
Lecture Access and Faculty Attendance System

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Abstract

Real-Time interactive classroom always plays an indispensable role in distance learning, where teachers and students located in different places can take part in the class through certain multimedia communication systems and obtain real-time and media rich interactions using pervasive computing technologies. The aim of this project is to record voice and transferring it through short-range wireless networks like Bluetooth and Wi-Fi network. The application is designed to receive audio streams from Bluetooth microphone and to store them in central database for future access using Ethernet. And the attendance of the staff is maintained in separate database maintained in server, along with the information of in-time and out-time.

1. Introduction

In recent years, learning has increasingly become one of the important applications on the internet and is being talked and studied by various universities, institutes and companies. The Internet provides relatively easy ways to prepare and issue hyper-linked multimedia content for more audiences. In most cases the teacher's live instruction is very important for the attention and interest of the students. Most presently deployed real-time Tele-education systems are desktop-based, in which the teacher's knowledge is totally different from teaching in a real classroom. The aim of Smart Classroom project is to narrow the gap between the teacher's experience in Tele education and that in the traditional

Classroom education, by means of integrating these two currently separated education environments together. The lecture recording system is vital for any institute which wants to use latest technologies to teach, share knowledge and get global exposure.

These audio files can be published over the internet for resource and knowledge sharing between various universities and also for student learners. The authorized users can access these information's from the central database. This system can be used by primary schools, colleges, universities, research institutes and corporate to record their day-to-day lectures, guest lectures, meetings and conferences.

The rest of this paper is structured as follows; the next section explains the design considerations and working of the project. Finally some outputs and conclusions are presented.

2. System Description

This system contain raspberry pi 2 model B module, finger print module, Bluetooth headset, Bluetooth dongle, Ethernet connections. The block diagram [Fig.1] shows the working of this project. Software used is raspbian OS which is free downloadable from the internet.

2.1. Hardware

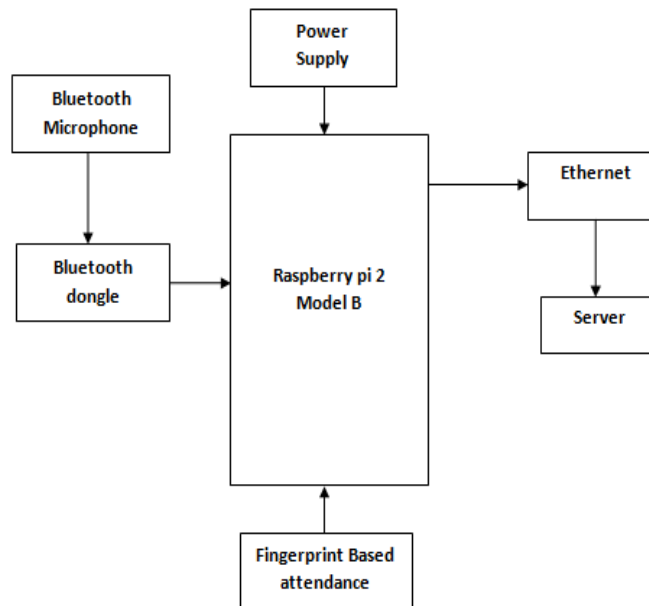


Fig.1: Block Diagram

2.1.1. Fingerprint Module

Fingerprint working includes two parts, fingerprint enrollment and fingerprint matching. When enrolling user needs to enter the finger two times. The system will process the two times finger image generate a template of the finger based on processing result and store the template. Matching uses enter the finger through optical sensors and system will generate a template of the finger and compare it with templates of the finger library. When using this method the staff's attendance is stored in server through raspberry pi.

2.1.2. Raspberry Pi Module

Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core Processor that runs at 900MHz. The board also features an increase in memory capacity to 1Gbyte.it contains 10/100 Base-T Ethernet socket which is used for data transmission across LANs, HDMI (rev 1.3 & 1.4) for interfacing multimedia devices like displays, 3.5mm jack for audio transmission, HDMI 4 x USB 2.0 Connector for data transmission,40-pin header with 2x20 strip Providing 27 GPIO pins as well as +3.3 V, +5 V and GND supply lines and 15-pin MIPI Camera Serial Interface (CSI-2).The raspberry pi module operates on raspbian OS, Which is installed in the micro SD card and the programs can be written in the same.

2.1.3. Bluetooth

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs).

Microphone

A Wireless Microphone is microphone without a physical cable connecting it directly to the sound recording or amplifying equipment with which it is associated. Also Known as a radio microphone, it has a small, battery powered radio transmitter in the microphone body, which

transmits the audio signal from the microphone by radio waves to a nearby receiver unit, which recovers the audio.

Bluetooth Dongle

Bluetooth dongle is a electronic device that transfer the data between two device using Bluetooth technology.it consist of transmitter and receiver in a single device. It is interfaced to the raspberry pi module through USB port. When staff's taking lectures the receiver receives the audio and transmits it to the raspberry pi.

