SMART DISPLAY UNIT USING ANDROID APPLICATION

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Abstract: - Notice board is ideally useful tool for organizing and displaying information, these are used in multitude of businesses such as schools, colleges, railway station etc. In this project, we proposed an advanced wireless notice board in which at any time we can add or remove or alter the message according to our requirement. The main aim of this proposed project is to drastically reduce the cost involved, consume smaller amount of power and help in achieving quality of service. Wireless electronic notice boards are a faster alternative to conventional pin-up type notice boards. In this Project we are going to use a 32x16 LED dot Matrix display module which is also known as P10 LED Display Module to display a Scrolling text by using Arduino UNO.

Keywords: Arduino UNO, P10 LED Module, HC-05 Bluetooth Module, FRC Connectors, SMPS

I. INTRODUCTION

In this world Mobile Phones and the related technologies are becoming more and more prevalent. Various technical arenas in the field of Telecommunication and Embedded Systems are becoming omnipresent in the people. The use of cell phones has rapidly increased over the last decade and a half Upgradation in networking technologies has encouraged the development and growth of very dense networks. Now-a-days the general mass prefer communicating while on the move therefore landlines usage has been drastically reduced. Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large.

A lot of paper is been used and which is later wasted by the organizations. This in turn leads to a lot of deforestation thus leading to global warming. Small innovative steps in making use of technology for regular purposes would have an adverse effect on the environment issues which we are presently concerned about. The main aim of this paper is to design a SMS driven automatic display Board which can replace the

currently used programmable electronic display and conventional notice boards. It is proposed to design to receive message in display toolkit which can be used from an authorized mobile phone. The whole process can be described from the transmitter and receiver section. The BLUETOOTH module receives a message from the authorized mobile phone and the message is extracted by the microcontroller from the BLUETOOTH module and is displayed on the P 10 LED Display. By using this proposed methodology, we can enhance the security system and also make awareness of the emergency situations and avoid many dangers.
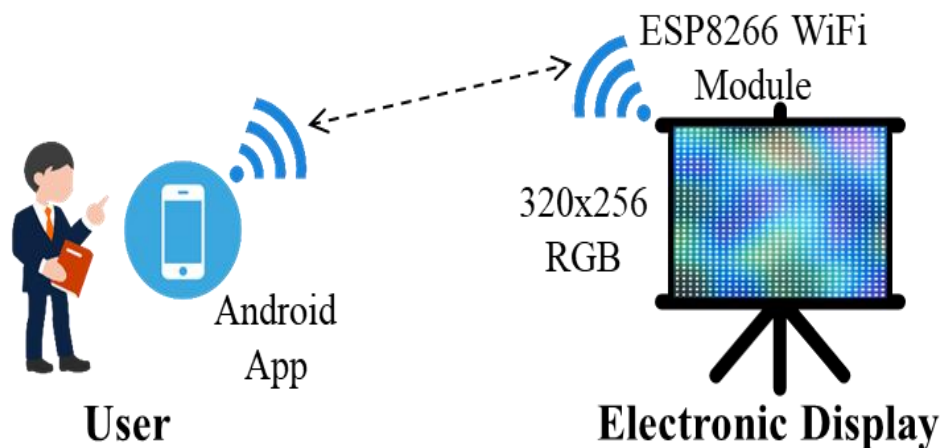

Fig 1 Application overview

II. LITERATURE SURVEY

The leading note-taking apps make taking notes on the fly simple, whether it's for promotions, ideas, business details, or reminders. Notes-taking apps are becoming more common, not the least with widespread availability of mobile devices, not least smartphones. This means mobile applications for taking notes now allows you to write wherever you are, and there is a huge range of apps available. It does not matter if you are a telephone engineer, a secretary, or simply inspired by an idea while commuting - the ability to take notes on mobile phones can be a real benefit. Notepad application is an application, designed to store important information and notes in a device. It can be used to type on their devices just as they would on paper and you can add your to-do list in this app, some important notes for future reference, etc.

