

IOT BASED SMART CLASSROOM NOTICE BOARD

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Abstract— This paper based on the working principle of cloud security system i.e. how the cloud is capable of keeping data safe and the date stored in the cloud cannot be accessed by anyone except the authorized one. The system consist of various components such as LED Matrix, ESP8266, power supply etc., The system is made in such a way that it can be used to display messages, important announcement, legit schedules via LED matrix which is controlled by ESP8266 module. There are various types of displaying system across the globe which has made our life easier, but our system offers more convenience, easy to control, data over cloud can easily be displayed, 100% accurate and the more important thing is, it preserves a lot of time. So based on these problems we had researched how to secure and control time and the system is very inexpensive. If this system is applied in every school and college areas then wastage of time can be controlled easily.

Keywords— LED Matrix, Esp8266 Module, Proteus App, Cloud, DC Source, Feeder.

1. INTRODUCTION

Today, almost all institutions have used the conventional chalk and board teaching method and this method wastes a lot of time, since it is very paramount to us. Keeping time as a very paramount thing we have designed a very sophisticated system which can be used to preserve time. The system is based on electronic circuits comprising of various components such as Esp8266 module, Led matrix, power supply, phone/pc etc. This system allows a person to provide information to students without visiting them, instead of going to students and providing information, he/she can stay in a place and supply information.

This system is used to reduce the time consumed in providing information; the system performs several functions like displaying the schedule of the classes, supplying notes to students etc. The system gets activated when someone directs a data to the cloud, after recognizing of the data is received by the cloud. Then, the cloud is activated to perform forward action by which cloud direct the information to the Esp8266 module and also can be accessed by power supply for the convenience of the faculty.

In this project the main module is WI-FI esp2866 is implemented for controlling and manipulating the data.

2. BLOCK DIAGRAM WITH EXPLANATION

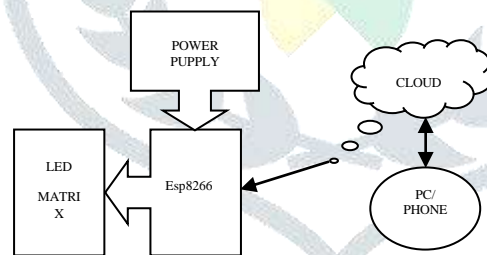


Figure -1: Block diagram of displaying system.

Fig. 1 shows the block diagram of displaying system. PC/Phone block is responsible for sending data to the cloud this data is kept secure in the cloud further the cloud is triggered and the data is transferred to Esp8266 module. Later on the data is displayed on LED matrix; power supply is responsible to turn on/off the Esp8266 module.

3. PROPOSED WORK

In the above figure the PC/Phone is responsible for producing data, this data fed to the clouds, if the connection to the user is relatively close, it may be designated an EDGE server which means high connectivity is required to perform the operation. Cloud computing relies on sharing of resource to achieve coherence and economies of scale.

When the clouds receives data from the PC/phone then clouds asks permission to the user to transfer the data to the module Esp8266 and when the user allows cloud to transfer the data to Esp8266 module, then the data is transferred to the esp8266 and the data is stored on the module. The whole set-up is dependent on a power supply, when the power supply is turned on Esp8266 then it produces PWM pulses in accordance to the relative information as directed by the user, when these signals are received by the LED matrix then LED matrix allows the static and animated images and text to display.

4. REQUIREMENTS

i) LED MATRIX:-

Fig-2(a) LED Matrix

Led matrix is a dot matrix of large display, low resolution value and is useful for both industrial and commercial displays as well as for hobbyist human interface machines. It contains a 2-D diode matrix which has the cathode joined in rows and anode in columns. In this LED matrix each can be controlled individually by controlling the electricity through each pair of columns or rows diodes. These matrices are very popular matrices by means of displaying information; they allow the static and animated images and text. A LED matrix is shown in figure

ii) ESP8266:-

Fig-2(b) ESP8266

ESP8266 is a Wi-Fi SOC (system on a chip) produced by Espressif Systems. It is a highly integrated chip designed to provide full internet connectivity in a small package.

ESP8266 can be used as an external Wi-Fi module, using the standard AT Command set Firmware by connecting it to any microcontroller using the serial UART, or directly serve as a Wi-Fi-enabled micro controller, by programming a new firmware using the provided SDK. The GPIO pins allow Analog and Digital IO, plus PWM, SPI, I2C, etc.

This board has been around for almost a year now, and has been used mostly in IoT contexts, where we want to add connectivity for example to an Arduino project. A wide adoption has been facilitated by the very modest price, ranging from 2.50 to 10 USD depending on the features offered by the manufacturers. NodeMCU is an open source LUA based firmware developed for ESP8266 Wi-Fi chip. By exploring functionality with ESP8266 chip, NodeMCU firmware comes with ESP8266 Development board/kit i.e. NodeMCU Development board. Since NodeMCU is an open source platform, their hardware design is open for edit/modify/build. NodeMCU consists of ESP8266 Wi-Fi enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Espressif Systems with TCP/IP protocol.

