Iot based Web Controlled Notice Board

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***Abstract*—**One of the word become very popular in Information Technology is Internet of Things (IoT). The technology of Internet of Things, which will transform the real world objects into intelligent virtual objects. In this paper shows the design and structure of IoT based Web Controlled Notice Board. This new technology of controlling Notice /Display board using web and internet will eliminate the use of old technology of GSM-based notice board. As IoT based web controlled notice board is faster, cheaper and is more secured than GSM-based Notice Board. The embedded system features like arduino is interfaced with Wi-Fi module and Web .The IoT based Web Controlled Notice board can be controlled from anywhere or any place on this earth using Web and Internet. It as has great flexibility even in the remote access as small Internet service is enough to send the message which is not so in GSM based Notice board. As GSM-based notice aboard operate on network operator SIM for sending SMS messages and this service is not available in many remote areas of World. This IoT based notice board operated and managed using HTML and Web graphical interface applications. One of the very important service WAMP i.e. Web Application Messaging Protocol is installed already to fortify for individual applications and for the systems to communicate seamlessly with high security using robust web service security protocol. This system provides cheaper and efficient solution as the cost of public IP address and computer are not included, which is not so in other solutions.

Keywords—HTML; Internet of Things; Liquid Crystal; Display; Microcontroller; WAMP; Web-Page; Wi-fi Module

I. INTRODUCTION

The Internet of Things (IoT), also known as the Internet of Objects [1], [2], [3]. The various sectors like education, industries, business, science, government, and many others widely use this technology as shown in Figure1. As we all know Internet is one of the most important and powerful creations in all of human history and now with today's world of the internet of things, internet play a vital role in for making the world smart. Internet of Things is a technology which accesses the Internet. The Internet of Things (IoT) interface or connects everyday objects like mobiles, Internet TVs, sensors and actuators to the Internet through which objects or things are connected intelligently results to bring new form of communication between things and people, and between things themselves [1], [2]. The concept of Iot enters into the world in the last couple of years which results to bring new advancement in the IT sector [1], [2], [3]. It is notice and estimated that the number of machines using Internet will increase from 100 million in 2011 to 2 billion by the year 2021, which is rising at a rate of 36% per year [1], [2], [3]. In the year 2011, more than 75% device to device (D2D) connections were made over mobile networks such as 3G and 4G and it is estimated that by 2021, this ratio will increase to 93% since the cost related with D2D over mobile networks are generally cheaper than fixed networks. Now anyone, from anytime and anywhere can have connectivity for anything and it is expected that these connections will extend and create an entirely advanced dynamic network of IoT's. This new technology will provide us many new applications like Smart home Automation, Smart Agriculture Irrigation, Smart Cities or World, and many more to make the things smarter [1], [2].

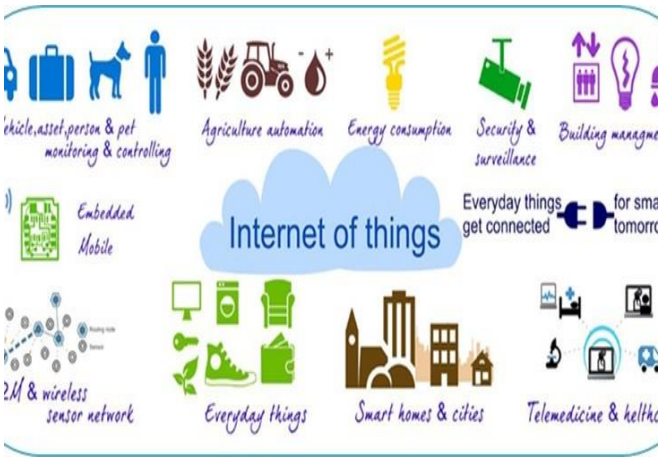

Figure 1. Internet of Things (IoT)

