

IoT based Smart Attendance and Device's Monitoring

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Abstract - The IoT Internet of Things enables the world become faster, cheaper, better and more integrated together the system we have illustrate a system which monitors the student lab attendance and a system to monitors the devices which they are using in lab as there are certain cases of misplacing of devices in educational organizations the data is fetched in real time information and exchange to the internet this also notifies by means of SMS or Call function to higher authorities of the organization both the This system will reduce the man power and time and it is easy to use in daily life.

Key Words: IoT (Internet of Things), esp8266, Wi-Fi Module, HC SR-04 Ultra Distance Sensor.

1. INTRODUCTION

The common problem in educational organizations is to take and to maintain the attendance many of times error happens as we are humans wastage of papers and also time consuming if the attendance register gets lost or due to some reason if it gets destroyed then it gets very stressful to manage using of this system it gets easy to manage the records, a problem also appears from colleges device gets stolen from practical rooms. Our illustrated system resolves these problems by using the means of IoT.

2. SYSTEM REQUIREMENT

Software and Hardware requirements of system

2.1 SOFTWARE REQUIREMENT

1) Arduino IDE:

Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module. It is easily available for operating systems like MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment. It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process. A range of Arduino modules available

including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more. Each of them contains a microcontroller on the board that is programmed and accepts the information in the form of code. The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module. This environment supports both C and C++ languages.

2) Sublime Text 3:

Sublime Text Editor is a full featured Text editor for editing local files or a code base. It includes various features for editing code base which helps developers to keep track of changes. Various features that are supported by Sublime are as follows: Syntax Highlight, Auto Indentation, File Type Recognition, Sidebar with files of mentioned directory, Macros, Plug-in and Packages Sublime Text editor is used as an Integrated Development Editor (IDE) like Visual Studio code and NetBeans. The current version of Sublime Text editor is 3.0 and is compatible with various operating systems like Windows, Linux and MacOS

3) File Zilla Web Client:

FileZilla is one of the most popular FTP clients. The main purpose of using FileZilla is to make it easy for you to upload and download files from our web hosting server. We can also edit the files and save changes without the need of manually downloading and uploading. FileZilla supports Mac, Windows, and Linux.

4) ATMEL STUDIO:

Studio 7 is the integrated development platform (IDP) for developing and debugging all AVR® and SAM microcontroller applications. It has various features The Atmel Studio 7 IDP gives you a seamless and easy-to-use environment to write, build and debug your applications written in C/C++ or assembly code. It also connects

seamlessly to the debuggers, programmers and development kits that support AVR® and SAM devices.

2.2 HARDWARE REQUIREMENT

1) Microcontroller (Atmega 328):

ATMEGA328 is high performance, low power controller from Microchip. ATMEGA328P is an 8-bit microcontroller based on AVR RISC architecture. It is the most popular of all AVR controllers as it is used in ARDUINO boards. Operating Voltage (V) from + 1.8 V TO +5.5V

2) Wi-Fi Module (ESP8266):

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The module can work both as a Access point (can create hotspot) and as a station (can connect to Wi-Fi), hence it can easily fetch data and upload it to the internet making Internet of Things as easy as possible. It can also fetch data from internet using API's hence your project could access any information that is available on the internet, thus making it smarter. The ESP8266 module is an extremely cost-effective board

3) DFMini MP3 Module:

The DFPlayer mini is a small, low-cost mp3 module with a simplified audio output that can be connected directly to a speaker or an earphone jack. The module can be used as a stand-alone module with attached battery, speaker, and push buttons or used in combination with a microcontroller or development board like the Arduino, enabled for RX/TX (Serial) communication, thus through simple serial commands we can play music and perform other functions like playing the next and previous song, shuffle, pause the song currently being played etc. The module comes with an SD card slot and supports both FAT16, FAT32 file system.