As summarized in [1], the purpose of the note-taking request is to ensure that you are able to capture the essence of information collection so you do not have to memorize everything word by word. Now as we live in a world where life without technology is unthinkable, our taking notes the practice has become digital. That's why we now have apps for taking notes. The best note-taking apps can help you make sure you do not forget the light of creative inspiration. Writing things down is everything well and good, but we find it very easy to lose our notes that way. But to keep your

thoughts, ideas and electronic ideas keep them safe, secure and, best of all, searchable for you as soon as you need it. As note-taking technology becomes more sophisticated with the addition of pens and styli, we can expect to see an increase in note-taking devices in classrooms in different ways. With the support of Android Studio, we can easily build Android Studio on various Android models and screen sizes. On the other hand, we have used Java SDK to develop the native application with SQLite database to build the backend storage to store the data of users locally in their device itself. SQLite is an in-process library that delivers a self-contained, serverless, transactional SQL database engine with zero configuration. It is a zero-configuration database, which means that, like other databases, you do not need to configure it on your system. SQLite engine is not a stand-alone process like other databases; it can be linked statically or dynamically with your application depending on your needs. SQLite directly accesses its storage files. To implement SQLite, we have used Room database. It is the room persistence library. It is an abstraction layer that sits on top of SQLite.

In Android, the room is an ORM (Object Relational Mapper) for SQLite databases. It is a component of the Architecture. By implementing annotations, the room makes it easier for you to use SQLite. One advantage is that it eliminates the need for a developer to write a lot of boilerplate code to construct and manage databases. It also validates SQL queries at compile time. This means that if there is a SQL query error, the application will not compile. This keeps the developer from running into run-time issues. Java is used in this project because it is a general-purpose coding language that is object-oriented, class-based, and designed with minimum implementation dependencies in mind.

III. PROPOSED SYSTEM

In this circuit Arduino UNO is used as the controlling unit, and Bluetooth Module (HC-05) and power supply forms the input unit and P10 LED module (32*16) forms the output unit. SMPS is used to power up the P10 LED matrix display. and 5v dc power supply is used for the Arduino power requirements. If we want t o display any information on the display that will be send through the Bluetooth module to the Arduino, that will display on the P10 LED display module. Bluetooth module is connected to the Arduino UNO pins i.e.,TXD, RXD pins for the purpose of Transmitting of information. We can change the notice any time by simply sending the new message through the Bluetooth module. As shown in figure there are only three building blocks in the circuit: the scrolling message on the Matrix LED board, the Arduino NANO board, and the Bluetooth module HC-05.

- The scrolling message Matrix LED board requires three wires for interfacing the Vcc, GND, and the serial input. For the Vcc, a 12V @ 1A supply is required as an external power supply from the adapter. Its serial data input is connected with the Arduino board's digital pin D3.   The Bluetooth module HC-05 uses four wires for interfacing the Vcc, GND, TX,

and RX. Its Vcc pin is given 5V from the Arduino board and the GND pin must connect with the common ground. Its TX and RX pins are connected with the Arduino board's RX (D1) and TX (D0) pins, respectively.