In order to display information and keeping people aware Notice Board plays vital role. As the traditional notice board using sticking of printed or hand written paper having information on the board. But the modern notice board like GSM [4], [5] or IoT based notice board are faster and more effective than traditional notice board. These new technology notice boards can display multiple notices at a time to the number of users. This idea with an aim to increase the usability of electronic notice boards, deals with wireless reception and display of notices using Arduino [8] and Wi-Fi module [9], [10]. There is need digitize the notice board because traditional notice-board involves wastage of paper, ink and moreover there is less security [4], [5]. The internet is used to send information. Arduino Board [8] and Wi-Fi module [9] are used as transmitter, and by using this board we can make notices to display anytime at receiving end after establishing connection

between the transmitter (arduino) and receiver (LCD screen) by providing IP address, then we are able to send the notices remotely from anywhere in the world.

II. RELATED WORK

As we have seen around us in many big shops, shopping centres, institutions, train and bus platforms uses the GSM Notice Board [4], [5] to display the information. GSM is basically a Global Systems for Mobile. In GSM notice board, GSM Modem can use or accept any network operator sim and it is situated on notice board. This module on notice board gets the message and showed on the see load up as the message will be send distinctive port number store in storage unit of microcontroller. It have Max232 , is an integrated circuit which converts signals from Rs232 serial port to suitable signals like Rx, Tx, CTS, RTS signal for use in TTL-compatible digital logic circuit [4], [5]. But GSM notice board have many disadvantages like limited data rate capability, less security, chance of loss of data and slower etc. Apart from this many Bluetooth based notice board also used in which the display and sender is interfaced using Bluetooth module [6].

III. PROPOSED WORK

A. *Block Diagram*

Figure 2 show the block diagram of IoT based web controlled Notice board. It consists of cloud [7], web server, Wi-Fi module [9], [10] , microcontroller (Arduino Board) [8] and LCD [14] to display message. The User can use and send the message through web-page from anywhere anytime if he knows the web address, security key. Then enter the message in the Web-page to send to microcontroller and display on the digital notice board.

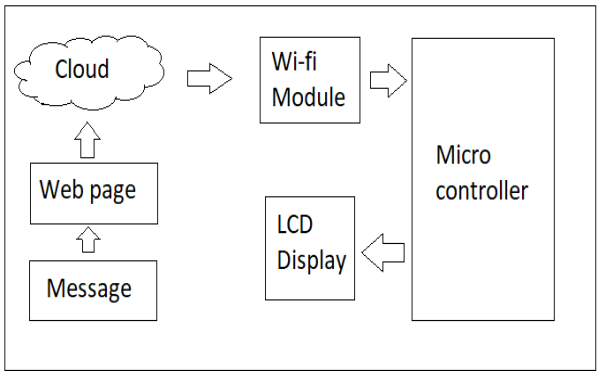

Figure 2. Block diagram of Iot based Web controlled Notice-Board

In the IoT based Web Controlled Notice Board , the user enter the web address , security key and if it is correct it leads the user to the web page where he will type the message . The user then enters the message on the message box and press submit. After pressing submit, the message or data is sent to the cloud or server. At the receiver end, the LCD consists of Arduino board and Wi-Fi module with internet connectivity. It receives the message through cloud using WI-FI module and board. Then the microcontroller displays the message on the LCD board. In this way the IoT based Notice Board works and the whole process take place within seconds (less than 10 second).

B. *Flowchart Implementation*

Step 1: Enter the web address, if it is correct leads to the web page.

Step 2: Enter the security key like username and password, if it is correct it leads to the message page else try again.

Step 3: At the message page enter the message in the message box and submit.

Now, message enters to the cloud.

Step 4: At the receiver end, the microcontroller fetches the message from the cloud through Wi-fi module.

Step 5: At last microcontroller display the received message to the LCD display.

Repeat the above steps to display the next message.

