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PROJECT ON

"AI SMART MIRROR USING RASPBERRY PI 3B+ "

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AI SMART MIRROR USING RASPBERRY PI 3B+
PROJECT SYNOPSIS

ABSTRACT

The AI Smart Mirror is a project that combines the functionality of a traditional mirror with the intelligence of artificial intelligence. The project uses a Raspberry Pi 3B, a two-way mirror, a display, a camera, and various sensors to create a smart mirror that can display information, provide assistance, and improve everyday routines. The mirror can display the time, weather, news, and other personalized information. It can also provide assistance through voice commands, facial recognition, and gesture recognition. The project can be used in homes, offices, and public spaces. The smart mirror is a system that functions as a mirror with additional ability of displaying date, time, weather, daily news and also other needy information. The user can interact with the mirror by giving commands by the user. This mirror will help in developing smart house and provide unique environment to the users. To make this more interesting mirror, we can develop our products to include a variety of controls, as well as music and other entertainment.

INTRODUCTION

In today's world, everyone needs a comfort quality life and they are always ready to access the information easily with wireless connected device that are being used in various day to day activities. The smart mirror is the moderation over the regular household mirror with associated smart digital devices and raspberry pi which provide advance functionality such as time, calendar, weather of the city, updates of news and headlines.

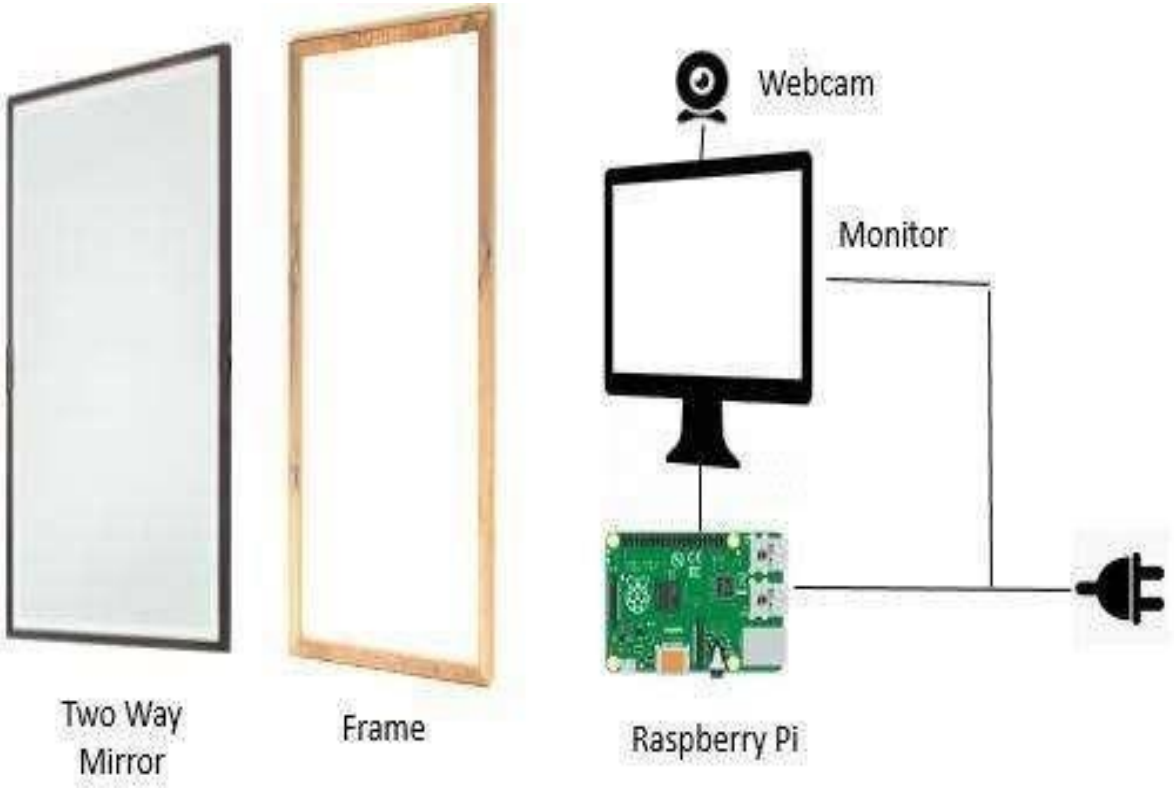
A common approach for building the smart mirror is to consist of high quality glass, LCD monitor, a wooden frame to hold the glass and monitor and motion sensor to detect the person in front of mirror. This paper will discuss design of Smart Mirror. The smart mirror is also providing voice service system will analyses commands from users and displaying accordingly.