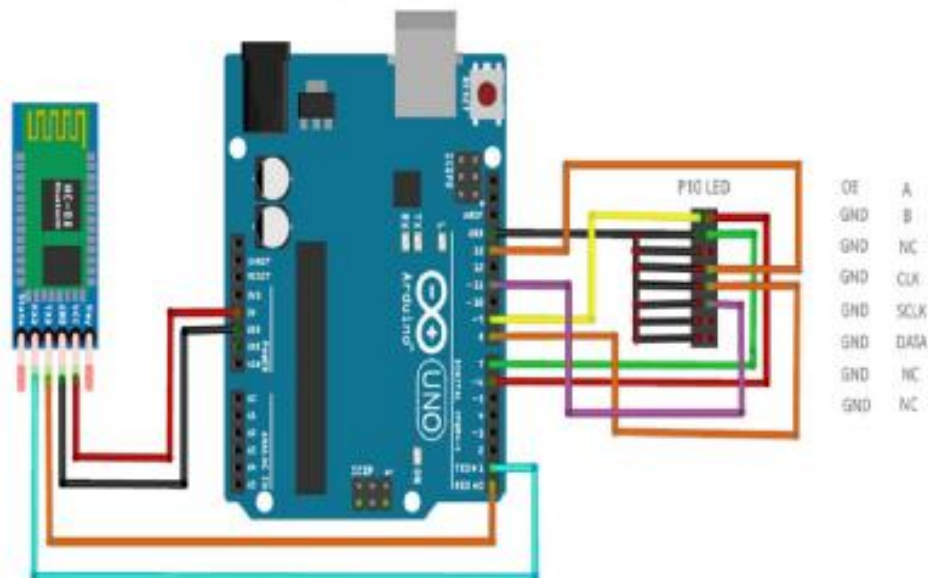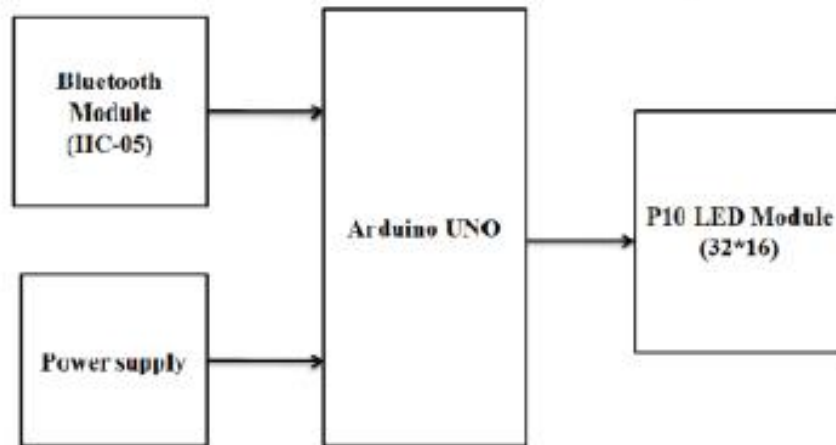The Arduino board also receives a 12V input from the adapter to its Vin pin.

Fig 2 Proposed Block diagram and Circuit Diagram

IV. HARDWARE DESCRIPTION

The model consists of following components

A. Arduino MEGA

Arduino MEGA is a heart of the school bus monitoring system. The Arduino Uno board is a microcontroller based on the ATmeg328. It has 14 digital output/input pins in which 6 pins can be used as PWM output, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 Analog inputs, a power jack and a reset button. This contains all the required

support needed for microcontroller. In order to get started, they are simply connected to a computer with a USB cable or with a AC-to- DC adapter or battery.

Arduino Uno board varies from all the other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 programmed as a USB- to-serial converter. It is an easy USB interface. This allows interface with USB as this is like a serial device. the chip on the chip on the board plugs straight into your USB port and supports on your computer as a virtual Serial port. It is easy to find the microcontroller brain which is the Atmega328 chip. it has a greater number of hardware features like timers, external and internal interrupt, PWM pins and multiple sleep modes. It has a 16 MHz clock which is fast enough for most applications and does not speed up the microcontroller.

B. HC-05 Bluetooth Module

The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality to your projects. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop. There are many android applications that are already available which makes this process a lot easier. The module communicates with the help of USART at 9600 baud rates hence it is easy to interface with any microcontroller that supports USART. We can also configure the default values of the module by using the command mode. So, if you looking for a Wireless module that could transfer data from your computer or mobile phone to microcontroller or vice versa then this module might be the right choice for you. The HC-05 has two operating modes, one is the Data mode in which it can send and receive data from other Bluetooth devices and the other is the AT Command mode where the default device settings can be changed.

