

Department of Technical Education

Capstone project

Execution Document

Capstone project Name: AI Smart Mirror Using Raspberry PI 3B+

Capstone project Members: Manju Shree Yadav D
Purushothama K
Shashank V
Gowrish HB

Design:

The AI Smart Mirror system comprises several components, including a Raspberry PI 3B+ microcontroller, a two-way mirror, a high-resolution display, a camera, a speaker, a microphone, and various sensors. The system is designed to provide users with an interactive mirror that can display information such as time, weather, news, and calendar events, as well as respond to voice commands and gestures.

The system design requires the development of a custom software program that will process user inputs, display information on the mirror, and interact with the various hardware components.

Description of Technology Used:

The following hardware devices will be used in the project:

1. Raspberry PI 3B+ microcontroller
2. Two-way mirror
3. High-resolution display
4. Camera
5. Speaker
6. Microphone
7. Various sensors

The following software products will be used in the project:

1. Raspbian operating system
2. Python programming language
3. OpenCV library for image processing
4. TensorFlow library for machine learning
5. Google Cloud Platform for natural language processing

Fabrication:

The two-way mirror will be mounted in a frame with the high-resolution display behind it. The Raspberry PI 3B+ microcontroller, camera, speaker, microphone, and sensors will be connected to the system through various ports on the microcontroller.

Testing and validation:

The system will be tested and validated using a combination of laboratory experiments, computer programming, simulations, and analysis. The software program will be developed and tested on the Raspberry PI 3B+ microcontroller, with various inputs and outputs monitored to ensure the system is functioning as intended. Natural language processing algorithms will be developed and tested using Google Cloud Platform.

Step-by-Step Execution:

Hardware Setup

- a. Connect the Raspberry Pi to the LCD screen, camera, speaker, and microphone.
- b. Install the Wi-Fi module and connect the Raspberry Pi to the internet.
- c. Mount the two-way mirror or acrylic sheet onto the mirror frame.
- d. Attach the LCD screen to the back of the mirror.
- e. Connect the Raspberry Pi to the power supply.

Software Setup

- a. Install the Raspbian operating system on the Raspberry Pi.
- b. Install the AI assistant on the Raspberry Pi.
- c. Write the code for the smart mirror using programming languages such as Python and Java.
- d. Configure the camera to recognize faces and provide personalized greetings.
- e. Integrate the AI assistant software with the smart mirror code.

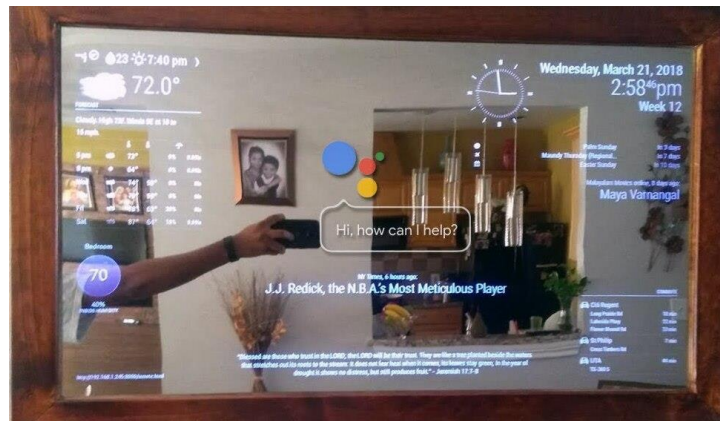
Testing and Debugging

- a. Test the smart mirror with AI for basic functionality such as displaying weather updates and news headlines.
- b. Test the face recognition feature and personalized greetings.
- c. Test the integration of the AI assistant software with the smart mirror code.
- d. Debug any issues that arise during testing.

Finalization and Deployment

- a. Install the smart mirror with AI in a suitable location such as a bathroom or bedroom.
- b. Test the smart mirror with AI in its deployment environment.
- c. Make any final adjustments to the code or hardware as necessary.
- d. Deploy the smart mirror with AI for regular use.

Results and inference:



The AI Smart Mirror system will provide users with an interactive mirror that can display information and respond to voice commands and gestures. The system will be able to recognize users through facial recognition technology and personalize the displayed information based on their preferences. The system will also be able to interact with various home automation systems, such as controlling smart lights and thermostats. The successful completion of the project will demonstrate the capabilities of the Raspberry PI 3B+ microcontroller and various software libraries for developing intelligent systems.

Date:

Signature of the student

Signature of the cohort owner