In this paper, this study was proposed to design of a device called "Smart Mirror" which aimed to provide people with an easy way to access information with minimum effort. It will run on the interface of a mirror and provide productive information such as weather forecast, clock, and news feed and so on. The mirror will have artificial intelligence and thus will be able to interact with people in real time. It will be intelligent enough to recognize face and voice of a person and thus will be able to identify users. People will be able to retrieve data from internet by interacting with the mirror directly. The mirror will solve the problems that many people experience every day, getting information without distraction. Before going to bed, the user may want to know whether it will be rain in the next morning so that they can plan their commute. Thus, for every little chore like this, mirror will be able to provide solution and make the life of people comfortable by connecting to huge information.

OBJECTIVES

The objectives of the project are:

- To create an AI smart mirror using a Raspberry Pi 3B.
- To display information such as time, weather, news, and other personalized information on the mirror.
- To provide assistance through voice commands, facial recognition, and gesture recognition.
- To improve everyday routines by providing relevant information and assistance.
- To make the mirror useful in homes, offices, and public spaces.



REQUIREMENTS

HARDWARE REQUIREMENTS

- Raspberry Pi
- Webcam
- LCD Screen
- Two-way Mirror
- Microphone
- Motion sensor (PIR sensor)

SOFTWARE REQUIREMENTS

- Raspbian OS
- NodeJS
- Anaconda Distribution

METHODOLOGY

The AI Smart Mirror will be created using the following components:

1. Raspberry Pi 3B: The Raspberry Pi will act as the brain of the mirror, controlling all the sensors and displaying the information on the mirror.

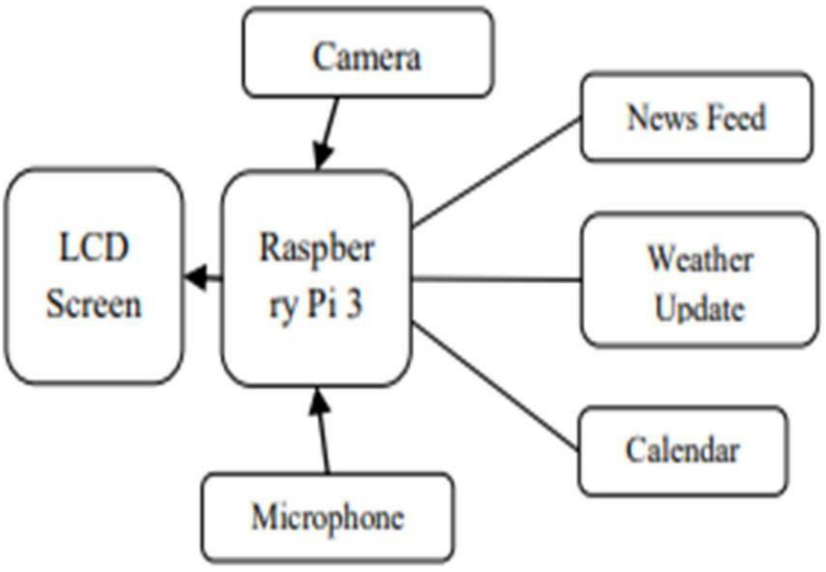
2. Two-way mirror: The two-way mirror will be used to create the illusion of a regular mirror while still allowing the display to show through.

3. Display: The display will be placed behind the two-way mirror and will be used to display the information.

4. Camera: The camera will be used for facial recognition and gesture recognition.

5. Sensors: Various sensors such as temperature, humidity, and motion sensors will be used to gather information about the environment.

6. The software for the AI Smart Mirror will be developed using Python and various libraries such as OpenCV, Tensor Flow, and Speech Recognition. The software will be responsible for facial recognition, gesture recognition, voice commands, and displaying the information on the mirror.



DESIGN

1. Gather the necessary materials: In addition to the Raspberry Pi 3B, you will need a monitor or touchscreen, a two-way mirror, a frame for the mirror, and various sensors and modules, such as a camera, microphone, and speaker.