C. P10 LED Matrix Display Module

P10 LED display screen is made up of the modules whose pixel pitch is 10mm. The P10 full color LED display screen is widely applicable for advertisement, gymnasium, factory and mining enterprises, transportation, station, wharf, airport, building, educational system and other public occasions. The function of P10 full color LED display screen.
1. It can display various of fonts, font sizes and different languages.
2. It can connect scanner from exterior, to input various of images and patterns.
3. It can input video signal (Television, Camera, Laser Disc), real-time to display dynamic video picture, and it can display other graphic and animation at the same time.

4. It can input computer signal, real time to display the content which is supervised by computer monitor, such as various of charts, curve, image which is processed by computer, at the same time, it also can display weather forecast, various of news, current affairs, etc. The display mode and retention time can be controlled.

5. There are many ways for animation display, such as up and down, left to right, etc.

6. The display time of each frame picture can be controlled, and being able to switch automatically.

7. The programming can be changed at any time, including its content, playing direction, playing time, etc. The amendment programming can be displayed timely.

8. It can take computer control as network station, to read data from designated server, to display on screen. In a word, P10 LED display screen is widely applicable for most of outdoor occasions, it can connect with exterior video devices, such as television, VCD, camera, and computer, etc, which has wide compatibility to digital devices.
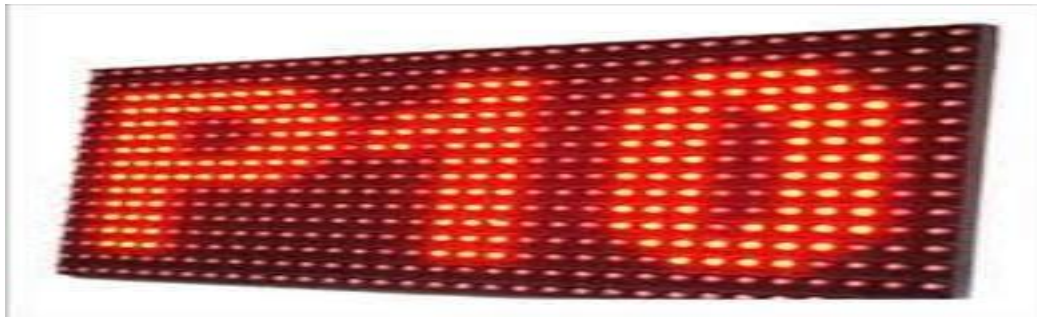

Fig 3 P10 Led display unit

D. Flat Ribbon Cable

FRC is also known as multi wire planar cable because they are the type of cables formed by joining insulated wires in a flat plane forming the Ribbon shape. In other words, Ribbon cable have many conducting wires running parallel to each other on the same flat plane. These wires are commonly used for internal peripherals in computers, such as hard drives, CD drives, wired robots, etc. The ribbon cable was invented in 1956 by Cicoil Corporation, California. This ribbon cable then allowed major companies to replace bulky, stiff round cables with sleek, flexible ribbon cables. This cable consists of 4,6,8,9,10,14,16,18,20,24, etc. upto 80 conducting wires stuck together in parallel.FRC is an ideal way to connect two device digitally. The resultant impedance for any two adjacent wires within the cable is 120 Ohms. FRC also fold and bend readily, conforming to the mounting area, and they fasten easily with clamps, adhesive, or double-faced tape. Since the conductors are visible and in a fixed position

within the dielectric coding, inspection and circuit tracing are simplified.

E. SMPS (Switched Mode Power Supply)

SMPS is a type of Power Supply Unit that uses some kind of switching devices to transfer electrical energy from source to load. Usually, the source is either AC or DC and the load is DC. The most common application of an SMPS is the power supply unit of a computer. SMPS has become a standard type of power supply unit for electronic devices because of their high efficiency, low cost and high-power density.

