

Smart Mirror Using Raspberry PI

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Abstract—Grooming in front of mirror has been a favourite task of the day. A smart mirror will make this task more interesting. Smart mirror using raspberry pi3, home automation technology and internet will give daily information such as weather report, news feeds, time and date, daily routine, notifications from social media etc. and home automation will allow to control the home appliances such as fans, lights etc. This information will be displayed on screen of smart mirror. This paper describes use of smart mirror for home automation and entertainment purpose.

Keywords: Home Automation, Internet of Things, Python, Raspberry Pi, Smart Mirror.

I. INTRODUCTION

The ordinary mirror shows only the object kept in front of it. People waste a lot of time standing in front of mirror and then they read newspaper, schedule their routine after which they realize that it's too late. There are too many things to be done at a time and at certain point users are not able to multi-task such daunting chores. For example, a to-do-list of house chores is accidentally 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 wastage of resources. As all knows time is precious, the project aims to overcome time wastage and give access to control the devices at one place. It displays the essential day to day information such as weather fore-cast, sticky notes, daily schedule, newsfeeds, etc. as well as it will make sure that user won't forget important work to be done. Smart mirror will help to save some human efforts this leads to do daily chores at one place and save time.

The prior aim is to develop a smart mirror device as well as an operating system that will be monitoring and controlling the home appliances. This device looks like a regular mirror but will have a screen inside and people will be able to interact with it using rotary knob. The important features of the Smart Mirror will be showing daily weather forecast and day to day information, able to set alarms, reminders or notes in a similar way of sticking posit notes on a refrigerator. Wireless home automation makes this device more effective and can be used to control electronic devices such as fan, light and other electronic appliances.

II. LITERATURE SURVEY

A rigorous study has been carried out on smart mirror and its importance in day to day life. Information required for daily use like Time, Date, weather details and news are fetched online using predefined URL. The Smart Mirror has the functionalities of the modern-day Smartphone applications implemented in the form of the widgets [1][2][3].

Few sensors like DHT22 –digital sensor is used to get the humidity and temperature details which can be connected to GPIO pins of Raspberry Pi board [4][5][6]. A smart mirror is a natural interface that facilitates access to personalized services and control of household smart appliances in the ambient home environment [5][7][8].

They have great potential to serve not only as a reflective surface, but also as an interactive display as part of a smart home environment. They can also be used to monitor and control home appliances, such as lighting and security cameras [6][9][10].

III. IMPLEMENTATION OF SMART MIRROR

User will connect the smart mirror to the home Wi-Fi connection or any internet connectivity. As soon as the internet connectivity given to smart mirror, it will synchronize the global data, such as weather report, time and date and daily news feeds, which are developed and fetched using java script. This information is ready to display on smart mirror, but not yet displayed on the screen because it has PIR (Passive Infrared) sensor in the circuitry which will wake up the mirror only if any person will come in contact with the certain range of PIR sensor. The information will appear on the screen of the smart mirror for a certain time period, if that person finishes his work and moved away from the certain range of PIR sensor the mirror is directed to go in sleep mode.

One of the main applications of smart mirror is Home Automation. In Home Automation Atmega328P or NodeMCU ESP8266 with WIFI technology is used to control Fan, lights and other home appliance.

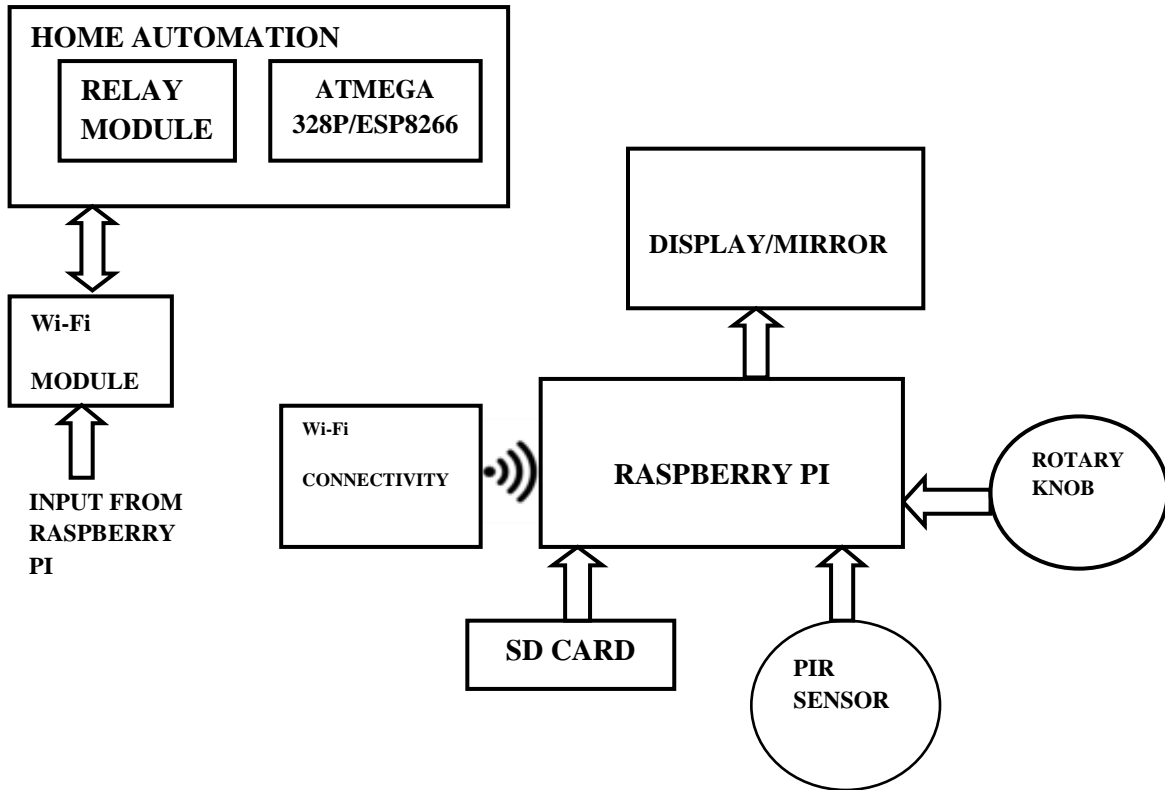


FIG.1 Block diagram of Smart Mirror Using Raspberry Pi

A GUI interface will be created through which the respective user can control the electronic appliance by making the preferable setting by the rotary knob.