4) Ultra Sonic Distance Sensor:

HC-SR04 Ultrasonic (US) sensor is a 4-pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that $Distance = Speed \times Time$. Since we are using the Ultrasonic wave, we know the universal speed of US wave at room conditions which is 330m/s. The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets back reflected towards the sensor this reflected wave is observed by the Ultrasonic receiver module

3. SYSTEM ARCHITECTURE

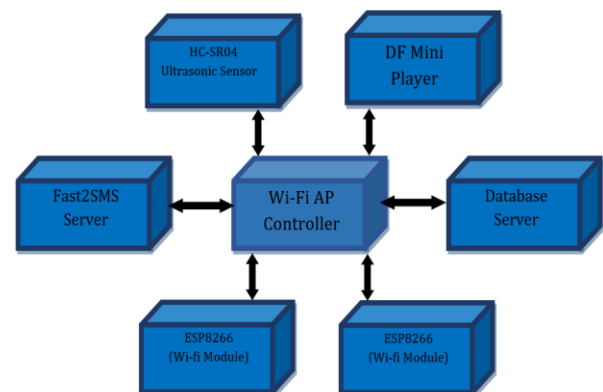


Fig -1: System Architecture

The System contains Smart Attendance structure which has very easy way to gain attendance mark of the students. The module Ultrasonic Distance Sensor which will be embedded at Lab door detects whenever the student goes in the lab the sensor counts in the student and passes the data to database through Wi-Fi controller thus the lab in charge gets to know the real time attendance of the students present in the lab and whenever students gets out of the lab the sensor again detects and gives minus count of the student another system contains Wi-Fi module which is ESP8266 this is installed on the computer system devices like Keyboard and Mouse this module integrated devices then can be controlled from your local Wi-Fi network which is continues in the network within the area of the lab size if anyone tries to steal the devices from the lab the device gets out of range then system notifies by DFMini player device which emits sound within the premises and also notification by SMS server notifies the lab in charged person immediately. The Smart Attendance and Device count is monitored by the lab in charge through the user interface all the data is stored in the server database.

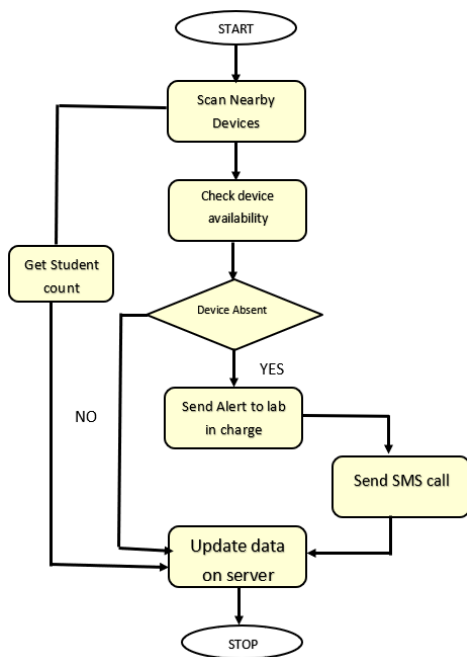


Fig -2: System Flow

2) Database:

A database is required to store the data which will be produce the server has also provided PhpMyAdmin all the following data gets uploaded at server and sequentially the data is presented and also we can retrieve the data by giving MySQL commands

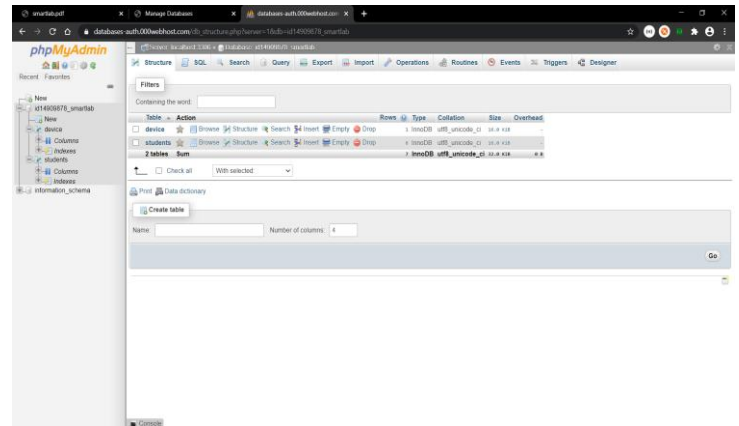


Fig -4: Database Manager

4. SYSTEM DESIGN

1) Web Server(000WebHost):

