

# Information Conveying and Power Management for Smart Classroom

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**Abstract:** In present scenario, the classroom is equipped with some technologies which termed as smart classroom, but these are not sufficient in this fast growing modern world. The developed countries are attaining the developed placed only due to their modern classroom system in which the modern and youngest minds are developed. But in India we are very rarely having that modern classroom system. To develop our classroom as a modern one, our proposed system suggests some ideas which are better than available smart class system in our country. The main advantage in this is we can implement the smart classroom is economical and precision. The smart class system consists of automatic attendance monitoring system, remote device controlling and digital notice board. When students match their fingerprint, the Arduino micro-controller ensures their presence of the student and attendance is monitored. After the matching process, the controller only counts the matched finger is noted as present and remaining noted as absent. The count of the presented students and absented students are displayed though LCD display which is interfaced with Arduino. In addition, the Arduino can be linked with cloud through Wi-Fi module to transfer the attendance copy of the students for further purpose and receive notice messages along with commands to automatic operation of Lights and fans. In digital notice board is used to receive the information and displayed by LCD screen. And also, pre-defined voice announcement by using APR33A3 Voice play back module.

**Keyword:** Arduino, Liquid Crystal Display (LCD), NodeMCU Wi-Fi Module, Voice Play Back Module.

## I.INTRODUCTION

In the World of Technology, Biometrics plays an effective role in identifying Human beings. Through this project, you will develop a unique system that can identify students for attendance purpose using their fingerprints. In this project, we are going to design a Fingerprint Sensor Based Biometric Attendance System using Arduino. Simply we will be interfacing

fingerprint sensor with Arduino, LCD Display to design the desired project. In this project, we used the fingerprint Module and Arduino to take and keep attendance data and records. Biometric Attendance systems are commonly used systems to mark the presence in offices and schools. This project has a wide application in school, college, business organization, offices where marking of attendance is required accurately with time. By using the fingerprint sensor, the system will become more secure for the users. Attendance plays a major role in educational institutions. The most common means of taking attendance in the classroom is by calling out the roll numbers of students or asking the students to manually sign the attendance sheet, which is passed around during the lecture. The process of manually taking and maintaining the attendance records becomes highly cumbersome. Biometric systems have reached a sufficiently advanced stage wherein they can now be deployed in systems without hampering portability. With the recent development of various cloud based computing and storage systems, data can be securely stored and retrieved whenever required. Primarily, fingerprints and iris images are considered to be the most reliable for use in biometric systems. A system that records the attendance making use of biometric scanners and stores them securely over cloud in the form of Google Spreadsheet can help resolve issues. The system consists of a fingerprint scanner which is used for ascertaining a student's identity. If the fingerprint scanned matches with records present in the database, attendance is granted to the student by updating to the Google Spreadsheet. IoT based Biometric Attendance system using Arduino and Thingspeak board and Fingerprint Sensor Library. In now a day's, development and changes of technologies is happens daily as well as continuous improvement of people's living standards are

increasing. The mobile phones are the inspirable part of human lives today. The mobile phone is the most important part of human lives today. With the help of this smart gadgets human can do many works with or without internet like here we can make our home as well as organization smarter or more luxurious. The phone based on Android system is rapidly developed, so at it's I/O developers conference, Google showed a sneak preview of it's Android Home Project, which will extend the Android platform into household objects. Here we proposed a new technology, so that mobile phones can be used to communicate with and control electrical switches like Fans, A.C. , Lights etc using Android App Wi-Fi module. The transmitter of Wi-Fi transmits the data given by the application using radio waves technology. The Wi-Fi works on radio waves technology, as the data to be passed through Wi-Fi is converted into the electromagnetic signal which is then sent using the antenna. This signal is passed to the Arduino controller. The Arduino further operates the received information and performs operations. This controller can be connected to the Relays of different switches to pass the current after generating the magnetic field. In future, we can use router for a wide range access like for the Smart City projects. New appliances can be added anytime to the system, which provides for the reliability of the system.

Notice Board is the most common and primary apparatus in any institution, organization, or public utility places like a bus station, railways stations, and parks. But sticking various notices day today is a difficult process. This project deals with a wireless notice board. The main objective of the project is to develop a wireless notice board that displays messages sent from the webserver. When a user sends a message, it is received by a wi-fi Module through Local Web Server. A display connected to a server system should continuously listen for the incoming messages from the user, process it, and display it on the LCD screen. The message displayed should be updated every time the user sends new information. Only authenticated people should update the data to be displayed on the LCD.