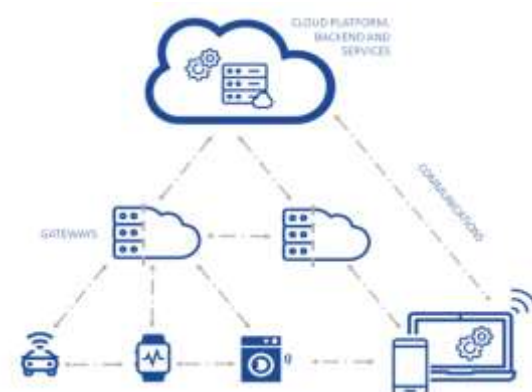
iii) CLOUD:-

Fig-2(c) Cloud

Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. Large clouds, predominant today, often have functions distributed over multiple locations from central servers. If the connection to the user is relatively close, it may be designated an edge server.

iv) POWER SUPPLY:-



Fig-2(d) Power Supply

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters. Some power supplies are separate standalone pieces of equipment, while others are built into the load appliances that they power.

Examples of the latter include power supplies found in desktop computers and consumer electronics devices. Other functions that power supplies may perform include limiting the current drawn by the load to safe levels, shutting off the current in the event of an electrical fault, power conditioning to prevent electronic noise or voltage surges on the input from reaching the load, power-factor correction, and storing energy so it can continue to power the load in the event of a temporary interruption in the source power (uninterruptible power supply).

5. PROPOSED CIRCUIT AND ITS OPERATION

Purpose of this project is to program an ESP8266-12 module to make a web page with a proper format, and when the user loads a data to it, the data is loaded in the cloud then data is transferred to ESP8266-12. Later on the data is displayed on LED matrix using PWM.

The node MCU must be connected with internet within the same network that is connected with the client device. The program is uploaded to node MCU with configured pin mode of LED matrix and node MCU (esp8266). We have designed a webpage for sending message (data) through cloud, for this webpage port 80 is assigned. When the node MCU is powered 'ON' LED matrix starts to scroll, then the IP address is enter on webpage. The webpage contain text box, department name and heading with DECE department digital notice board. As we write the message in text box and the text is send via cloud to node MCU.

The labels on the left side (1,2,3,4,5) of node MCU represent the supply (VCC which is normally 5V and GND) and also the interface of the IC which it uses to communicate with a microcontroller, in order to get the text that will be displayed and to set the working parameters. This interface is a SPI Bus system. We have 2 data wires, MOSI and MISO. MOSI represents Master Output. This is the data on which we are writing from our microcontroller. (μ C a Master, IC for LED Matrix Slave). MISO represents Master Input. This connection assures that the microcontroller is reading data from the IC. For this system, we only need to send data to the controller IC, for displaying text. There is no data that will be reading back from the IC, so only use MOSI (in this case DIN). The other pins, CS and CLK are basically the Chip Select and Clock pins.

The chip select wire helps the microcontroller selecting the correct IC when transferring the text since many of those ICs are used in the system, each one of the ICs communicate with the microcontroller. The Clock pin is basically where the working clock is latched to. Circuit Diagram simulated in PROTEOUS has shown in Fig-2.

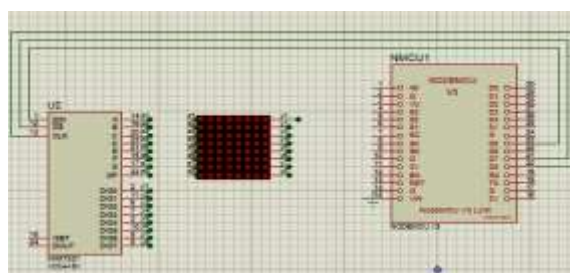


Fig-3: Circuit diagram

6. RESULT

Proteus simulation is quite easy and without any components we can perform experiments and we also can design numerous circuits to perform tasks. Hence, according to our system we can save a lot of time in spite of this we can do other productive work simultaneously. By this we can prove the world that two task can be done at the same time.

7. APPLICATION

- This can be applicable in military training.
- This can be used to show results.
- Resources can be preserved for future generation.
- It can be used to provide information from one place to another.
- It contributes in growth of learning ideas and problems solving skills.

8. FUTURE SCOPE

In future, this system can be extended by increasing the number of displaying outputs that can be used to perform many actions simultaneously. Fingerprint based attendance system can also be included later in the future, even though the fingerprint sensor module automates the attendance process, it is still a time consuming process. Hence, in future this can be replaced by image processing techniques such as face detection that require no human intervention at all.

In the future we can implement the Google assistant to help the faculty to search the internet verbally without the need for typing the query in a web browser by adding the Google voice Assistant to the Esp8266.

9. CONCLUSION

In conclusion, to solve daily problems in any institute that requires simplification of visual aided presentation in efficient and effective way. Daily activities such as presentation of studies, schedule of classes can be simplified with application of this system concept in daily life. The main focus of the system is to reduce the wastage of time and resources and provide proper guidance to the students in efficient way as seeing how things actually work teaches better than just writing in the board. This will help to remove the conventional method of teaching and learning. Last but not the least this technology will bring new revolution in learning process.

10. ACKNOWLEDGEMENT

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