A server which we have used is a free of service that is 000WebHost a very functional and standard server ("000WEBHOST"), provides us webhosting, domain name registration, and related products and service. Free hosting services come with rich feature set Manage your account easily with the intuitive cPanel control panel Even entry-level plans support PHP and MySQL. One of the most impressive features is that you can run PHP and MySQL from a free account. However, 000webhost is a free website hosting solution that provides an array of features, including a website builder, WordPress support.

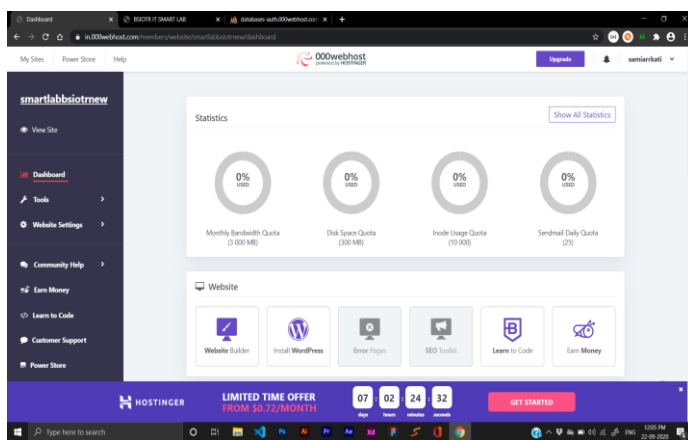


Fig -3: Server Dashboard

3) Fast2SMS Server:

Fast2SMS.com is a very famous site for sending bulk SMS. You can send messages without approval and that too for both DND and non DND numbers. Users can use their own sender ID and can import bulk contacts from list and create QR. Also, SMS can be sent 24*7 without any time restriction. Fast2SMS provide API for bulk SMS, which ensures security and it is a very reliable source of sending data. There is various specified package available according to that you can choose the plan. But from September onwards TRAI New Rules (DLT) has changed the rules for bulk SMS so one must clear the registration process the no first and then the provider and the cellular network owner give access to use this type of services

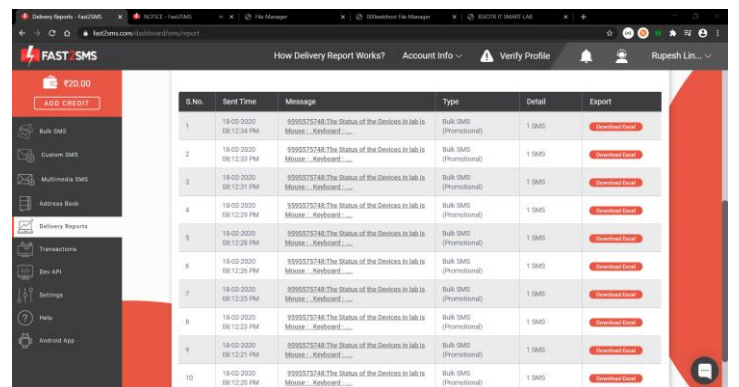


Fig -5: Fast2SMS Server

5. RESULT

The Prototype of the system shows the HC-SR04 Ultrasonic (US) sensor which is use to get count of the students and the mouse which is integrated by the WiFi module in the device which will be available at labs. If any device gets stolen from the lab then the notification is sent to Lab In charge and sound is produced by speakers and available person gets to know about device stolen.

