Design and Construction of Voice-Controlled Smart Electronic Notice Board

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Abstract - *Notice board plays a vital role in displaying important messages in many institutes, offices, print media, or in railway stations, bus stands, schools, hospitals, and in many other public places. In the traditional system of paper notices which are pinned on the notice board are time-consuming; require more papers and human work. This paper presents a new type of notice board, a smart electronic notice board, which reduces the cumbersome work and displays messages on the board. A smart electronic notice board will display any messages that will be spoken by the operator. The display messages will also be controlled from a distant point by the same user. In this paper, this speech-operated notice board will be designed and its performance will be analyzed by giving a command. The operator has to provide a voice command to control the messages displayed on the notice board. For this to do, the user needs to install the android application on the cell phone or tablet to detect the voice. The speech will be converted to text and will be transmitted via Wi-Fi or mobile data. It will be then received by a receiver on the Node MCU unit and then displayed on the notice board.*

Key Words: **Electronic notice board**, **Android application**, **Voice-recognition, MCU, WiFi dongle**

1. INTRODUCTION

In this world, everyone wants to lead a comfortable life. Researchers around the globe have researched different technologies for the sake of leading a contented life. In today's world of communication, mass people are becoming accustomed to easy access to information. Now people, around the world, want to be informed of the latest events happening around the world by any means. The wired network connection has many limitations depending on the need and type of connection [1]. Therefore, people prefer a wireless connection because they can easily interact with people and it requires less time. The main purpose of this paper is to design a wireless smart electronic notice board that displays a message sent from the user and would be user-friendly. GSM and Wi-Fi are the wireless technology used [1] [6]. At present, cell phones and related technologies are becoming more and more prevalent. Various technical areas in the field of telecommunication and embedded systems are becoming omnipresent to the people. Mobile phone use has hastily increased over the last decade and a half. Upgradation in networking technologies has encouraged the development and growth of very dense networks [2]. Traditional notice boards are being used widely from primary schools to major organizations to convey messages. A lot of paper is being used daily by the institutions. Small innovative steps in making use of technology for regular purposes would have an adverse effect on the environmental issues which we are presently concerned about [3, 4]. This paper deals with designing a smart electronic notice board that will be wirelessly connected to the user's cell phone. In this case, the user may speak out the message through an android phone which uses a developed speech to text mobile application. The text message is then transferred via e-mail using Wi-Fi Dongle or through the mobile data access over a mobile phone to the receiver of the Wi-Fi MCU IC. The MCU unit then extracts the text messages and then displayed on the LED dot matrix display screen. It is cost-effective and saves resources like human effort, ink, and especially paper.

2. RELATED WORKS

Different types of notice boards are used in distinct institutes to display notices and these boards are managed manually. Researchers are being done to make the process easy and to minimize the cost and manpower.

Abhishek Gupta, Rani Borkar, Samita Gawas, Sarang Joshi has mainly focused, in their project, on the GSM technology, Raspberry pi technology, and LCD monitor. In this world, everyone wants a comfortable lifestyle. Man has researched different technology for the sake of life. In today's world of communication, everyone is becoming accustomed to easy access to information whether by the use of the internet or television, people want to be informed. Now a day's people prefer wireless connection because they can interact with people easily and it requires less time [1].

Prof. R. G. Gupta, Nawale Shubhangi, Tupe Usha, Waghmare Priyanka worked on "Android Based E-Notice Board". In this paper, the main concept is to design an electronic notice board for institutions where the message to be displayed. The notice can be sent to the required departments wireless within a second. This creative technique used by the faculty in order to display the latest information. The contents of the notice can be changed whenever required. The GSM modem is the special type of modem that accepts the Subscriber Identity Module (SIM) card. And it is connecting to the microcontroller through the serial port [4].

Mr. Ramchandra K. Gurav, Mr. Rohit Jagtap described in the paper titled "Wireless digital notice board using GSM technology" a system by which the message send from authorized users to the GSM module which is located on the notice board. This GSM module receives the message and displays it on the notice board, at the same time this message will be sent to a different mobile number stored in the memory of the microcontroller. When a new message has arrived on the notice board then the buzzer will beep. Max232 shifts the level of the signal which converts the signal between the microcontroller and GSM module. After the conversion of the signal, this message will be displayed on the notice board [5].

Neenu Ann George completed a project titled "Raspberry Pi Based Speech Recognition Sensed Smart Notice Board Display". This project introduces an innovative android based notice board display system [7].

3. SYSTEM DEVELOPMENT

At present, papers are used to circulate any notice on the notice boards by human effort. It is a time consuming and cumbersome job as well as there is wastage of paper. For any changes of notices, a person needs to go to the notice board and put a new hard copy.