F. Power Supply

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.
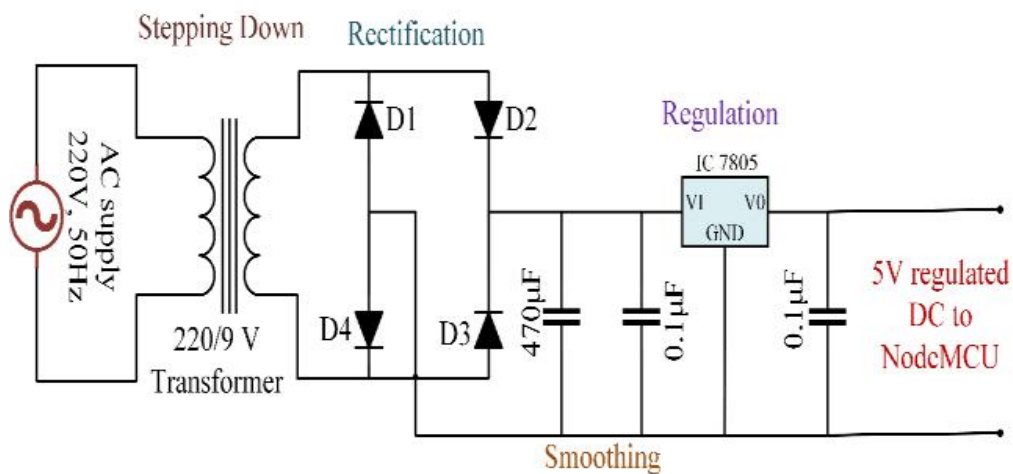

Fig 2 Power supply module

Working principle

Transformer The potential electrical device can step down the facility offer voltage (0-230V) to (0-6V) level. Then the secondary of the potential electrical device are connected to the exactness rectifier, that is built with the assistance of op– amp. the benefits of victimization exactness rectifier area unit it'll provide peak voltage output as DC, remainder of the circuits can provide solely RMS output.

IV. PROJECT DESCRIPTION

The circuit operation for this project is simple. When the 12V supply is provided to the circuit, it will start operating. The Arduino board receives a string (message) from the HC-05 module and will pass it on to the Matrix LED board. The scrolling message will then be displayed on this board.

• Initially, the default message "ECE Department" is displayed and continuously scrolled on the board (though it's easy to set any preferred default message).

• The user can send a message (string) through a Smartphone using the Bluetooth-based application. However, to display the new message, the user first has to connect and pair its Smartphone with the HC-05 module (this requires the passkey, "1234"). Make sure the module remains open.

• Type in the message on the Smartphone and send it to the system via the Bluetooth application.

• This notice will be transmitted by the Smartphone-connected Bluetooth and will be received by the HC-05 module. It is, then, serially given to the Arduino UNO board.

• Arduino will temporarily store the message in its internal RAM. Once the message is completely received, Arduino will send it serially to the scrolling message P10 LED board for display.

• Arduino's digital pin D3 works as the serial data TX pin that sends the message to the P10 LED board.

V. CONCLUSION

As the technology is advancing every day the display board systems are moving from Normal hand writing display to digital display. Further to Wireless display units. This paper develops a photo type laboratory model wireless notice board system with GSM modem connected to it, which displays the desired message of the user through an SMS in a most populated or crowded places. This proposed system has many upcoming applications in educational institutions and organizations, crime prevention, traffic management, railways, advertisements etc. Been user friendly, long range and faster means of conveying information are major bolsters for this application. By using this proposed methodology, we can enhance the security system and also make awareness of the emergency situations and avoid many dangers. VI

FUTURE SCOPE

A commercial modal can be able to display one message at a time. By including priority conditions, we can enhance the project. Robots can be controlled in a similar fashion by sending command to the robots. As this technology emerges, in may be new device and hence new markets will

evolve. The project itself can be modified to achieve a compete Home Automation All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

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