2.1.4. Ethernet

Ethernet has been a relatively inexpensive, reasonably fast, and very popular LAN technology for several decades. Ethernet LAN typically uses coaxial cable or special grades of twisted pair wires. The most commonly installed Ethernet systems are called 10BASE-T and provide transmission speeds up to 10 Mbps Fast Ethernet or 100BASE-T provides transmission speeds up to 100 megabits per second.

2.2. Software

For Capability of gathering audio from an USB microphone and transmit to another remote computer in real time we need to configure microphone and also connect to the Raspberry Pi from remote PC using SSH(Secure SHell).But before that Raspberry Pi needs to be prepared with the required OS and software packages. Then Connection of the Raspberry Pi to the laptop with a Ethernet cable needs to be done to View the Raspberry Pi desktop on remote pc using PuTTY[4]. At last for recording and playing voice from Raspberry Pi Configuration of the USB microphone, Wi-Fi connection and a GUI is desired.

2.2.1. Installation of the “Raspbian” Os on the Raspberry Pi Module

Raspbian is a Debian-derived free OS optimized for the Raspberry Pi hardware. Raspbian uses a Linux kernel also popular as the Debian GNU/Linux distribution. It comes with over 35,000 packages and pre-compiled software bundled in a format that is easy for installation on the Raspberry Pi. The “raspbian.Zip” file can be downloaded from Raspberry Pi’s official website. To extract the OS image file into the SD memory card, an image writer application “win32diskimager-v0.9-binary”[5] can be used. This software is used to write a raw disk image to a removable memory device. It is a freeware and the program for it is open source. It has been proved useful for embedded development as the source code can be branched and modified as per the requirement. After writing to SD card is finished, it is put in the SD card slot of Raspberry Pi and switch it on so that initial booting can start.

2.2.2 Geany

Geany is a lightweight GUI text editor using Scintilla and GTK+ including basic IDE features. It is designed to have short load times, with limited dependency on separate packages or external libraries on Linux. It has been ported to a wide range of operating systems, such as BSD, Linux, Mac OS X, Solaris and Windows. Among the supported programming languages and markuptlanguages are C, C++, C#, Java, JavaScript, PHP, HTML, LaTeX, CSS , Python, Perl, Ruby, Pascal, Haskell, Erlang, Vala and many others.

3. Working

Here in this project we have tried to automate a classroom attendance procedure by using fingerprint recognition module interfaced with raspberry pi. A fingerprint recognition system can be used for both verification and identification. In verification the system compares an

input fingerprint to the “enrolled” fingerprint of a specific fingerprint with the prints of all enrolled user in the person is already known under a duplicate or false identity. The attendance system is used to monitor the attendance and movement of staff’s within their working hours and to prepare materials for processing wages. This report also involves the product based design of a attendance system and has tried to make the hardware a marketable portable.

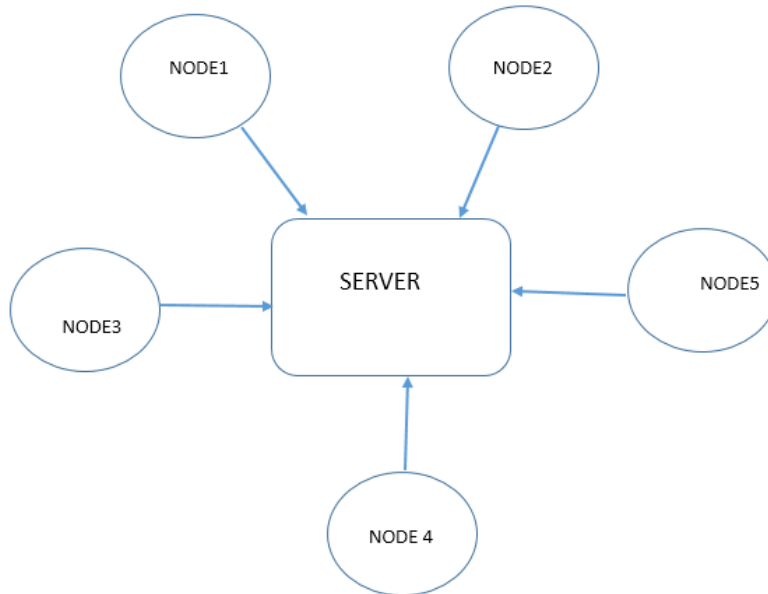


Fig 2: Nodal diagram

The Fig 2 shows the nodal diagram. Each node is a hardware which is placed in each class. Each node sends the recorded lectures and attendance details to server. The server is connected to the nodes via Ethernet. Data from each class is saved in server. The server and nodes are connected in star topology as the data are transferred from various nodes to common server, and some announcements can be made from server to all the nodes commonly.

Advantages

- The lectures can be accessed at any time
- The management can monitor the performance and effective lecture delivery of each staff.
- The lecture timing can be recorded.
- Announcements can be made.
- Institute can sell the lectures as a course.
- Reduced cost.

Conclusion

Staff monitoring system using raspberry pi is presented in this paper. Using this system it is possible to track all the activities of staff’s. It is also know management behavior of staff’s according to their activities.

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