SMART MACHINE SYSTEM FOR VIRTUALLY IMPAIRED PEOPLE

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Abstract – *The authentication process will be done to unlock the magnetic door using face detection algorithm. The two algorithm used are LBP, HAAR cascade algorithm. If the face is unmatched then the image of the unauthorized person will be sent to a mail. After entering, all the home appliances will be controlled by his/her voice command. Also he/she can manage the magnetic door (lock /unlock) using the button. If there is any abnormalities like increase in temperature and pressure the buzzer will make an alert sound.*

Key Words: Face detection, Alert mail, Voice recognition, Buzzer, Sensor.

1. INTRODUCTION

This system covers the need for blind people, they are facing more problems and difficulties in their daily routine and this system will give the solution relatively based on security management system.

1.1 Face Authentication

In this system if there is any motion in front of the sensor it will turn on the camera. The camera will immediately start capturing the image. In smart machine system we have already saved the recognized image of the authorized person in system data base. The capturing image will be compared with the image that is present in the database.

If the image got matched then the door will be opened automatically or else the captured image of the unauthorized person will be sent to the guardian's mail id. Additionally the authorized person can operate magnetic lock that is the person can lock and unlock the door while he/she is inside the home by using the button.

1.2 Device Control

After the successful completion of face authentication process the person will enter into the home. Now he/she can operate home appliances by the voice command. Once the voice command is recognized by the system, then the system will stimulates the relay and perform the operation(on/off) voice command.

1.3 Sound Alert

If there any abnormalities like increase in temperature and pressure, the buzzer will make an alert sound. The range of the temperature and the pressure will be fixed as per our convenience.

2. PROPOSED SYSTEM

In this proposed method face recognition based home security and also monitoring system using ARM11 Processor. This Project implement to all the home members face image are stored in database, so easily identify the authorized user or not in the system. And also sensors are used to monitor the home status. If any unknown person is detected, the unknown person image is send to the mail.

3. ARCHITECTURE DIAGRAM
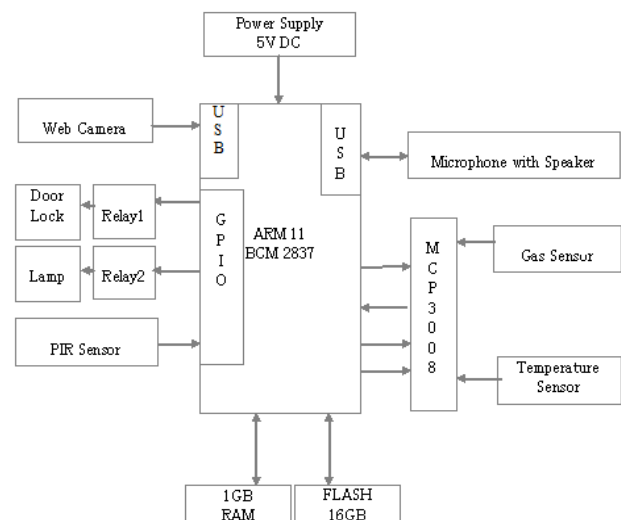
This system implemented in the smart home security using ARM11 processor . PIR sensor is used to any motion is detected camera and microphone is enabled to the microprocessor. At the same time camera is detecting the face and recognize the face is authorized or not if the face is not authenticated suddenly capture the picture and send to the mail. If anyone is authorized door is unlocked. At the same time sensors will monitor temperature and pressure, if the temperature or pressure increases the alarm will produces alert sound. Microphone is used to control the voice command. The relay will manage the appliances (on/off).

4. HARDWARE REQUIREMENTS

4.1 Raspberry pi

Raspberry pi is a credit card sized computer and is to create a low cost device that would improve programming skills and hardware understanding at the pre-university level. Credit card sized computer that plug in to TV and standard pc keyboard. It cost between \$5 and \$35. It is available anywhere in the world, and can function as a proper desktop computer or be used to build smart devices.
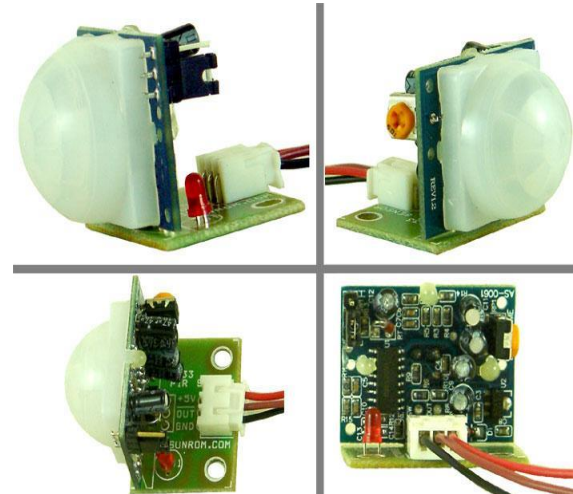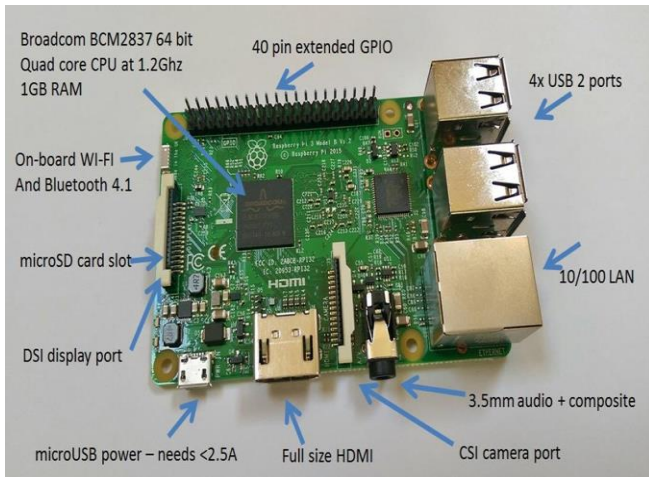
4.2 Web Camera

