

Home Automation using Smart Mirror and Firebase Cloud

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ABSTRACT: Using this system we are going to develop a smart mirror which will be controlling home appliances such as lights, fans, TV, and other electronic equipment's. And we will be controlling music system, along with controlling it will be useful for security purposes such as fire detection, unauthorized entry and provides overall security for home. The smart mirror is consisting raspberry pi and firebase cloud technology along with micro controllers and relays. This system leads to the best method to home automation and security with high accuracy and at low cost.

Key Words: smart mirror, firebase cloud, raspberry pi



Fig 1.1 - Smart Mirror

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I. INTRODUCTION

In this model, the device is to create a new technology which are used to a new different way. But in this modern generation many different kinds of innovation are running and providing much better interaction and also provide more useful information. Relevant items are displayed on wall mounted mercury mirror in which user can analysis to weather report, schedule important tasks and other fields of home appliances automation work, and used to control the device. It should be solving the problems that many persons experience in day-to-day life by using this wall mounted magic mirror.

This magic mirror is easily allowed to access and control the home automation and security system. And we will be controlling music system, along with controlling it will be useful for security purposes such as fire detection, unauthorized entry and provides overall security for home. The user needs to put their respective fingerprint to unlock the device. The smart mirror is consisting raspberry pi and firebase cloud technology along with micro controllers and relays.

II. PROBLEM IDENTIFICATION

By the survey, we found that Peoples ignorance leads to waste of natural resources and inappropriate use of power, lights and electronic appliances. And also, there is no status and no alert messages from the already existed automation technologies or models. Security is not maintained when the owner is out of home and no intimation of thief entering the home in absence of owner. And also, Air Gesture's feature and functionality is not recognizing in existing system. Hence, we come with the smart mirror which functions as a mirror with additional task of displaying weather, time, date and schedule user tasks and also provides high security to home.

III. LITERATURE REVIEW

In this paper, its mentioned that mirror could offered best natural mode of interaction through by which the people could able to control their home appliances and also, they could feel the AI chat google assistant. Thus, it provides the most natural and convenient mode of interaction. It is also mentioned that it was isolated and not directly connected to any sensor or any microcontrollers; that was capable for running uniquely and independently. Their ultimate goal was to provide high security system and fire alert system. And their paper was far extending the required services [1]

According to this paper the design of a Smart Mirror is mainly for home environment. That smart mirrors are not widely used due to cost or high requirements of hardware. It would be operated by Raspberry Pi and connected to the world through internet. Their smart mirror consists of Raspberry-Pi, LED monitor, speakers, microphone with two-way mirror and acrylic glass. Their idea of designing this project with raspberry pi using internet was much advanced and was better with low cost. [2]

This paper mainly talks about Wireless Sensor Networks which are channels where data from the physical world can be accessed and utilized by any computation device in the world. On similar lines, IoT is the basic connection to various such devices with the ability to share information across multiple platforms through a unified framework such as cloud computing. These two streams are similar such that both collect data for analysis and processing. But their approach was bit complex with IOT method and less accurate. [3]

This project provides the design and development of smart mirror that has application in important aspects. According to this paper their design approach was much similar to regular smart mirror automation which using microcontrollers and master raspberry pie model.[4]

According to this paper, design method was using microcontrollers and sonus technology. The Sonus technology which is used as a medium of interaction between people and systems. The main advantages of this model were that they had used sonus technology instead of AI chat bot which is much regular and widely used thing.[5]

Here, this model which recognizes the user facial expressions and emotions using recognition technique with its intelligence and provides services such as face recognition, health parameters, height identification. This paper did not go in-depth to basic subjects of smart mirror but provides necessary artificial intelligence sense to smart mirror [6]

IV. PROCEDURE AND METHODOLOGY

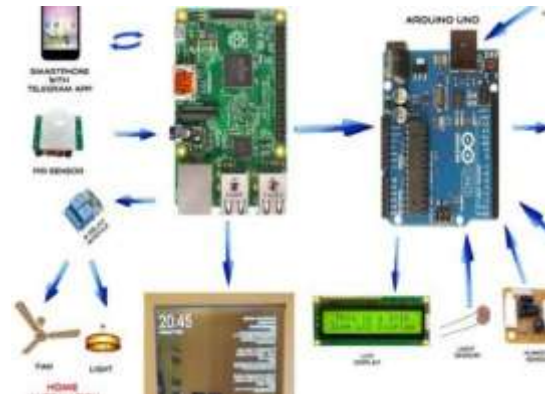


Fig- 4.1 - Architecture of Smart Mirror System

The proposed smart mirror device gets activated when the authorized user unlocks it using authentication methods such as face recognition or using bio metric finger sensor.

