands. One of the commands is the mirror and the other one operates the camera. When the users recorded audio signals are detected, they are converted to text in the microcontroller and the commands are executed by executing the required functions. Raspberry Pi3 reads the voice commands with the help of the embedded code, then executes the modules according to the command that is read, allowing the command to be read. The structured code is through the flow modules. Each feature on the intelligent mirror refers to a separate module. The modules are called separately in a common class. On the smart mirror snowboy.kitt.ai platform, which is operated by voice command, audio signals have been defined and converted to a .pmdl file. This .pmdl extension file is added to the modules and the operation of the commands is provided in this way.

Communication technology Wi-Fi has been utilized in order to establish communication between user and the system. The prototype of the proposed mirror system itself is an LCD panel mounted with a one-way mirror, in front of the monitor. If the panel is turned off, the one-way mirror acts as a normal reflective mirror. On the other hand, if the monitor gets turned on, the mirror is transparent to the viewers to see the screen of the monitor. The power of the monitor is controlled by the system based on the state of the operation. When the user comes in front of the mirror, the mirror displays information that is being fed from the web. Passive Infrared sensor is used to detect the presence of a person.

Using speech recognition, the user can control home appliances and also a shelf that is attached to the system. User can set a command for home automation and for controlling the shelf in future aspects.

Figure 2: Raspberry Pi

V. SYSTEM IMPLEMENTATION

This part clarifies the philosophy chose in finishing this undertaking. A technique in this setting alludes to the part of advancement work to unmistakable stages containing exercises with the objective of a superior arranging and the executives. The Methodology approach utilized in this undertaking is known as The Evolutionary Prototyping. Model Figure 2. Primary Display of Smart Mirror display is an actual existence cycle demonstrate that enables applications to be created in stages with the goal that it very well may be altered effortlessly as indicated by input from clients. Transformative prototyping centers on social affair a right and reliable arrangement of prerequisites. The procedure loans specific solidarity to building quality programming by methods for the continuous elucidation of existing necessities and the revelation of beforehand absent or obscure prerequisites.

Generally, the iterative reevaluation of a framework's prerequisites has not been the panacea that experts looked for, because of the inclination for necessities to crawl over and the trouble in overseeing such prerequisites demonstrates a stream diagram of the framework execution in Smart Mirror. Clients can offer guidelines to the framework to see a rundown of directions that are accessible. At that point, they can give directions by means of voice guidelines gave.

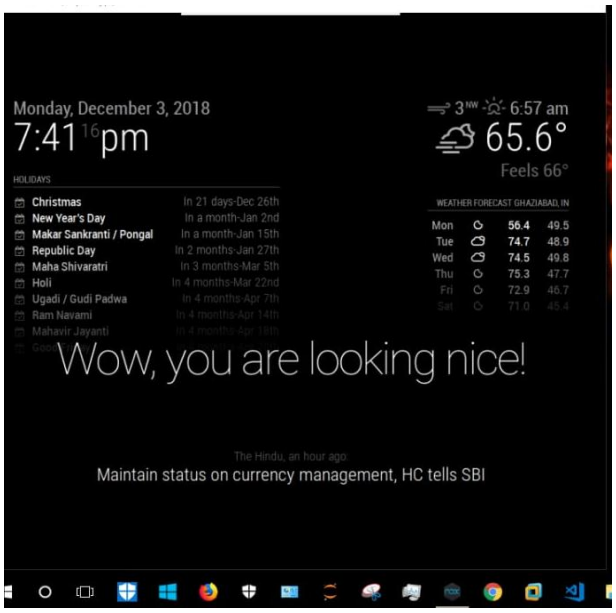

Figure 3: Main Display of the mirror

Figure 4: Example when user commands for map interface

VI. SYSTEMATIC APPROACH

Keen mirror is actualized so that it shows data recovered from the web. Recovered information incorporates climate condition, time, date-book, and notices from online life. The technique for actualizing Smart Mirror is acknowledged in the accompanying advances:

1. The thought and the mirror
2. The screen
3. The packaging
4. Hardware establishment
5. Installing raspberry pi
6. Production of interface

A. The thought and mirror

Our way of life has advanced for improving time, it is the most vital thing. Our work thought was advanced from thought when we took a gander at the mirror when we go out, figuring for what reason don't that reflect improve the reflect determination

A standard mirror would not work. The mirror ought to be semi straightforward or to be progressively precise, it needs to carry on like a mirror when the screen behind it is dark, and ought to act like a glass window when data is shown on the screen.

B. The screen

After a couple of estimations and a few tryouts by tape on the divider where we wanted to inevitably mount the mirror, we figured a suitable estimation that would give the ideal screen measure. In the long run we use LCD screens that met a large portion of the desires. They are generally modest straightforward touch catches and the correct connector introduction. This control board of screen is to be associated and mounted inside the packaging.

C. The packaging

Estimated the measurements required for the new packaging and we chose to make a wood packaging that would make a solid and consistent edge. This packaging goes about as a rack where the things can be kept. Since the model would presumably create some warmth, air ventilation openings were given. Additionally a pleasant and firm mounting point was included the rear of the packaging.

D. Introducing Hardware

Introducing equipment required the accompanying segments

1) The Monitor
2) A Raspberry Pi A HDMI Cable (to interface the Raspberry to the Monitor.
3) A USB to small scale USB link (to control the Raspberry Pi)
4) A power link to control the screen

Introducing equipment is simply required to just associate every one of the segments, connected the power link and after that give capacity to the screen. The Raspberry is booted and The framework didn't make any huge warmth.

