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DIGITAL NOTICE BOARD USING IOT

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Abstract - : *In this paper the work is based on designing and development of advertisement. These techniques are used mostly in the shopping centres or malls where digital displays are used. This paper mainly focuses on digital notice board. Its application is both Educational and Market sector, wherever it can be used. In this paper LED display are used for displaying messages. For displaying large data P10 LED is used in this work is preferred because it a scrolling display. In this work a model is formed for displaying notices at places those require real time noticing by sending message through SMS using mobile phone through GSM modem. The heart of this system is Arduino board using ATmega 328. This system can be used by any kind of person such as educational or businessmen both can send message by SMS to the system so that system can display it on the digital notice board. Another feature included in the system is to display Temperature and Humidity.*

***Key Words*: :** Arduino board, ATmega 328, LED Display, Temperature, Humidity.

1. INTRODUCTION

The Internet of Things (IOT) is the network of physical objects or devices, vehicles, buildings, and other items embedded with electronics, software, sensor and network connectivity that enables these objects to collect and exchange data. Mobile phone and other related technologies are becoming more and more famous. So that communication with every person has become easy and smart. Another technology used is Global System for Mobile Communication (GSM) for sending message anytime and anywhere.

Notice board plays a vital role in today's world. It is commonly used in places like school, colleges,railway stations and other various institutes. But changing notices day to day is a difficult task. So to overcome such things this paper focuses on a digital notice board. The main objective of this paper is to develop a notice board using IOT that replaces the currently used electronic display. Adigital notice board can be replaced in place of an conventional notice board which reduces manpower and resources. The digital notice board uses digital technology and electronic components. It is implemented to display notices or messages from anywhere or at anytime.

A Smart Notice Board [1] designed and developed using Internet of Things. It uses an Mobile App that send message that is to be displayed on the notice board. This uses an Wi-Fi module which limits the distance from which the message is to be sent. A Digital Notice Board [2] is mainly consists of Raspberry Pi in which there is an android application that is connected to the LCD display. This project needs a continuous internet connection that too with registered network.A survey paper on The Android Controlled Smart Notice Board using IOT [3] has been implemented an Android Controlled Smart Notice Board using IOT which uses the Raspberry Pi and IOT. The drawback of this project is that it uses a specific App which is again to be developed for the same and it also requires continuous internet connection. Implementation of Digital Notice Board using Raspberry Pi and IOT [4] in which PC is used for sending information and Raspberry Pi is connected to internet at the receiving side. The need of continuous internet connection is one of the drawbacks of the system. A survey paper on Voice Over Wi-Fi based Smart Wireless Notice Board [5]. It is a system to wirelessly transmit short notice using Wi-Fi. This system uses Raspberry Pi for the Transfer of the information. Zigbee based Electronic Notice [6] Board. In this project the wireless notice board is developed with the help of ZigBee and GSM Technology. The software developed at the personal computer is to assist the user to send the notices to the students through emails through mobiles and to display the notices at the notice board. The drawback of this system is that it needs continuous internet connectivity to transfer information that is to be displayed through e-mails.

In this paper a digital notice board is proposed which can be controlled/operated by authorized person from anywhere without any distance issue. The normal messaging app of an android mobile phone is used for transfer of notices/messages in this system to make it more user friendly. The resources, manpower, time

consumption generally required for conventional notice board is reduced with the use of this system. It is also cost effective over the conventional notice board.

2. BLOCK DIAGRAM:

The Figure 1 shows the block diagram of Digital Notice Board using IOT. The Digital Notice Board is based on Arduino board and IOT. The block diagram consists of Microcontroller ATmega 328 which is the brain of the system. The GSM Module uses set of AT commands for communication with the microcontroller. P10 LED Display is the display unit used for the system. This system uses DHT11 sensor for measurement of Temperature and Humidity.