Once the user unlocks it display the home menu screen on mirror along with basic multimedia texts and whether, time and date, user schedule tasks etc. which is made up of mercury coated mirror.

The home screen displays the control panel and the music system control such as volume, pause and play using air gesture technology. IR touch overlay screen technology is used to the display which is on the bottom, next to mercury mirror, the IR Touch Overlay is on top. From there we will cover the overlay with a frame to hide it from view and to hold the smart mirror together tightly. Time, Date, weather details and news are fetched from online websites as well as from live news channels.

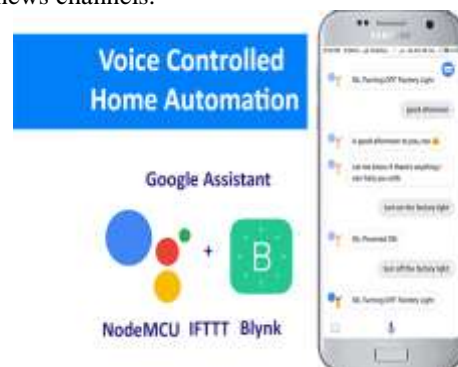


Fig 4.2 - User Communication with Chatbot

In the above figure we explain the functions of smart mirror are developed by firebase platform. Normal people view the mirror as just reflecting the original image but authorized user view the mirror as a magic mirror which basically acts like a robot and performs users' tasks at once as fast as computer. The user also can control the device using the Google assists voice to control the entire device.

And many sensors used as input to device to provide information of home, those sensors such as fire detector, alarm, PIR sensors.

The sensors such as fire detector, water level detector, burglar alarm and temperature sensors detect and sends to the system and the all values will be updated to the firebase cloud. DHT sensors connected to Raspberry Pi board. PIR sensors are used to detect the movement of object Infront of mirror.

Firebase cloud is used to store the real-time database and services which are provided to the smart mirror. It works as a googles backend. during the emergency period or if any variation happens in home the device using the information stored in database send alert message to authorized users' mobile phone or display it on smart mirror as notification.

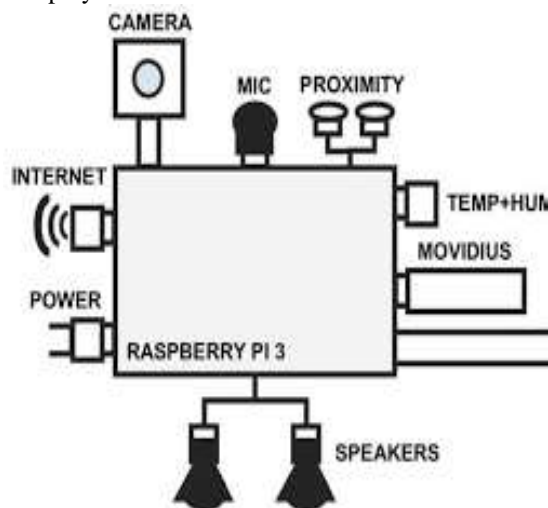


Fig 4.3 - System Working Diagram

V. ADVANTAGES

- 1) High security system which senses variations through sensors and notifies before happening anything.
- 2) Sends alert messages and notifications which was not there in existing model.
- 3) Only authorized user can able to access smart mirror.
- 4) It has music system control model and can be controlled through air gestures.

Over all smooth home automation can be achieved using this model.

VI. CONCLUSION

Smart mirror devices have the great potential and future scope for designing the best smart home. This magic mirror it does not only provides the home automation services, along with that it also provides the high-tech security and emergency alert with automated notifies system. This device is designing in the method that the user can able to extend the service for their

convenient through adding multiple microcontrollers along with the number of useful sensors. So, this futuristic home automation technology will create great revolution in advanced society and next generations. In future Smart mirror devices have the great potential and scope for designing the advanced smart home.

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