The APR33A series is a powerful audio processor along with high-performance audio analog-to-digital converters (ADCs) and digital-to-analog converters (DACs). The IC is a fully integrated solution offering high performance and unparalleled integration with

analog input, digital processing, and analog output functionality. The APR33A series is specially designed for the simple key trigger. The user can record & play the message averagely for 1, 2, 4, or 8 voice message(s) by a switch and be adjusted the sample rate by using different values of resistors. It is suitable in a simple interface or needs to limit the length of a single message, e.g., toys, leave messages system, answering machine, etc.

## II.LITERATURE SURVEY

Example of Jungwoo Lee [1] Information and communication technology (ICT) is affecting every part of our society. Education is not an exception in this trend, but its impact is found to be fragmented a best. The purpose of this study is to conceptualize and develop the idea of smart classroom that integrates emerging information technologies with novel content and newly advancing pedagogies. System requirements are elicited from popular but advanced pedagogical cases and the system architecture is proposed based on the analyses of such requirements. The analyses are focused around pedagogies under development, and future applications of the proposed system are discussed at the end of this paper.

Example of Unnati A. Patel [2] the proposed idea having some tool to control students' attendance. However, current manual way of taking student attendance is not an efficient way since there will be spent much of time for calling students names and putting marks like "presence" or "absence" if the class is a lecture class and, in this class, at least 5 groups are presented. Moreover, some students may call his/her friend as "presence" even though this student is currently absent. After thinking all these issues, author if the following research paper decided to create a system that makes easier to check students' attendance automatically. The system is based on RFID technology, and in this paper, details of this system are presented. The system can be easily accessed by the lecturers via the web and most importantly, the reports can be generated in real-time processing, thus, providing valuable information about the students.

Example of Nivetha S. R [3] proposed design of ARM controller with GSM technology, entries can be documented, and a record may be maintained for future use by using visual basic. The controller has internal a real time clock used for synchronization of

data. A resistive touch screen is used to access the previous notices and also progress details.

### III.PROPOSED METHODOLOGY

Every organization whether it be an educational institution or business organization, it has to maintain a proper record of attendance of students for effective functioning of organization. Designing a better attendance management system for students so that records are maintained ease and accuracy was an important key behind motivating this paper. This would improve accuracy of attendance records because it will save valuable time of the students as well as teachers or lecturers or professors in every school, colleges and universities. Recording and monitoring the attendance of students is an area of administration which requires significant amount of time to get necessary data. At present available technology are more time consuming and outdated, and this may

improve by applying technology and designing an efficient attendance system by using “Finger Print” which is designed by our self and it is a low cost. The Electronic appliances can be controlled by using a remote and mobile. The notices can be displayed by using a LCD Display. And also pre-defined voice announcement by using APR33A3 Voice play back module.

The whole arrangement divided into three process Attendance monitoring system, Electronic Notice Board System with some predefined voice notices and iot based remote device control for power saving. In attendance monitoring system, students roll number is synchronised with finger print reader. The finger print reader is used to scan the student’s fingerprint and matches the student roll number which stored in Arduino micro-controller. The LCD is used to display the processed information. Voice playback module is used to provide voice notices and relay light and fan are used to represent device control.