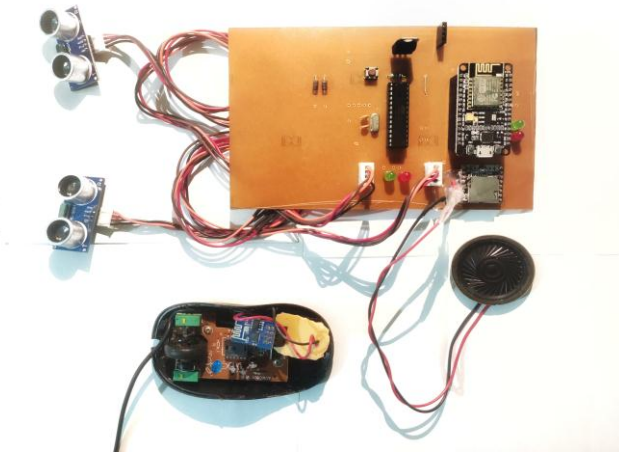


Fig -6: System Prototype

The result of the count and devices is upload and updated in secs and through GUI the Lab In charge person can monitor the system Fig -6 is the GUI Dashboard of Lab Assistant where lab in charge can log in and monitor the system.

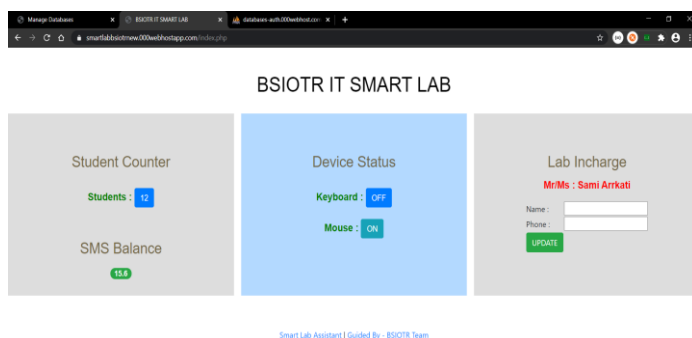


Fig -7: GUI of System

The Fig -7 shows how the lab in charge will get the notification by SMS service

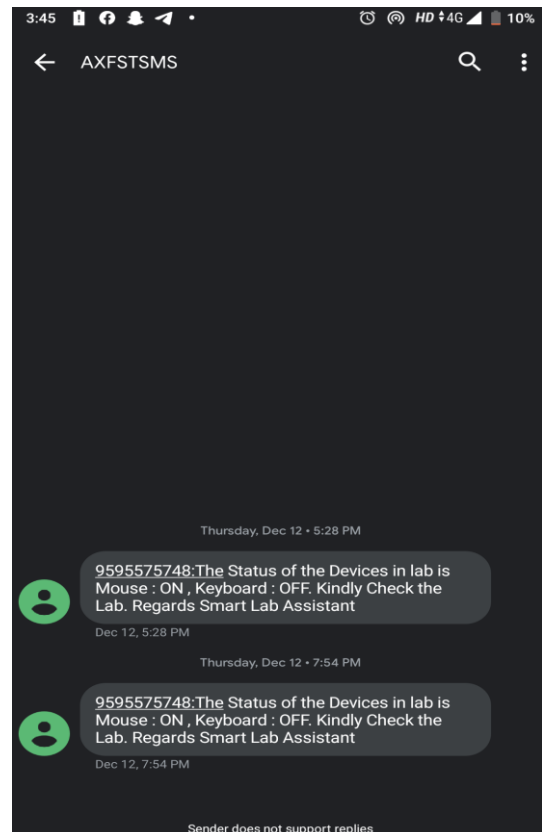


Fig -8: Fast2SMS Notification

6. CONCLUSIONS

Thus our system will enable the End User to use an automated attendance system through IoT, this reduces the workload and stress as the attendance record management and device monitoring in the organization is very important both are resolved through this system.

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