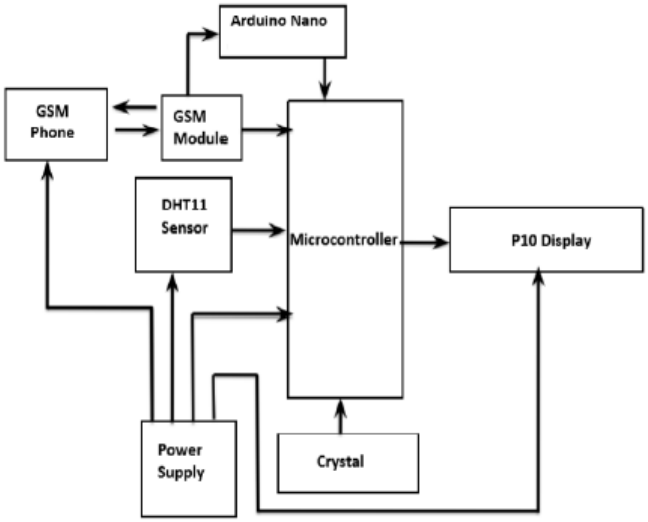

Figure1: Block diagram

The SIM loaded GSM Module receives message from user's android mobile phone. As the GSM modem is interfaced with the microcontroller, it decodes the message and sends instruction to the display unit accordingly. The P10 LED Display further displays the message sent by user on the scrolling display. DHT11 sensor is also interfaced with the microcontroller ATmega 328 which measures Temperature and Humidity from the surrounding atmosphere. This measured Temperature and Humidity is sent to display unit to display it on the notice board. The measurements from the DHT11 sensor are auto updated.

3. FLOW CHART:

Figure 2 shows the flow chart for the Digital Notice Board using IOT. As the display is turned on the first message that displays is the default message set up in the programming. The default message is decided by the user. There is a DHT11 sensor which is used for sensing Temperature and Humidity.

Temperature and Humidity is also displayed on the P10 LED Scrolling Display. The controller used is the ATmega 328 Microcontroller. The message is sent to the microcontroller through person android mobile phone. The message that is to be send is received by the ATmega 328 Microcontroller which further decodes the message and then sends it to the display unit.The message that is sent to the microcontroller through the GSM is protected with a password. If the message sent has correct password then GSM receives the message.

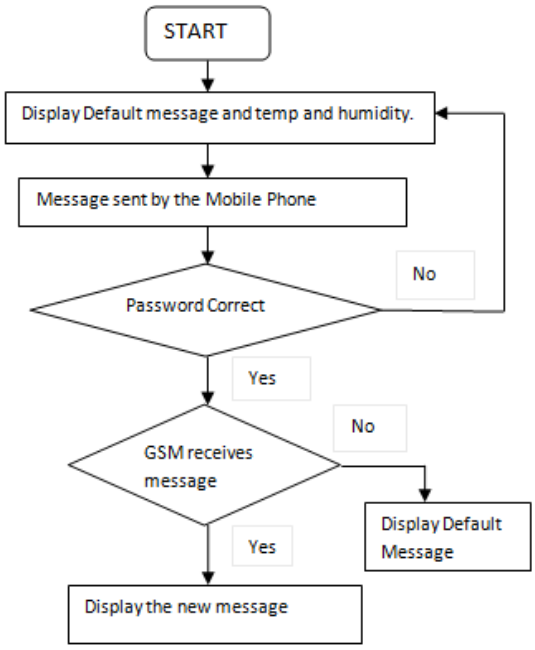

Figure 2: Flow Chart

As the message sent has correct password and is sent to the GSM then the display unit that is the P10 LED Display displays the sent message. If the password for the sent message is incorrect then the GSM does not receive the message and the display unit so displays the default message. If the password for the GSM is correct it is further displayed on the P10 LED Scrolling Display.

4. DESCRIPTION OF COMPONENTS:

A. Arduino Uno Board:

Figure3: Arduino Board

In this paper the Arduino board is self-made. This Arduino board uses ATmega 328 Microcontroller. Arduino is an open-source platform used for building electronics projects. It has 14 digital input/output pins in which 6 pins can be used as PWM output, 6 Analog input pins. The ATmega328 has 32KB of flash memory for storing code in which 0.5KB used for bootloader. It has 2KB of SRAM and 1KB of EEPROM. It operates on 5V, DC current per I/O pin is 40mA get it start.