#### Block Diagram

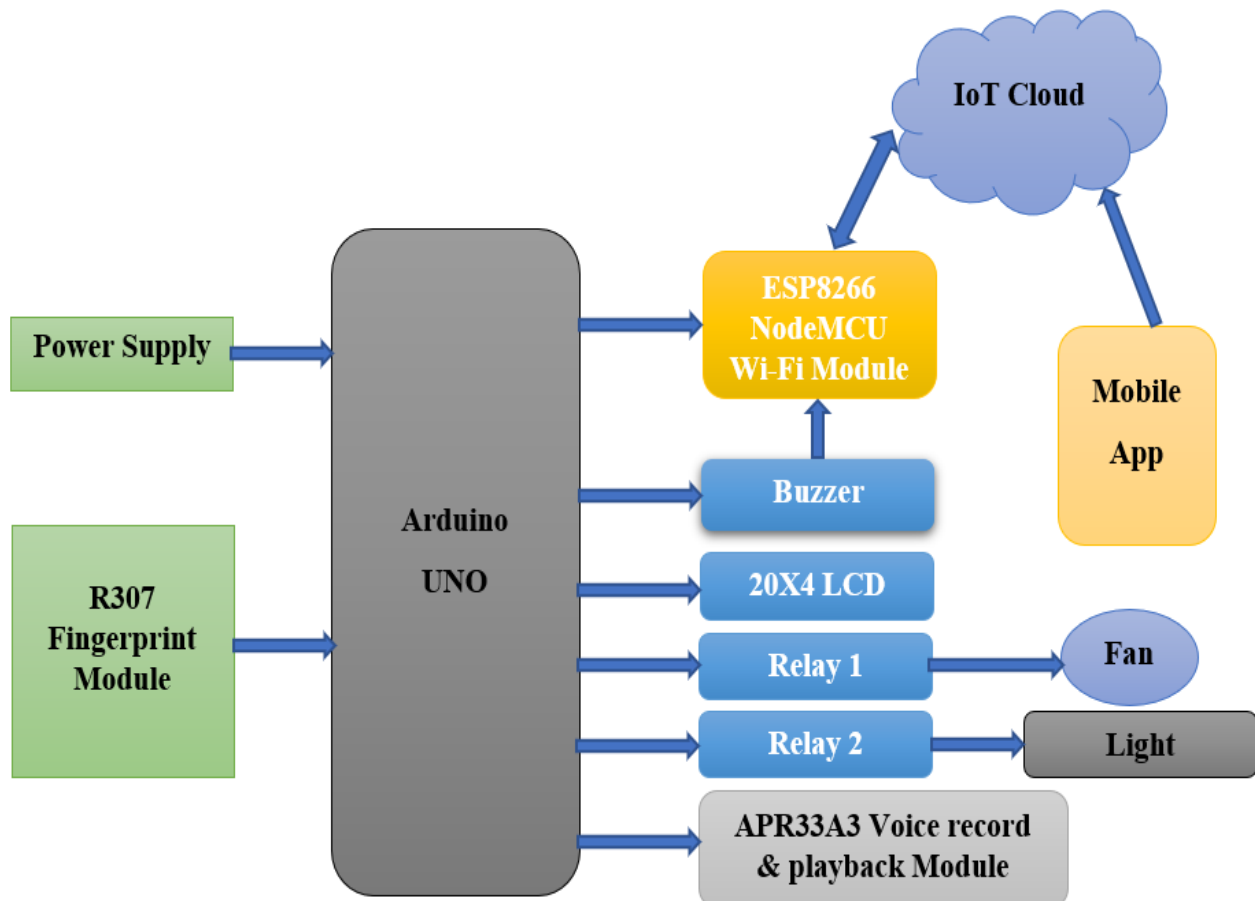


Fig1: Block diagram of Smart Classroom

a) Arduino UNO:

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards can read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

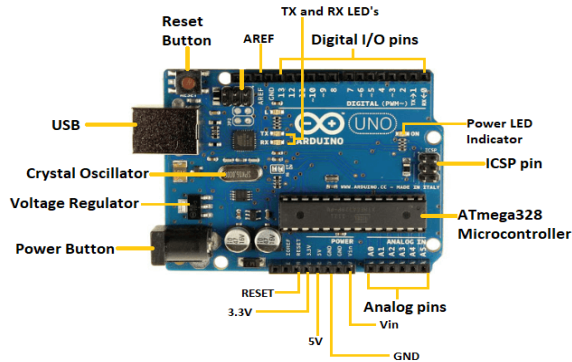


Fig3: Arduino UNO

b) ESP8266 Wi-Fi module:

In 2014, an ESP8266 Wi-Fi module was introduced and developed by third-party manufacturers like AI thinkers, which is mainly utilized for IoT-based embedded applications development. It is capable of handling various functions of the Wi-Fi network from another application processor. It is a SOC integrated with a TCP/IP protocol stack, which can provide microcontroller access to any type of Wi-Fi network. This article deals with the pin configuration, specifications, circuit diagram, applications, and alternatives of the ESP8266 Wi-Fi module.

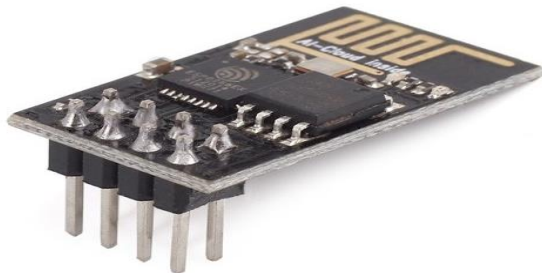


Fig4: ESP8266 Wi-Fi Module

c) R307 Fingerprint Module:

R307 Fingerprint Module consists of optical fingerprint sensor, high-speed DSP processor, high-performance fingerprint alignment algorithm, high-capacity FLASH chips and other hardware and software composition, stable performance, simple structure, with fingerprint entry, image processing, fingerprint matching, search and template storage and other functions.



