

# **IOT BASED SMART MIRROR**

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**Abstract:** In this era of modernization, we've all been exposed to several things that cause the event of the country. Usually, for an individual it becomes difficult to find enough time in the day to accomplish all the tasks that are part of life, so multitasking becomes necessary. Thus, smart devices are used which makes life simpler and easier. Internet of Things offers limitless opportunities to reinforce communication between devices and data sharing but this same feature makes it highly vulnerable from the purpose of view of security. The term Internet of Things (IoT) is said with the connection of physical devices through Internet. The 'thing' in IoT might be anything that has the power to gather and transfer the info over a network with none human's assistance. The devices are embedded with technology so that they can be controlled and monitored remotely. Our project aims at including IOT technology in a mirror, because in general people spend a considerable amount of time in front of a mirror. Smart mirror is a wall mounted mirror which displays weather, time, calendar, latest news headlines, events and other basic information related to our needs. IoT is a larger part of home automation which controls almost all the devices used for domestic purpose remotely through internet.

**Keywords:** Smart mirror, IOT, security, raspberry pi

## **I. INTRODUCTION**

Nowadays in this world, technologies are advancing day by day. For this reason, maximum devices need to be updated with smart technology. We got many smart devices like smart TV's, watches, phones etc. which have various applications. The smart systems are organized by artificial intelligence (AI) and build smart equipment that makes the devices more interactive with the user. A mirror is one of the most used items in homes on a daily basis. Everyone is highly busy with their daily work and thus it is quite difficult for them to check daily necessary information including the latest news, To-do list, social media newsfeed, traffic jam update, weather forecast and so on. This project helps user to get all these information on a smart mirror and it gets updated automatically time to time. In addition, smart mirror is used for security purpose where camera is placed behind mirror. An AI- based face detection method is introduced that detects the unknown person and immediately sends notification to registered mail ID. Google voice assistant is included which is used to interact with the mirror, user can watch YouTube videos, listen to music, etc. Besides, this system will also offer the opportunity for users to check their health status. It will measure the user's heart rate, body temperature and oxygen level. All these values will be displayed automatically on the mirror and if these values are not in normal range, then it will alert the user.

## **PROBLEM STATEMENT**

The major problem of any existing mirror is displaying just the object in front of it or just the human face without having to interact with them. People would often spend more time in front of mirror. Here This mirror which is used is Time saving. Nowadays for the aged people or handicapped it is not difficult to visit the hospital every time since the pandemic and other problems. Now in all important places CCTV cameras are installed for security. In houses it is visible to all so anyone who comes for robbery would easily destroy this camera. Sometimes we have controlled all the appliances manually so we might get irritated and also nowadays we can control all the appliances through the voice command.

## **II. LITERATURE SURVEY**

This Focuses on gathering a correct and consistent set of requirements. This process lends particular strength to build the quality software by means of ongoing clarification of existing requirements [1]. The advantages are running the system, it configures PI and sound. The disadvantages are Could not configure voice Control lights and allow enabling motion detection is difficult.

The prototype built here is mainly focused on the command language understanding so that no need to remember the commands. It recognizes the speech through the natural language and extracts the information from that and then converts the text to speech and answers with required output with natural language [2]. The advantages are Smooth screen display is used. Two-way glass is used. The disadvantages are the technically augmented interaction device could recognize properly and process according to that.

The wooden frame helps keep the system steady and provides durability to the mirror as well as protects it from physical damage the next step is to download the etcher software to make the OS by transferring the image file into the software and directly store this file in the memory card. Display of time, date, weather, news on the mirror is using Python language. The use of a mobile application is to provide a personalized and customized view of the mirror. Next the design the system and have to configure the Raspberry pi and programming the display screen according to requirements and finally fabrication [3]. The advantages are mirror saves time and make to access the information easily and allows users to access the information effortlessly. The disadvantage is the process is a little complicated. Smart Mirror as a Mirror We can see our view as we can see it in a natural mirror while looking and grooming with the help of one-way mirror with high concentration of aluminum content. As an Information System Time, Date, weather details and news are fetched from online using predefined URL. The advantage is it's innovative. It will be beneficial to track our attendance, Centralized Database. The process is very simple and cost effective thus making it user friendly. The disadvantages are the complexity is more.

This technology provides healthcare services for patients, especially who suffer from chronic diseases. In HP measuring, using sensor technology to observe heart pulse by bringing the fingerprint to the sensor via Arduino with Ethernet shield to connect heart pulse circuit to the internet and send results to the web server and receive it anywhere [4]. The advantages is the proposed system provided the usability by the user (user-friendly) not only by the specialist. It is cost effective. The disadvantages are Improve the proposed system to measure temperature, Oxygen in the blood and breathing and also tracking to the patient physiological parameter by a doctor via sending alarm or notification. In addition to, send an alert to a nearby clinical home via GPS for an emergency situation consumes a lot of time.

The aim of this project is to implement a simple and affordable, but efficient home security alarm system. When anybody comes in range of PIR sensor, then sensor sends a logic signal to microcontroller, then it will necessary action to take control and perform a given task. The output of the PIR sensor goes high when it detects any motion and the output goes low when there is no motion [5]. The advantages are it is simple and easily affordable and response is faster in this system. The disadvantages are Range fluctuation or busy network is observed since GSM module is being used which is not safe to transmit the data. And also range of PIR sensor is small.