Webcam is a video camera that can capture images continuously. The image capturing process can be viewed in the monitor. The captured image can be stored in the system and used for future use like sending image, comparing image and so on.

4.3 Microphone

It is used to get the voice command. It is a transducer. It will convert the sound waves into electrical signal which is used in many applications like telephone, sound recording, speech recognition ect.,


4.4 PIR Sensor

PIR stands for passive infrared sensor. It is electronic sensor. It is used to detect human beings within the range. It ranges from 5m to 12m. It can detect the human being around it and produce the output. PIR will be triggered by the motions. It's output can be used in many applications like door opening, smart homes, VCDs, DVD players, ect.,

4.4 MCP3008

EMCP3008 is an ADC, which is analog to digital converter. It has 10 bit 8-channel analog to digital converter (ADC). It is easy to connect and cost efficient. It will not need any additional components. It uses SPI bus protocol which is supported by pi's GPIO header.
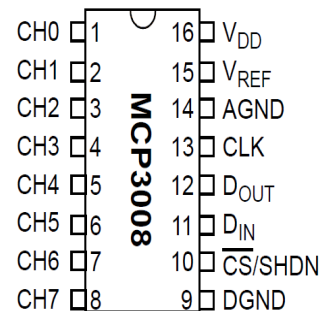
5. SOFTWARE REQUIREMENTS

5.1 LBP Algorithm

LBP stands for Local Binary Pattern. The LBP input image is converted into gray scale image, we are going to apply the threshold value to the gray scale image and then it will be converted in to binary image. This is the process of LBP algorithm. The LBP operator can be seen as approach like statistical and structural models to identify the texture analysis and it is used in various applications. The most important of LBP operator is perhaps in real world application, Example illumination variations. Another important property is computational simplicity, which possible to analyze images in challenging real time settings.
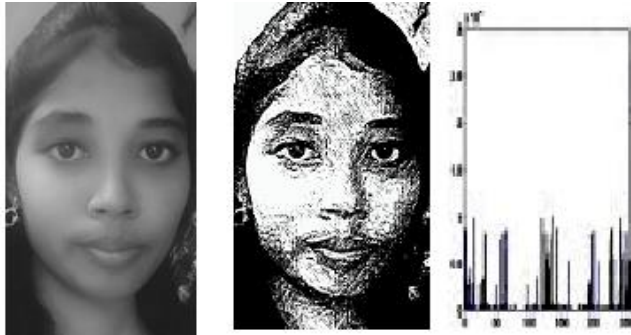
INPUT IMAGE   LBP IMAGE   LBP HISTOGRAPH

5.2 HAAR cascade Algorithm

HAAR cascade algorithm is a face detection method, to detect the face in the image. This algorithm consists of four methods. They are knowledge-based method, feature-invariant method, template matching method and appearance based method.

1. Knowledge-based method: It is also a rule-based method that encodes our knowledge of human faces using different rules.

2. Feature- invariant method: This algorithm to find invariant feature of a face despite its angle or position.

3. Template matching method: This algorithm compares the input image with stored pattern of face or features.

4. Appearance based method: A template matching method whose pattern databases learning from a set of the images.
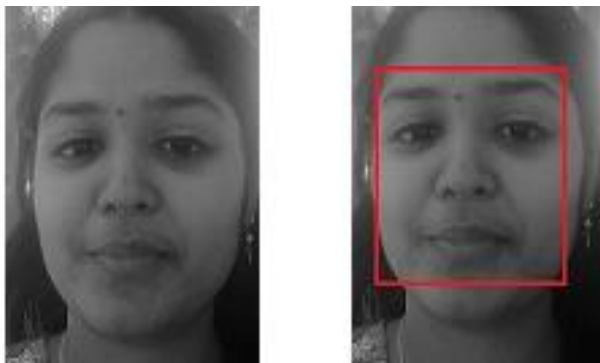
6. CONCLUSION

Though this system is significantly useful for blind people, it has its own limitations. The command should be very clear else the system will get confused and the operation will be failed or command may be mismatched. On scanning face some time mismatch can takes place. Hence iris Scanning can be done for more efficient output. In future the enhanced voice recognition and more efficient iris scan will be used for the greater performance of the systems.

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