B. P10 LED Display:

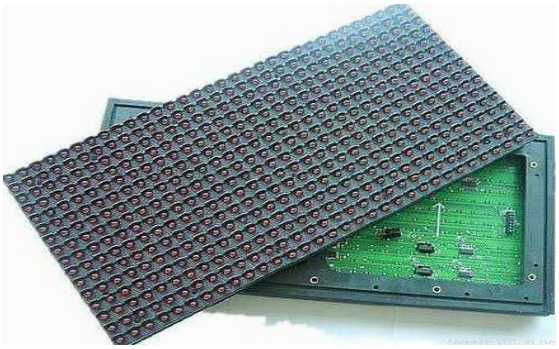

Figure 4: P10 LED Display

This Large, bright 512 LED matrix panel has on board controller circuitry designed to make it easy to use straight from your board.Its brightness level is upto 3500nits to 4500nits.one plate requires 3.5A current and 5V voltage .

C. GSM Module:

Figure5 : GSM Modem

It acts like communication device. The serial text format data from mobile is given to the microcontroller through GSM Module. It operates at 900MHz or 1800MHz frequency band.GSM initiates with AT commands AT, AT+CMGF, AT+CNMI. Then it performs read, delete, send operation.

D. DHT11 Sensor:

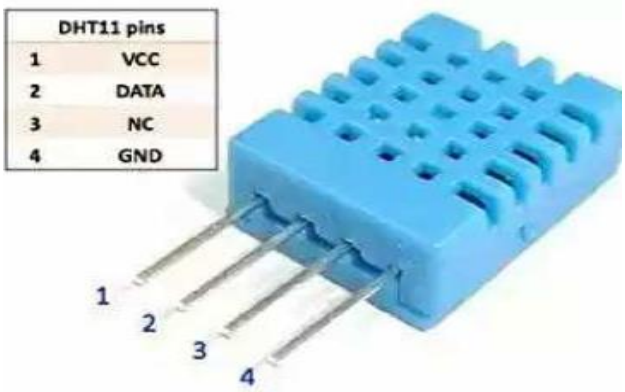

Figure6: DHT11 Sensor

The DHT11 is a commonly used Temperature and Humidity sensor. The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. In our project we display notice as well as Temperature and Humidity in surrounding air and it will be auto updated.

5. SOFTWARE DEVELOPMENT

A. Express PCB:

Express PCB is CAD software which is used to create the layouts for Printed Circuit Board (PCB).By using this software we make layout of circuit diagram which is printed on PCB.

B. Arduino IDE:

The Arduino Integrated Development Environment (IDE) is a cross-platform application that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards.

It is Integrated Development Environment software for programming of Arduino. It is run on computer used to write and upload computer code to Arduino board.

6. RESULT AND DISCUSSION

The GSM module usedconsist of a SIM card. The messagetransmitted by the user through its mobile phone to this number of the GSM is received and saved in the memory of the SIMcard.The message received by GSM module isretrieved by the ATmega328 by using suitable AT-commands.The message is transferredto the display board.

For example:

Figure7. Display of default message (WELCOME).

The above Figure 7 shows the display unit when the default message is displayed. Here the default message "WELCOME" appears on the display unit as soon as the system is turned on. This default message will continue to be displayed on the LED display until the user sends a message for the new message that is to be displayed.

Figure8. Display of message sent by the user.

When the user send message from its mobile phone that is to be displayed on the notice board it uses the normal messaging app on the android mobile phone of the user. For example the user sends the message "DEPARTMENT OF INSTRUMENTATION" to the GSM modem. The GSM modem receives the message and after decoding it sends it to the display unit. The display unit then displays this message on the scrolling display. this message continues to display till it receives another message from the user.

Figure9:Default display of Temperature and Humidity.

The DHT11 sensor that is interfaced with the microcontroller senses the Temperature and Humidity from the surrounding atmosphere. The figure shows the display unit displaying the Temperature and Humidity. The temperature is displayed as T34 that is the temperature is 34°Cand the humidity is displayed as H72. The temperature and humidity is displayed by default on the scrolling display.

7. CONCLUSION:

The prototype is very efficient as the components used are very simple and easily available in the market. This can be deployed commercially at places such as colleges, banks, railway station and in industry for flashing notices/messages. As the system uses GSM Modem the messages can transferred from anywhere and anytime irrespective of the distance between the user and the system.

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