MODERN ATTENDANCE SYSTEM USING RASPBERRY PI

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ABSTRACT

This project deals with face detection for an attendance recorder system for the purpose of maintaining attendance details of the students. Students faces are pre stored in class databases. Raspberry pi camera capture the student face and compared to database image if it is matched means that student attendance register with time. The absentees faces will be send to the authorized mail id.

The Raspberry Pi is a credit card sized single computer or SoC uses ARM1176JZF-S core. System on a Chip is a method of placing all necessary electronics for running a computer on a single chip. Raspberry Pi needs an Operating system to start up. In the aim of cost reduction, the Raspberry Pi omits any on-board non-volatile memory used to store the boot loaders, Linux Kernels and file systems as seen in more traditional embedded systems. Rather, a SD/MMC card slot is provided for this purpose. After boot load, as per the application program Raspberry Pi will get execute.

Key words: Soc, Raspberry, Attendance system

INTRODUCTION

Taking attendance in a class or in a organization is very important. Maintain those attendance plays a crucial role for an institution or an organization. Important thing is how to take Attendance. Conventional way of taking attendance in schools is by calling of names by teacher, students responding on their roll numbers and putting 'A' or 'P' on log book accordingly. Other methods of taking attendance are RFID cards, biometric identifiers like fingerprint, face recognition, palm print, hand geometry, iris recognition etc. But conventional method looks better as it is cheaper and more reliable as observer is human being itself.

Biometric recognition has the potential to become an irreplaceable part of many identification systems used for evaluating the performance of those people working within the organization. Although biometric technologies are being applied in many fields it has not yet delivered its promise of guaranteeing automatic human recognition. Face recognition is a technique of biometric recognition. It is considered to be one of the most successful applications of image analysis and processing; that is the main reason behind the great attention it has been given in the past several years.

BLOCK DIAGRAM

Raspberry pi is a small size computer which can be used with more applications. The processor at the heart of the Raspberry Pi system is a Broadcom BCM2835 system-on-chip (SoC) multimedia processor. This means that the vast majority of the

system's components, including its central and graphics processing units along with the audio and communications hardware, are built onto that single component hidden beneath the 256 MB memory chip at the centre of the board. The ARM-based BCM2835 is the secret of how the Raspberry Pi is able to operate on just the 5V 1A power supply provided by the onboard micro-USB port. It's also the reason why you won't find any heat-sinks on the device: the chip's low power draw directly translates into very little waste heat, even during complicated processing tasks.

If you're using the Raspberry Pi's HDMI port, audio is simple: when properly configured, the HDMI port carries both the video signal and a digital audio signal. This means that you can connect a single cable to your display device to enjoy both sound and pictures.

To prepare a blank SD card for use with the Raspberry Pi, you'll need to flash an operating system onto the card. While this is slightly more complicated than simply dragging and dropping files onto the card, it shouldn't take more than a few minutes to complete.

Although no current models of the Raspberry Pi include Wi-Fi networking hardware onboard, it's possible to add wireless
Connectivity with a simple USB Wi-Fi adapter. However, you will need to configure the adapter before you can use it to get your
Pi online.

Here the raspberry pi is connected with the Raspberry pi camera, personal computer and GSM. The multi tasking raspberry pi use with an MATLAB platform for the image processing to find the attendance system. So that the final result of the attendance will be sent to the particular mail id and to a authorized person mobile no. The SD card is used to store the database of the class students. Similar images of same student of nearly ten will be stored in the database. In order to get exact image as a output. This will be done for every student in the class.
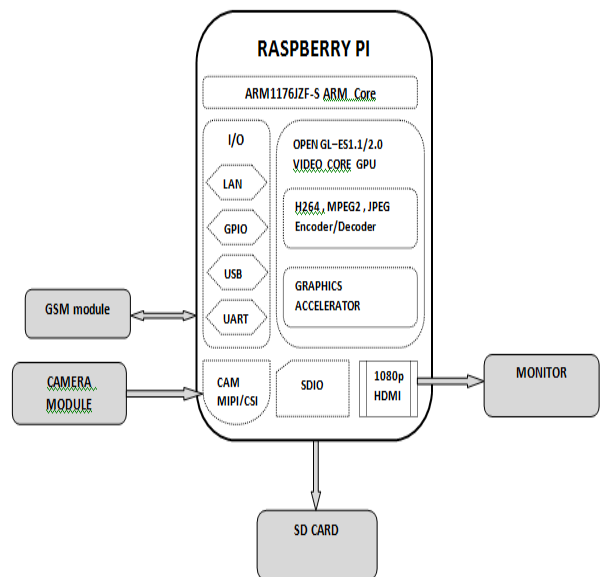

Figure: BLOCK DIAGRAM

STUDENT ENROLLMENT:-

We are going to maintain person details in the database which includes information like Branch, SEM, Name, ID number etc. and we also store the image of many persons in the database for further process. These unique features are then stored in the

face database with certain id of that person. At the time of enrollment templates of face images of individual students are stored in the database. This will be help us to five the details of a person when his face is detected and recognized in given group image. In case person face in the group image is not stored in the databases then it will gives an error message like "this person details is not stored in the database"