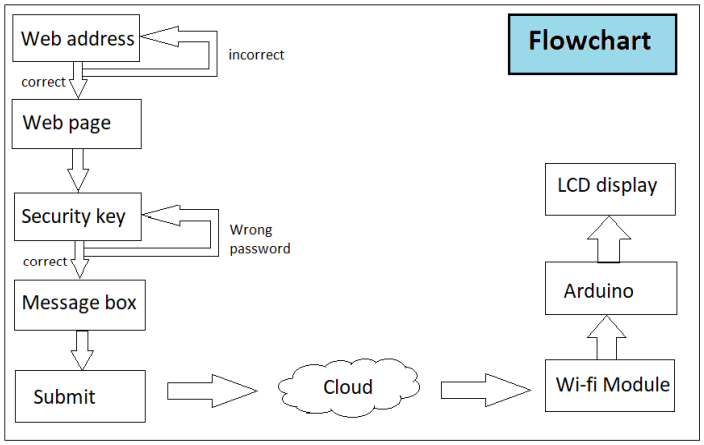

Figure 3. Flowchart of Iot based Web controlled Notice-Board

C. *Hardware*

1. *LCD Display*

A Liquid Crystal Display is used to form of visual display used in many electronics devices like laptops, digital cameras, mobile phones, calculators, digital watches, TV sets. The liquid crystal is sandwiched between two pieces of glass or transparent plastic and it blocks light rather than emitting. [14]

2. *Arduino Uno 328 Board*

Arduino Uno is basically an Atmega328 microcontroller having 32Kbyte flash memory and is a 8 bit microcontroller. It consists of 14 Input/output pins (in which 6 can be used as PWM outputs), analog inputs, 16 MHz resonator, USB connection, power

jack, ICSP and reset button. Its operating voltage is 5V and input voltage is 7-12 V. [8][19-20]

3. *Wi-Fi Module*

It is a node Mc v3 Wi-fi module which is an open source IOT platform. It includes firmware which runs on esp8266 Wi-Fi SoC. It is used to interface with hardware like arduino. [9], [10]

4. *Potentiometer*

It is a three terminal resistor having sliding or rotating pin used to adjust the resistance. It is used to adjust the contrast of the LCD.

5. *Real Time Clock(RTC)*

RTC is a clock based on the interrupt at present interval. It interrupts service executes on each timeout of this clock. This component once started will never be reset with another value.

D. *Software*

1. *HTML:*

HTML stands for Hypertext Markup Language. It is used to define the structure of a webpage. It is called the 'noun' or the 'skeleton' of a webpage. [11][12][16]

2. *CSS:*

CSS stands for Cascading Styling Sheets. It defines the style of HTML. It is called the 'skin' or 'adjective' of a webpage. [12], [13][17]

i. *JavaScript*

It is programming language used to add functionality, logic and interactive (for example load updated content from twitter) to a webpage. It is called the 'verb' or 'action' of a webpage. [12], [13][18]

ii. *Embedded C:*

It is programming language used to program a microcontroller. C language is used because it is more reliable, scalable, and portable; and in fact, much easier to understand. Embedded C is basically the extension of C language with some additional header files.

iii. *Arduino IDE:*

The arduino software or IDE (Integrated Development Environment) is used to write code ion a computer and upload computer code to the physical board. It can be used by Windows, Mac OS X, and Linux.

E. *CIRCUIT DIAGRAM*

The circuit diagram of Iot based web controlled notice board consists of Arduino Uno, LCD display, RTC, Wi-Fi module and power supply as shown in Figure 4