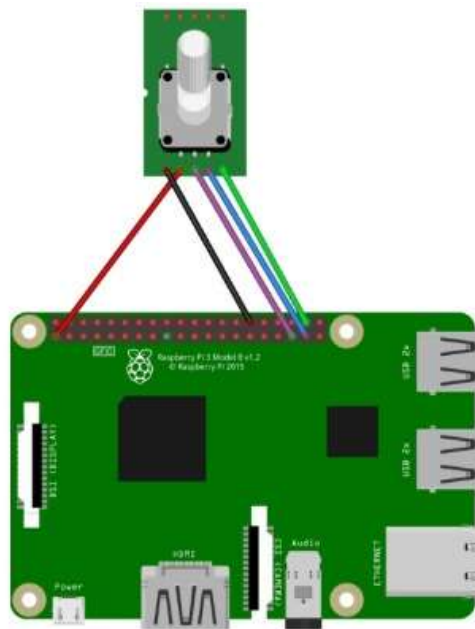


FIG.2 .Interfacing of Rotary Knob with Raspberry Pi

3.1 Functions of knob:

1. In case of any failure with PIR in the System, there is also a backup plan to access the system, by simply using touch response i.e. by using double tapping the rotary knob in the system.
2. When the knob is pressed the GUI interacts with user by displaying MENU on the screen which is programmed using PYTHON code.
3. The rotating function of the knob is used to display the interaction i.e. moving up and down through the MENU on the mirror by the wish of the USER.
4. And if desired by USER to select an option from the MENU, he/she can do it by simply pressing the knob again.

3.2 The process of knob:

The whole process is carried out as stated earlier by only using PYTHON code. When the knob is pressed, using the binary system i.e. 0 or 1, the signal will be transferred by a transmitter which in this case is a WIFI/Bluetooth module through air medium to the respective electronic appliance. So in short this system is based on wireless communication to make contact with the respective appliances, to save manual labour and cost which is generally the case in wired system.

IV. RESULT & DISCUSSION

The smart mirror which will have a screen inside will look like the figure given below [Fig.3]. The screen that showing information in the picture below, the orientation of that information can be changed by doing some changes in code. After pressing the rotating knob a menu popped up on the screen that is main object in the mirror. The menu contains four options, those are dedicated for controlling the home appliances. The controlling can be done by using rotary knob, to select a particular option the user has to rotate the rotary knob clockwise for upward direction and anticlockwise for downward direction. A reboot option is given for rebooting the system.

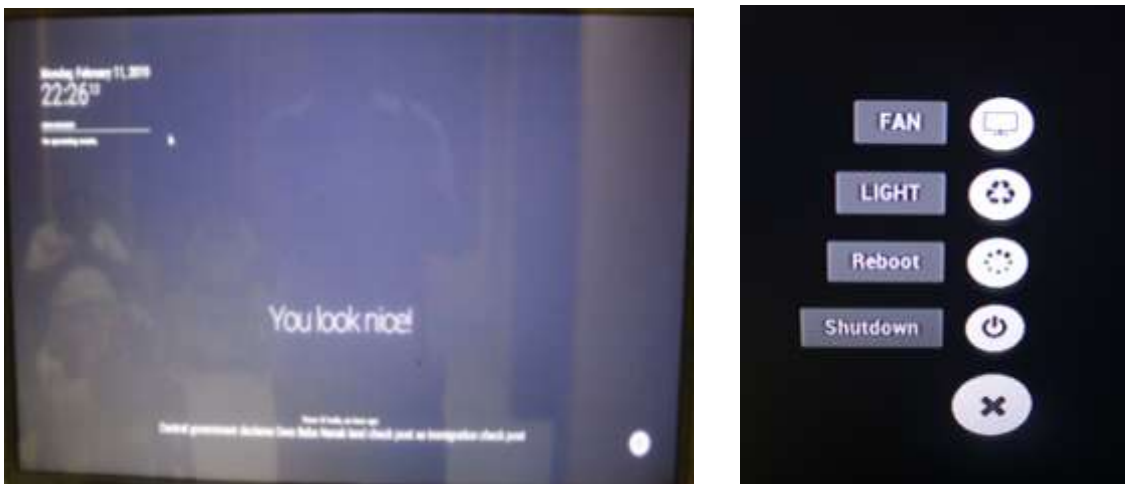


FIG.3 Tentative Output

V. CONCLUSION

A futuristic smart mirror is designed that provides natural interaction between users and the ambient home services. The mirror display is provided by a flat LED display monitor which displays all the necessary information which are useful for the user. This is a functional prototype to demonstrate our work. Overall, the prototype provides an easily extendable framework that can be utilized to provide even more functionality to the user. In future work the developer can investigate how the surrounding context of the user and the environment can be utilized in order to provide optimal service experiences in the home environment. The system can be

made much more useful to the users by adding more functionality like integrating light settings, speech processing, or by controlling rotary knob etc.

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