Fig5: R307 Fingerprint Module

d) APR33A3 Voice Playback Module:

APR33A3 module provides high quality audio record and playback up to 11 minutes with 8 KHz sampling rate and 16-bit resolution. Using on board jumpers total duration can be divided into 1,2,4,8 messages which can be triggered by onboard switches or external triggers using external microcontroller pins.



Fig6: APR33A3 Voice Playback Module

e) Relay Board:

The four-channel relay module contains four 5V relays and the associated switching and isolating components, which makes interfacing with a microcontroller or sensor easy with minimum components and connections. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as marked on the body of the relays.

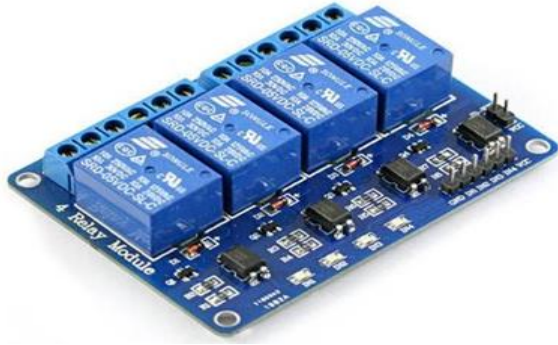


Fig7: Relay Board

IV.IMPLEMENTATION AND WORKING

In the design of MIT App Inventor, introducing mobile app development in educational contexts was a central goal. Prior to its release, most development environments for mobile applications were clunky, only accessible with expertise in systems level or embedded programming, or both. Even with Google’s Android operating system and the Java programming language, designing the user interface was a complex task. Further, use of the platform required familiarity with Java syntax and semantics, and the ability to

debug Java compilation errors (e.g., misspelled variables or misplaced semicolons) for success. These challenges presented barriers to entry for individuals not versed in computer science, App Inventor’s target demographic. We briefly highlight and discuss design goals for the App Inventor project, specifically, the use of components to abstract some of the complexity of platform behavior, and the use of blocks to eliminate complexity of the underlying programming language. These goals can be further explained as aligning the visual language to the mental models of young developers and enabling exploration through fast, iterative design.

FLOW CHART:

Initialize the variables with the Voice announcement, Fingerprint Module, and any important notices. From the voice announcement step, it goes to attendance processing and after fingerprint module is activated, speaker functioning will be enabled. After attendance processing and important notices will be displayed in the LCD screen. The attendance that was processed will also go to the Excel sheet. Hence, this is the functioning of entire project.