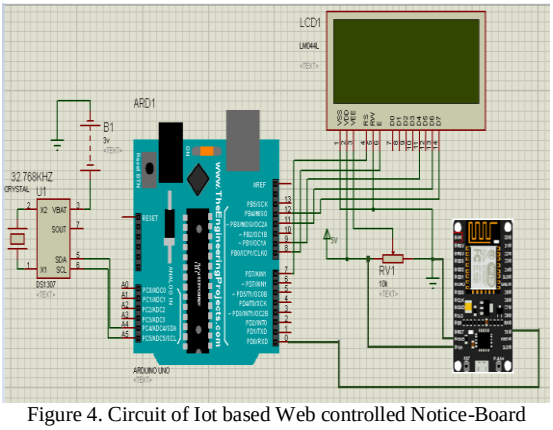

Figure 4. Circuit of Iot based Web controlled Notice-Board

F. *CODING*

Table.1. Code 1

```
void setup () {

Serial.begin(115200);
WiFi.begin(ssid, password);

while (WiFi.status() != WL_CONNECTED) {

delay(1000);
Serial.print("Connecting..");

}

}

void loop() {

if (WiFi.status() == WL_CONNECTED)
{ //Check WiFi connection status

HTTPClient http;  //Declare an object of class
HTTPClient

http.begin("http://codeplaylabs.com/heartshop/
Message.php?id=1234");
//Specify request destination
int httpCode = http.GET();
//Send the request

if (httpCode > 0) { //Check the returning code

String payload = http.getString();
//Get the request response payload
Serial.println(payload);
//Print the response payload

}

http.end();   //Close connection

}
```

```
delay(10000);    //Send a request every 30 seconds

}
```

Table II. Code 2

```
//include the library code:
#include <LiquidCrystal.h>
String r,s;
// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(7, 8, 9, 10, 11, 12);
#include <Wire.h>
#include "RTClib.h"

RTC_DS3231 rtc;

char daysOfTheWeek[7][12] = {"Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"};

void setup() {
// put your setup code here, to run once:

if (! rtc.begin()) {
Serial.println("Couldn't find RTC");
while (1);
}

if (rtc.lostPower()) {
Serial.println("RTC lost power, lets set the time!");
// following line sets the RTC to the date & time this sketch was compiled
rtc.adjust(DateTime(F(__DATE__), F(__TIME__)));
// This line sets the RTC with an explicit date & time, for example to set
// January 21, 2014 at 3am you would call:
// rtc.adjust(DateTime(2014, 1, 21, 3, 0, 0));
}
// rtc.adjust(DateTime(F(__DATE__), F(__TIME__)));
lcd.begin(20,4);
lcd.setCursor(0,0);
lcd.print("Notice Board");
lcd.setCursor(0,1);
lcd.print("IOT based Display");
lcd.setCursor(0,2);
lcd.print("made by:");
delay(3000);
lcd.clear();

Serial.begin(115200);
}

void loop() {
// put your main code here, to run repeatedly:
DateTime now = rtc.now();
lcd.setCursor(0,0);
lcd.print(now.day());
lcd.print('/');
lcd.print(now.month());
lcd.print('/');
lcd.print(now.year());
lcd.print(", ");
lcd.print(now.hour());
lcd.print(':');
lcd.print(now.minute());
if(Serial.available()>0)
{
r= Serial.readString();
int x=r.length();
// Serial.println(x);
lcd.setCursor(0,1);
lcd.print("                    ");
lcd.setCursor(0,2);
lcd.print("                    ");
lcd.setCursor(0,3);
lcd.print("                    ");
int i=0;
while(i<=19 && r[i] !='\0')
{
if(i<x-2)
{
lcd.setCursor(i,1);
lcd.print(r[i]);
}
i++;
}
int j=0;
i=20;
while(j<=19 && r[i] !='\0')
{
if(i<x-2)
{
lcd.setCursor(j,2);
lcd.print(r[i]);
}
i++;
j++;
}
int k=0;
i=40;
while(k<=19 && r[i] !='\0')
{
if(i<x-2)
{
lcd.setCursor(k,3);
lcd.print(r[i]);
}
i++;
k++;
}
delay(2000);
}
}
```

G. CONCLUSION

As know the Internet of Things has entered in every field. In this paper, we have discussed the implementation of Internet of things in Digital Notice Board. This Iot based Web Controlled Notice Board is used to send data or message from anywhere in the world and at anytime using Internet, Arduino board, WI-FI module and LCD to display the message. The sending and receiving of message in this board is faster than previously used Notice Board. The Iot based Web Controlled Notice Board is cheaper, faster, secured and efficient than already used notice board. Moreover it will also eliminate the use of paper work or hand written notice board.

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