FLOW CHART

The image taken by the cam is a colour image. Processing on the colour is difecult so that the image is converted to a gray scale image. That is of 256 values. For the elimination of noise histogram is calculated. From that noise removed image face will be detected individually. The images of students in the class room are stored in the database before the process is started. So that the face detected images are correlated with the images in the database. If ever ther is any image not be matched by the captured image those images will be send to a perticular mail id. Also the small message will be send by using the GSM module to a authorized person.
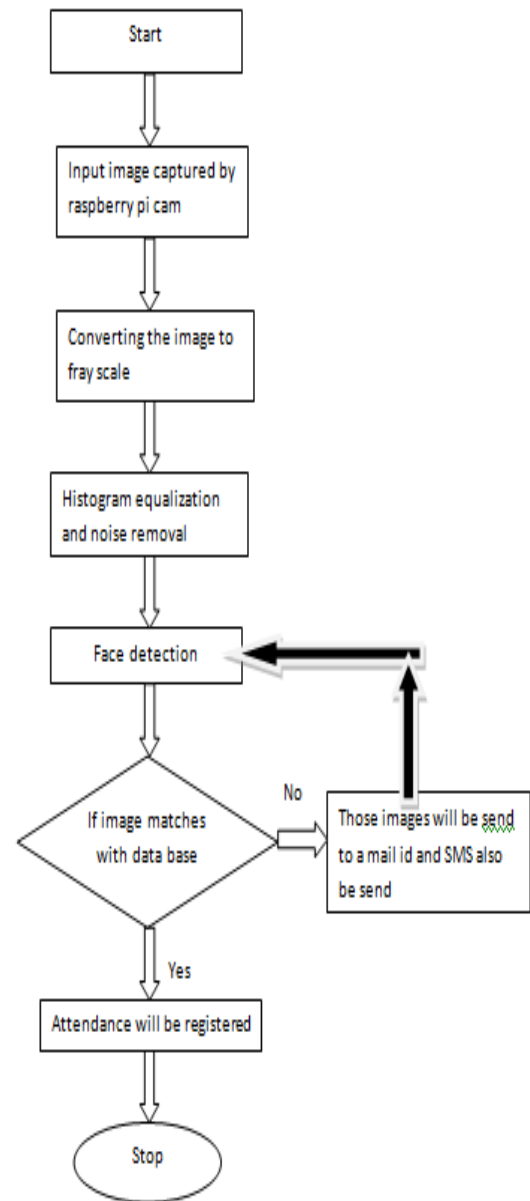

IMAGE ACQUISTION:-

Image is acquired from a high definition camera that is connected above the white board. This camera is connected to the computer. It captures images and sends these images to the computer for processing.

Input image

UPGRADE CONTRST:-

In this stage we converty RGB image into binary image. For this process, we calculate the average value of RGB for each pixel and if the average value is below than 110, we replace it by black pixel and pther wise we replace it by white pixel. By his method, we get a binary image from RGB image.

Histogram Equalized image

Histogram normalization is good technique for constrast enhancement in the spatial domain. This can be easily seen that the students sitting on the black rows are now clearly seen and in this way they can be easily recognized.

NOSIE FILTERING:-

Manay sources of noise may exist in the input image when captured from the camera. There are many techniques for noise removal. In our system median filtering in is used for the purpose of noise removal in the histogram normalized image.

FACE DETECTION:-

Face detection was tested on varity of images with different face positions and lighting conditions and then was applied to detect faces in real time viedo.

Face Detection

After the detection of faces from the images next step is cropping of each detected face. Each cropped image is assigned to a separate for the recognition purposes.

Cropped Faces

HARDWARE:-

- Raspberry pi
- Camera
- Monitor
- USB adaptors
- SD card

Communication between a computer and a GSM-GPRS system. Global System for mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232,USB, etc) for computer.

GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.

2. Read, add, search phonebook entries of the SIM.

3. Make, Receive, or reject a voice call.

 The MODEM needs AT commands, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command. Different AT commands supported by the MODEM can be sent by the processor/controller/computer to interact with the GSM and GPRS cellular network.

SOFTWARE:-

➤ Wheezy Raspian

➤ opencv

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run.

Raspbian is an unofficial port of Debian wheezy armhf with compilation settings adjusted to produce code that uses "hardware floating point", the "hard float" ABI and will run on the Raspberry Pi.
The port is necessary because the official Debian wheezy armhf release is compatible only with versions of the ARM architecture later than the one used on the Raspberry Pi (ARMv7-A CPUs and higher, vs the Raspberry Pi's ARMv6 CPU).

The Debian squeeze image issued by the Raspberry Pi foundation was based on Debian armel which uses software floating point and the "soft float" ABI. The foundation used the existing Debian port for less capable ARM devices. Therefore, it did not use of the Pi's processor's floating point hardware - reducing the Pi's performance during floating point intensive applications - or the advanced instructions of the ARMv6 CPU.

CONCLUSION:-

This paper introduces the efficient and accurate method of attendance in the classroom environment that can replace the old manual method. This method is secure enough, reliable and available for installing the system in the classroom. It can be constructed using a camera

and computer. There is a need to use some techniques that can recognized the faces in veil to improve the system performance.

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