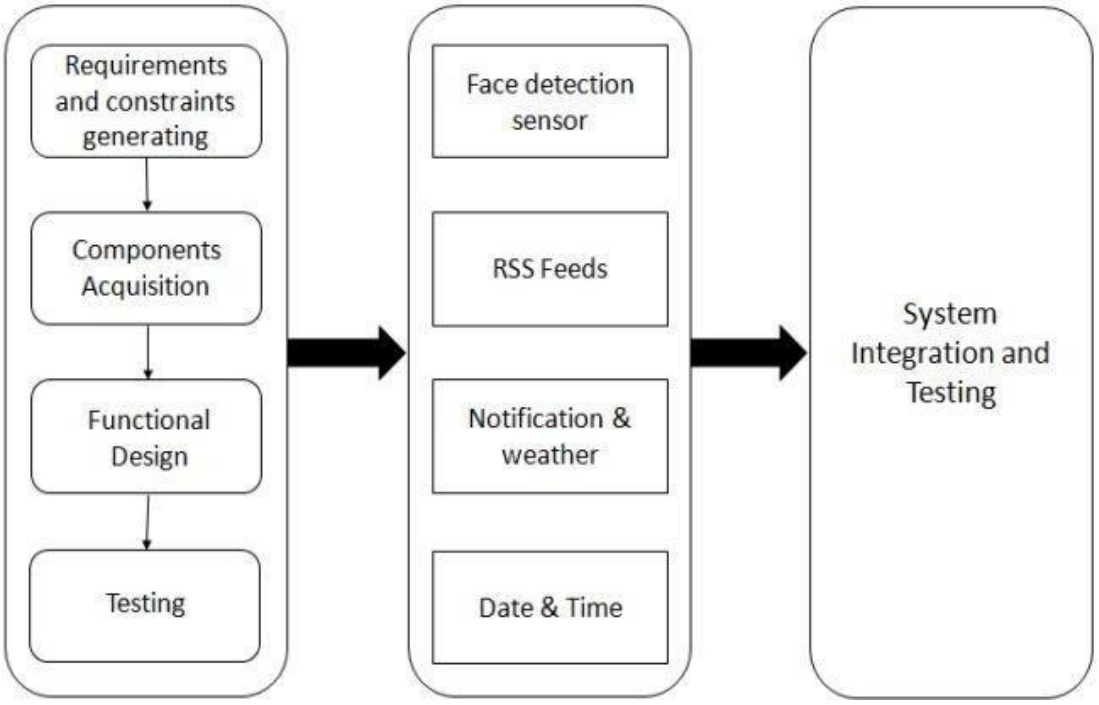
2. Install the operating system: You will need to install an operating system on the Raspberry Pi, such as Raspbian, which is a popular OS for the Pi.

3. Set up the mirror: The two-way mirror will be placed in front of the monitor or touchscreen to create the mirror effect. You can use a frame to hold the mirror and monitor in place.

4. Install the AI software: You can use open-source AI software, such as TensorFlow, to create the AI capabilities of the mirror. You will need to train the AI model to recognize various gestures and voice commands.

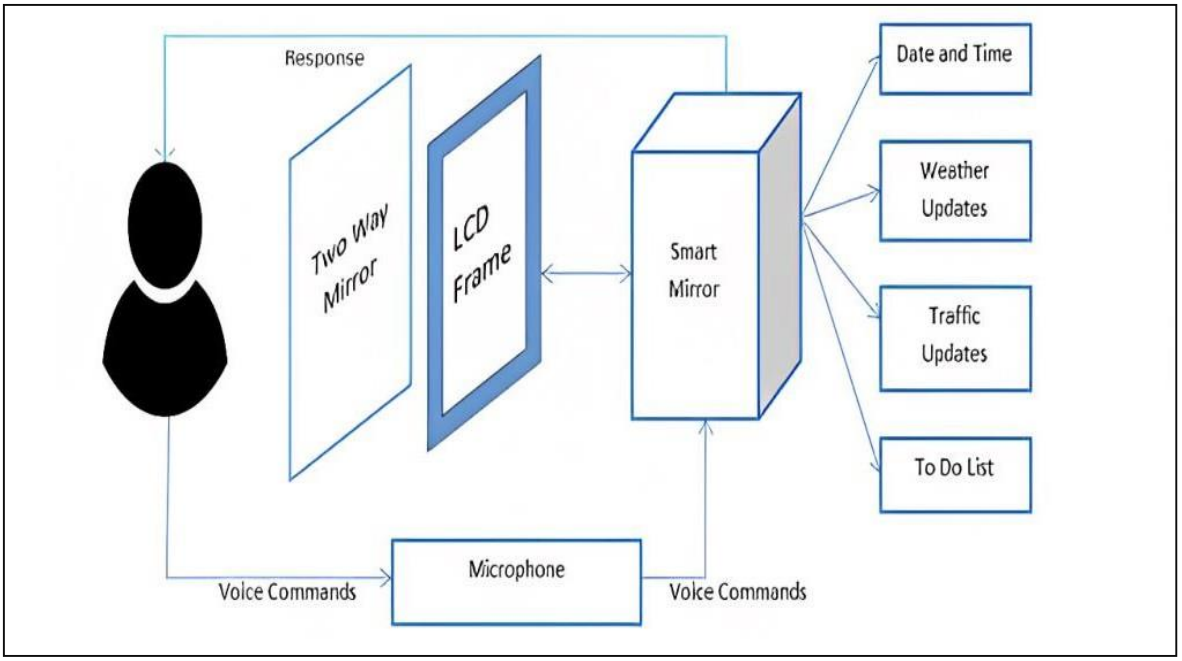
5. Connect the sensors and modules: You will need to connect the camera, microphone, and speaker to the Raspberry Pi and configure them to work with the AI software.