The IoT based Security System using Raspberry Pi system views the entire floor for movement. Whenever someone enters in the house, signal is passed to controller. If the request is valid the camera is turned on and is linked to the controller to the area where motion was detected and then sends it over the Internet for the user to check the footage [6]. The advantages are it is much safer and fast in detecting the motion of the person. The disadvantages are it is insensitive to very slow motion of the objects and also it does not operate greater than 35°C.

Whenever someone enters inside the house, their movement will be immediately sensed by the sensor which passes on the signal to raspberry pi controller. The controller processes the request if it is a valid request and then it turn on the camera which is linked to the controller to the area where motion was detected and then sends it over the Internet for the user to check the footage [7]. The advantages are it saves money, power and noise. It can also manage the device using the Internet as well on the long way, easily connected to the web service. The disadvantage are this is very difficult to construct and not cost effective.

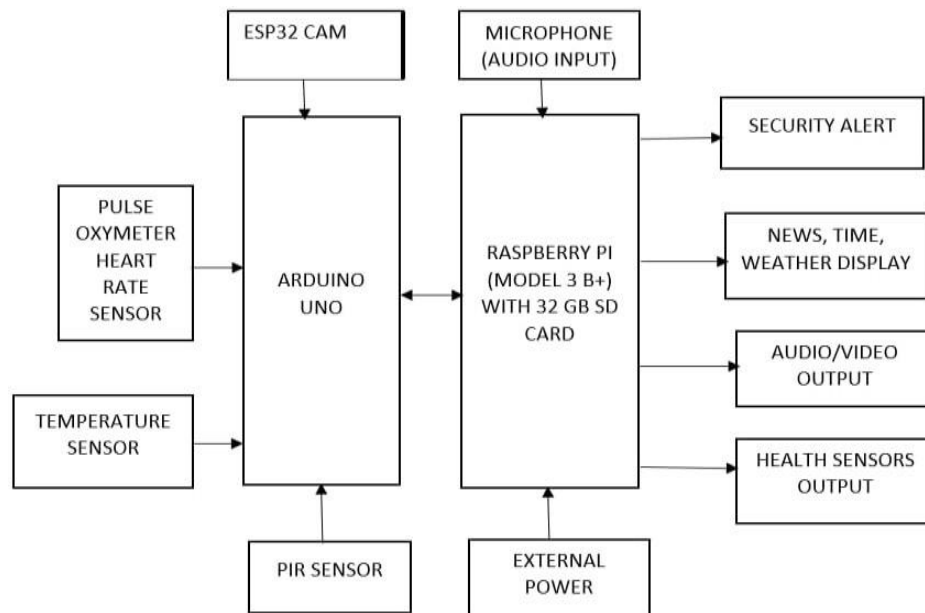
The Heart Rate Monitoring system is developed using IOT technology with an objective of detecting the heartbeat of the patient in order to monitor the risk of heart attack and also there regular check-up. The pulse sensor is placed on the finger and it measures the heart rate [8]. The advantages are the data received from heart rate module can be saved and viewed for further medical usage and also low-cost heart rate monitoring device from fingertips based on the Bluetooth technology. The disadvantages are the range of the Bluetooth module is very less and also the current version of the processing application displays the near time PPG (Photoplethysmography) heart rate but does not record anything.

## **VI. METHODOLOGY**

This particular mirror has a number of advantages. Starting with the security, this IOT based smart mirror acts as security device where the camera is placed behind the mirror. This camera continuously monitors the surroundings, detects for unknown faces and alerts the user by sending the captured image to the user mobile device. It includes google voice assistant which is used for live interaction with the mirror which can play YouTube videos, music, etc. on giving the voice command. The voice command is given through the microphone and speakers are connected for the output audio. Number of health sensors are interfaced with the mirror which measures heart rate, oxygen level and temperature of the user and alerts the user if it is not in the normal range. Motion sensor is used which activates the mirror display from sleeping mode when a user appears in front of the mirror. All the information is displayed on the LED screen connected with the raspberry pi.

### V. BLOCK DIAGRAM

In the above block diagram, Arduino Uno and Raspberry pi 3B+ are connected various other devices. They are used to reduce the complexity of the circuit. At the input side we have the pulse oximeter heart rate sensor, temperature sensor, PIR sensor, ESP32 camera, microphone and external power. The pulse sensor is used to check the pulse rate and heart rate of the user. The temperature sensor gives the temperature of the individual. We also have a microphone which is used for google voice assistant. We also have a Pir sensor which is used to detect the motion of a person. At the output we have the news, weather, time, calendar display on the monitor whenever the mirror is on.



We also have sensors output and also security alert at the output along with audio and video output. The ESP32 camera is used for security purpose. The camera captures the image of an unknown person and is sent to the owner's mail Id.

### VI CONCLUSION

The smart mirror thus can be implemented which displays the basic information like date, time, weather forecast and updated current news. The google assistant with user interaction will be implemented along with you-tube. The health sensors will be useful in monitoring the user's health on a regular basic. In the future home automation can be done effectively by including various parameters.

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