The equipment establishment part included mounting the board behind the mirror and appending the raspberry pi to it utilizing HDMI link. We make utilization of a smaller Scale USB link to control the raspberry pi.

E. Introducing the Raspberry Pi

We had picked the working framework Raspbian, because of its adaptability and completely open-source network bolster. It gives a stage to establishment. Wi-Fi availability is important since extra links would lessen the adaptability of the Smart Mirror, we favored Wi-Fi to associate the shrewd Mirror to the web.

F. Creation of the interface

The interface we based on top the Raspberry work area is definitely not a strange application. It is essentially a full-screen web that enables us to utilize Python scripting. What's more, to sweeten the deal even further, it permits to create and test the interface on the standard PC, before pushing it to the Smart Mirror.

VII. RESULT AND DISCUSSION

Keen Mirror has a pretty plan. Since the Smart mirror will just capacity as an ordinary mirror when there is no light behind it. We utilize a dark foundation, for the best difference the substance was been white. Alongside the raspberry pi a Passive infrared sensor were utilized to recognize a man's essence accordingly consequently springing up the information nourished from web. The PIR sensor itself comprises of two spaces; every one of them is made of an extraordinary sort material that is delicate to Infrared. At the point when the PIR sensor is out of gear mode, both the openings identify a similar measure of IR from its environment. A constructive differential change happens when a man who has a warm body cruises by, causing a capture on one portion of the sensor. What's more, when the individual with hotter body leaves the locale, the invert happens, where the sensor produces a differential alter in inverse course. These heartbeats changes are distinguished in this manner prompting the discovery of a human body.

To recover the information that must be shown on the Mirror, API's and Feeds were utilized. Programming interface's incorporated schedule API to show timetable likewise every datum feed had comparing Google APIs. Home robotization was cultivated by utilizing Speech acknowledgment. Amid the coding stage, we set a catchphrase that is later used to control Discourse Recognition utilizes the API called Jasper, it as open program to which the scripting can be incorporated according to client want. At the point when a client says a word, the word is changed over to content utilizing Google API by means of web and the content is nourished back to framework where it is contrasted and the catchphrase in program. On the off chance that a match is discovered it does the comparing capacity. Programming interface resembles every one of the associations on the back of a DVD player: the gadget turns out to be considerably more helpful when associated with different gadgets to it. These associations are basically API's; the news source is only the RSS news source.

Mirror interface of the system would seem like shown in below figure. In the interface we could find that the mirror reflects the person front of it as well as it displays the basic information.

Figure 5: Smart Mirror Using Raspberry Pi

When we started working on the system, it was figured that interface would allow any direct interaction with using the mirror. This would result in home automation shelf security which is accomplished using speech recognition. What was even more significant was the fact that the mirror should be usable as a normal mirror reflecting the person, and thus it should not be fully filled with unwanted information. Only the outer corners should be used for content display, leaving enough room to see the person. The remarks made by mirror are:

1) **A compliment**: What is better than to start a day with a pleasing compliment ?
2) **Weather:** that shirt you're wearing ? Looks pretty! But is it hot enough to wear a t- shirt ?
3) **Clock and calendar:** Is there enough time to enjoy myself in reflection ?
4) **News feed:** what's out there ?

The automation centers on recognition of voice commands wireless communication modules along with microcontroller system is most preferable for the disabled

and the elderly persons especially those who live alone[1]. Beside using the right type of mirror, getting the monitor, building a new casing, installing the hardware and then configuring the Raspberry Pi in the final stage of implementation of the interface, additional to some self-written code, certain open source libraries are proposed to speed up things, it includes Google speech APIs etc.

VIII. CONCLUSION AND FUTURE WORK

The principle objective of this undertaking is to build up a shrewd mirror gadget. The gadget should resemble a standard mirror however would have a screen inside and you would have the capacity to collaborate with it utilizing voice directions, hand motions and face acknowledgment. The working framework would bolster running applications and would give a basic API that would assist a person with having the straightforward applications kept running on the shrewd mirror that ordinarily is available on the advanced cell. The fundamental highlights the Smart Mirror would have would demonstrate essential climate and time data, having the capacity to include cautions, updates or notes comparably we stick notes on an ice chest. We would likewise have the capacity to play music here and there and see pictures through Instagram, for instance.

The product should have been intended to be particular and responsive so as to fit the keen mirror activity. With the venture we need to take in a great deal about the Raspberry Pi as it is the first occasion when we ae utilizing it. Up to now there have been numerous individuals who have constructed Smart Mirrors however as I would see it they need intelligence and innovativeness. The venture plans to change this by giving the client a chance to interface utilizing distinctive reason to meet their general needs. It will be one of the primary Smart Mirrors you can cooperate with and feel like it is on the vital piece of life as it diminishes the need of conveying the PDAs to the regions like restroom and so forth. We can without much of a stretch utilize the keen mirror to satisfy our general needs like checking the news channel or any sort of update through our voice directions or general hand signals. Single screen. Another Application is that this usefulness can be setup openly puts. The goal of the undertaking is to investigate the approaching movement in how individuals get data.

The Artificially Intelligent Smart mirror is configuration to play out a few functionalities basic used to furnish a feeling of normal collaboration with the encompassing condition and furthermore we give an effortlessly extendable structure to coordinating web administrations, for example, YouTube recordings, intuitive maps and most recent entire week's climate report too.

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