The block diagram represents (Fig.1) the system. This system is an implementation of the idea of wireless communication between a mobile phone and a Node MCU unit. From the block diagram, it is apparent that the proposed system consists of a display unit, and an android device using wireless technology and an MCU unit. The display unit consists of an LED display that can be interfaced with Node MCU ESP8266, an open-source IoT platform. The Android application device (mobile phone) will send the signals via the internet at any distance and then received these signals to the MCU unit. The MCU unit extracts the test and further displays it onto the notice board (Fig.2).

In this paper, we will use the Google Voice Assistant through a user name and password. This will convert speech to text. We first need to create a server with Google API and in Node MCU. The user can connect the cell phone to the API server by using an email account, and after that, he can easily login with Google voice assistant on a phone then just speaking the command "Change Matrix to" any other voice will be shown onto the dot matrix LED display.

This electronic notice board is a combination of software and hardware. The email account password will only be known to the user. The User needs to get logged in for uploading the notice. By using this module the user can be able to update the notice directly from Google assistant that will be automatically updated on the digital notice board. When the update is finished, users can logout.
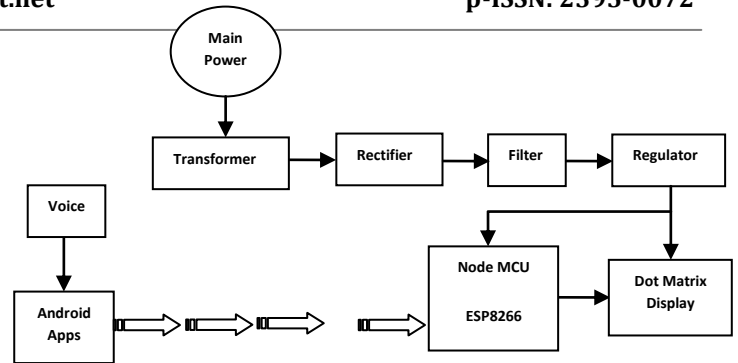

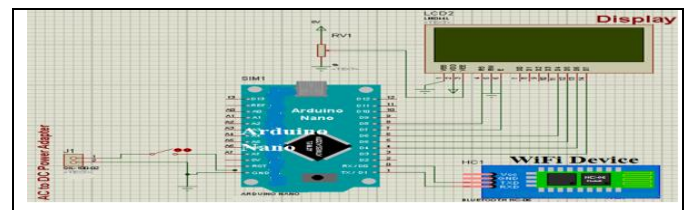Fig. 1. Block Diagram of Voice-Controlled Smart Notice Board

Fig. 2. Schematic Diagram of Voice Control Smart Notice Board

4. RESULT AND DISCUSSION

At first, it needs to log in through user name and password. Then the google API will convert out speech to text announced before the cell phone or tablet. When the user speaks in front of the android gadget the android system then sends out the spoken request to the MCU unit through the internet and asks the service to turn on the device's onboard LED. The MCU unit also sends its model and the device's instance identifiers so the service can determine how to best respond in context to the request.

If it needs to change the messages displayed on the notice board, the user requires speaking "Change Matrix to" and then speaking the messages that the user wants to display Fig.3 show the practical system just before sending the messages and Fig.4 displays the message announced in front of the android cell phone.
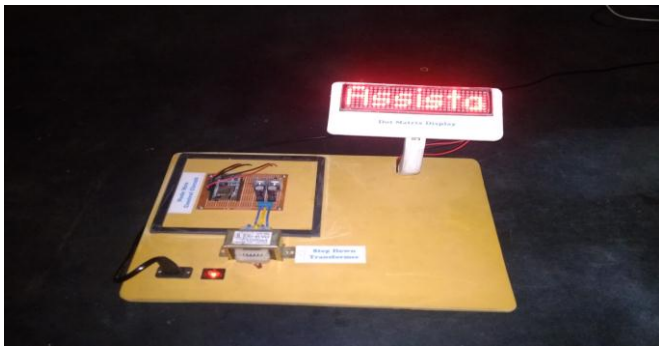

Fig.3 Complete project picture before sending voice

Fig.4: Compete project picture after sending voice

5. CONCLUSIONS

In the present era, everything in this world is digitalized. The voice-controlled smart notice board is a modern concept of showing information on the notice board in the world. This idea could be a milestone for the current world as the user can communicate from a distant point. When the head of an organization gives notice, it is to be printed on paper. Because of this, it is a waste of time, manpower and money. Since it is controlled by Android, it is cost-effective, user-friendly system, easy to use, reduces energy and time.

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