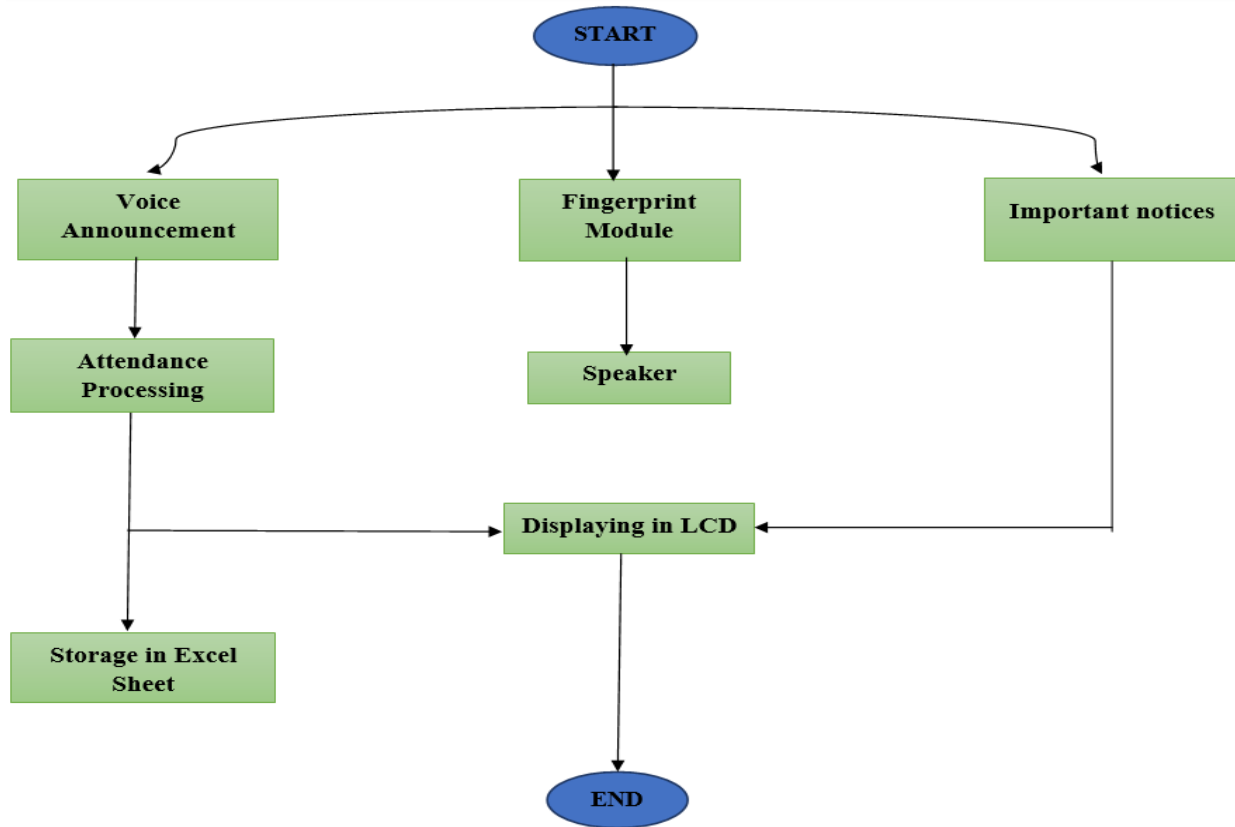


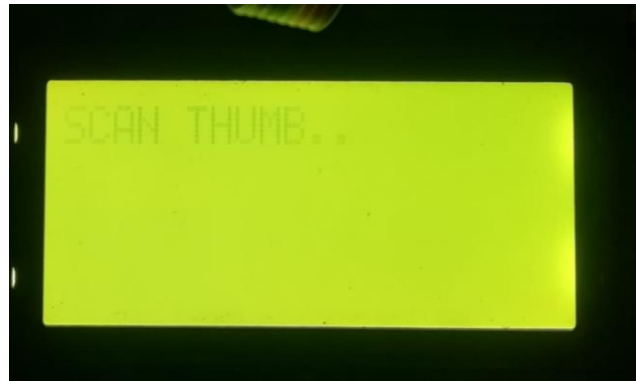
Fig8: Flow chart



#### IV.RESULTS



a. Speaker



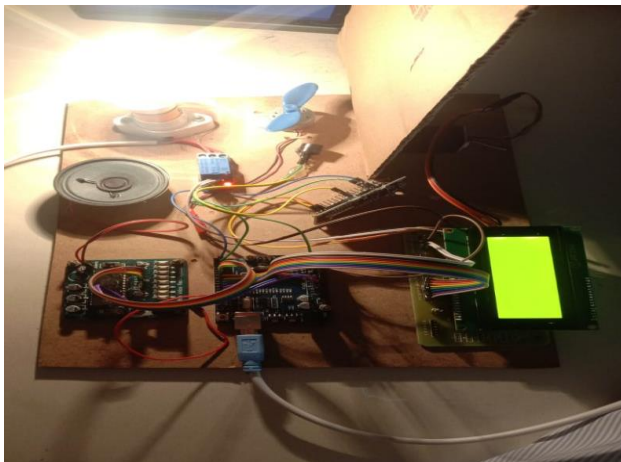
b. LCD displaying "Scan Thumb"



c. After the finger is placed on the scanner



d. Notice displayed in LCD



e. Functioning of Light.



f. Functioning of Fan.

#### V. CONCLUSION AND FUTURE SCOPE

Our proposed Smart classroom increases the precision of work and reduces the man work. Due to its economic cost it can be easily implemented in every class room. By digitalizing those system, better infrastructure can be achieved and chances of errors are nulled. In Future, wireless Shield can be interfaced with Arduino microcontroller to stream presentation

from mobile phones and tablets to the display devices like projector.

The Attendance system using face recognition can be developed in future. The Infrastructure can be developed.

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