6. Test and refine: Once everything is set up, you can test the mirror and refine the AI model to improve its accuracy and responsiveness.



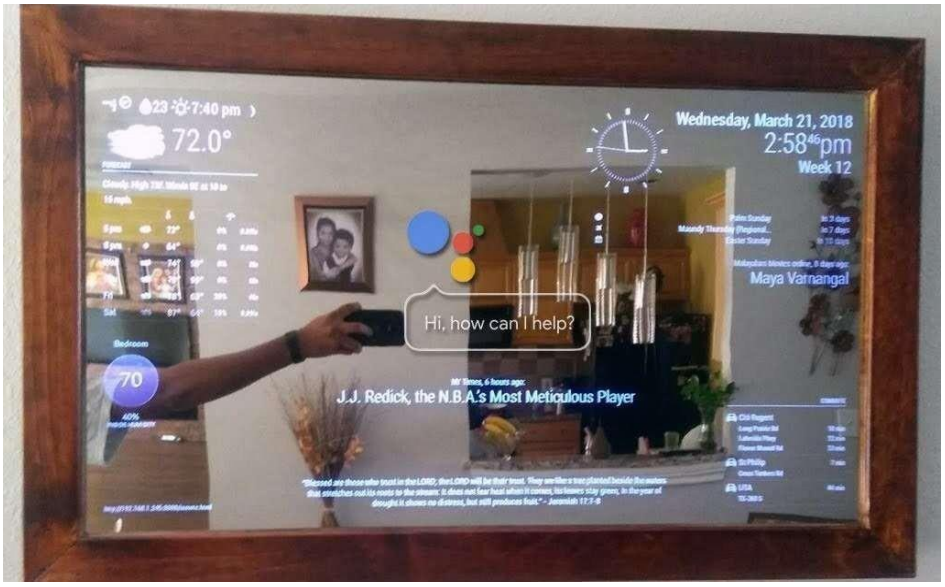
The System design of Smart mirror is shown in above figure. The Smart mirror system mainly consist of three parts a two-way mirror, LCD monitor and Raspberry pi. The two-way mirror is the mirror which is reflective on one side and transparent on the other side. There will be a webcam behind the transparent side so that it can capture and identify faces for security purpose. The LCD monitor is used for displaying different widgets on the mirror. The LCD monitor will be connected to the Raspberry pi. The Raspberry pi will be used for programming of different widgets using Python language. The Smart mirror will be switched on using a voice command such as "Hello Mirror!", "Good morning mirror" or any other keyword. The Smart mirror will also give voice as well as text response like greeting the user or give some compliment as response, for which the system will use system compatible microphone and speaker. The process will be firstly programming will be done for displaying images which will be displayed on LCD monitor and user will be able to see those widgets on the mirror when the Smart mirror is switched on using the keyword. The Smart mirror will also display some personal basic information only by recognizing the user's face.

LCD is placed at the backend of the mirror. This LCD is connected to the Raspberry Pi, which is interfaced with STM32 microcontrollers to access information. Camera, microphones are used as external inputs and speakers to access the output command, where the text is converted to speech with the help of a speech synthesis module.



EXPECTED OUTCOME

The smart mirror will display the daily news feed and provides other general information like time, date, weather forecasting as shown in figure. The figure shows the expected result of our project. The motion sensor will be in top of the mirror. The algorithms and functions are set by the Python programming and according to that displays the information.



CONCLUSION

Our Smart Mirror will give instant access to relevant information in a convenient and time saving environment. The smart mirror system is interactive system for home and reliable. The user stay updated on the time, weather and news headlines while getting ready for the day with the full functional Smart mirror. We can reduce the power consumption by utilizing the motion sensor, since the mirror will display data only in the presence of a person in front of mirror. In future this smart mirror project can be improved by adding interactive touch screen and some other feature like traffic updates, flight updates, etc. to make it more efficient. The mirror will provide the information with little to no effort from the user command. The smart mirror can also be implemented in office, industries and home automation. The facial recognition technique used in the smart mirror.