IoT based E – Notice board

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ABSTRACT

IoT (Internet of things) is an emerging technology for communication and automation which deals with communication and control of non-living things such as home appliances TV, AC etc. by using Internet. This technical paper provides a discussion on present trends in technology and how exactly, simple carry to use devices play a vital role in day-to-day life. Using the present technological devices, how an efficient and notice board can be made is explained in this paper. This model can be used where any information have to be given to a large number of people. For example in public places like railway stations, bus stations, colleges, banks etc. The main objective of the project is to develop a wireless notice board that displays notices when a message is sent from the user from anywhere. This project is internet based & platform independent.

Keywords: IoT, Arduino Uno, Ethernet Shield, Matrix LED display, Android app etc.

II. BACKGROUND OVERVIEW

A. Existing System
The following are the current technologies
- Manual
- RF based Noticeboard
- Bluetooth based Notice Board
- SMS based Notice board
- GPRS based Notice board

B. Drawbacks of Existing System
Following are the drawbacks of existing systems
- Manual notice Required Human source to show notice on board.
- Some of the notice boards have limited communication range, since RF module or Bluetooth is used.
- GPRS based notice board required network range for Internet connection.
- In case of SMS based notice board Mobile message plan is required. And only 160 characters can be transmitting at a time.
- All the noticeboard discussed are Platform Dependent. That means dependent on a particular platform.

III. THE PROPOSED SYSTEM

A. System Overview
The control unit comprises of Arduino board, Ethernet Shield and LED display. The Ethernet Shield allows an Arduino board to connect to the internet. Arduino board receives the message from the Internet by using the Ethernet Shield and display the message on the LED matrix display by means of scrolling the message. So in this case the Arduino act as a client. we have designed our own website to send the message from the Internet which also gives user authentication in terms of Login ID and password. Also we have developed an android app for the user simplicity.
B. Block Diagram
The Block Diagram of the system is given below.

Fig.1 Basic block diagram of system
C. Explanations of Blocks

The following are the brief explanations of the working principle of the various major blocks or sections used in the system...

- **Arduino Uno:**
  
  It is the heart of the system. This is a microcontroller board which is based on ATmega328p processor. It is very small but powerful board to implement various applications. It supports various shields like GSM, Wi-Fi, Ethernet Shield etc.

- **Arduino Ethernet Shield:**
  
  This is an additional hardware add on used with Arduino boards to provide Internet connectivity. It provides a network (IP) stack capable of both TCP and UDP. The Ethernet shield connects to an Arduino board using long wire-wrap headers which extend through the shield. It does not require any additional power supply. It uses the same power supply from the Arduino board.

- **LED display Drivers:**
  
  Here we used 8X8 LED clusters, which has 8 anodes and 8 cathodes to control 64 LEDs individually. Here we select Red LEDs since better intensity and visibility.

- **LED display Drivers:**
  
  Here we used IC 74HC595 (8bit shift register) to drive the row and TIPIC6C595 (high gain 8 bit shift register) to drive the column and daisy chained shift register with common clock pin to drive columns. Each shift register can drive 8 columns based on the number of columns number of shift registers can be increased, here is no limit for the columns. Both this shift registers have low power dissipation, so internal onboard 5V supply of Arduino Uno is sufficient.

- **5V DC power supply:**
  
  This unit will fulfill the voltage requirements of the System. It will convert the 230V AC to 5V DC. It consists of transformer, bridge rectifier and regulator etc.

- **Web Server:**
  
  We have created our own free webpage for writing and sending the message using HTML. Also we have given user authentication by means of user Id and password.

D. Software Specifications

The Following are the prominent features of the above discussed system...

- Arduino IDE 1.6.5
- SDK, Eclipse for android application development
- Eagle software for PCB designing
- Notepad for html webpage design

IV. SCOPE & APPLICATIONS

This project can be used at

- Educational institutions and organizations
- Advertisement
- Any public Utility places
- Managing traffic
- Bus/Railway Stations
- Conference hall

V. CONCLUSION

Arduino can be used as an IoT agent with the Ethernet Shield for serving internet to the applications. Arduino is a low cost IoT agent as compare to any other. This system can be used in various remote robotics applications for future scope.

VI. ENHANCEMENTS

A. Limitations

As generally all systems have some limitation, here are some listed for the proposed system...

- There is no acknowledgement that the message is being displayed.
- Not suitable for more complex characters. 16x16 display is required.

B. Future Modifications

There is always chance to improve the any system as research & development is an endless process. Our system is no exception to this phenomenon. The following improvements can be done...

- Multilingual display in different areas as per the local language
- Large LED scrolling display can replace small LED panels
- Time and date display during periods when no message are to be displayed.
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