# IOT AND GOOGLE ASSISTANT BASED WIRELESS NOTICE BOARD

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**Abstract**

This proposed system presents a digital notice board using WiFi module. The idea behind this proposed system is to provide its users with a simple, fast and reliable way to put up important notices in an LCD where the user can send a message to be displayed in the LCD. The message can be sent through an Google Assistant application designed in this proposed system, through the WiFi module. So, notices can be put up in an LCD display from any location in the world. It uses a microcontroller for system control, WiFi based technology for communication and sends the message through the Google Assistant application. The proposed system consists of a Nodemcu, WiFi module, an LCD, and an Google Assistant application for user interface with the hardware. This device can be used anywhere irrespective of the place of deployment provided mobile network connectivity is available.

## Introduction

As technology improves, efficient, financially affordable and highly productive output becomes an absolute necessity, and this leads us to be more inclined towards using automated control systems. Human intervention, although it offers variety, adaptability and interactivity, could lead to errors, as it is a natural and inevitable result of this variability. Hence, automation of a system is an accepted means to minimize human error and its impact.

Applying this to the situation under scrutiny now, the traditional methods of writing typing the notice on paper, and having a man/woman deliver the notice to the respective groups, or having him/her paste the notice on the notice board, is prone to errors. The person delivering could deliver it to the wrong group, or tamper with the information being sent, etc.

With the electronics industry moving at a fast pace, we are able to solve many such problems with digital replacements. Our proposed system, Multi Electronic Notice Board, aims at eliminating the use of

paper in offices, schools &amp; colleges, and other institutions; also minimizing the risk of errors, by replacing paper with LCD displays.

In this proposed system, an hardware capable of displaying notices electronically using an Google Assistant application has been built. In order to display notices, a user can use the Google Assistant application to type a notice and click on the send button to get it displayed. The functionality can be used only if wiFi module is connected to hot spot of the host. The hardware consists of a Nodemcu that communicates to the application through a WiFi module to receive messages. Nodemcu itself retrieves message and sends signal to switch on/off a device or display a notice.

The motivation behind such a proposed system is mainly to reduce physical effort for operating appliances especially for aged people. Another reason for this proposed system is over usage of paper in educational institutions for printing notices. Due to mushrooming paper usage day by day, lot of trees are being cut which is harmful for the environment. So, if notices are displayed everywhere electronically, it would reduce paper usage and make communication easier and faster. A GSM based system is exible, durable without any risk of getting hacked. Such a system has a low cost of installation and maintenance.

**Literature survey**

Literature survey is mainly carried out in order to analyze the background of the current proposed system which helps to find out flaws in the existing system and guides on which unsolved problems we can work out. So, the following topics not only illustrate the background of the proposed system but also uncover the problems and flaws which motivated to propose solutions and work on this proposed system.

GSM network is widely used today whether it is for calling or SMS. Also some of the places needs urgent notices like in college, railway stations share- market, and this notice should be in real time, so we need a real-time notice [1]. This proposed system is our experiment to give a start to the era of real-time noticing. This proposed system is about writing the message which is to be displayed in mobile and send it as SMS to other side. This received message is fetched into Microcontroller and after authentication it is displayed on LCD screen. Also by interfacing a voice data recording IC with Microcontroller we can also do announcements in real-time.

This paper is designed using Nodemcu interfaced with Graphical Display. At present, when information has to be updated in a notice board, it has to be done manually. Also in present electronic systems, no matter how many displays are present, only a single notice can be sent to all of the notice boards irrespective of their places. In order to overcome this disadvantage, multiple displays along with a decoder are used to select a particular display and the corresponding information is sent through a Nodemcu controller by using GSM technology.

The entries can be documented and a record may be maintained for future use by using visual basic. The controller has internal a real time clock used for synchronization of data. A resistive touch screen is used to access the previous notices and also progress details. The monitoring system consists of an image sensor which captures the images for the specified amount of time and the images can be transferred through an USB port to a PC for storage purposes.

This paper is developed a GSM based notice board display using ARM7 controller along with LED array. The microcontrollers provide all the functionality of the display notices and wireless control. The Display is obtained on a 7X96 Light Emit- ting Diode (LED) dot matrix display. A desired text message from a mobile phone is sent via a Global System for Mobile Communication (GSM) to the GSM module located at the receiving end [3]. The GSM modem is connected, through MAX 232 Integrated Circuit (MAX 32IC), to the ARM7 microcontroller. The message that is stored in the Electrically Erasable Programmable Read Only Memory (EEPROM) is then displayed on the LED dot matrix display. This hardware uses regulated 5V, 500mA power supply. A three terminal LM7805 is employed for regulation of the voltage. A bridge type full-wave rectifier is used to rectify the AC output of the secondary of 230/12V step down transformer. The system was tested to work according to specification.

In the last couple of decades, communication technology has developed by leaps and bounds. The use of Embedded System in Communication has given rise to many interesting applications. One of such applications is public addressing sys- tem (PAS). Many companies are manufacturing audio / video systems like public announcement system, CCTV, programmable sign boards etc. But all these systems are generally hardwired, complex in nature and difficult to expand. So, by adding wireless communication interface such as GSM to these systems, we can overcome their limitations .Now a days LED Message Scrolling Displays are becoming very popular .These displays are used in shopping malls, theaters, public transportation, traffic signs, highways signs, etc. This paper describes the GSM based LED display [4].

Now a days, Scrolling LED Displays are normally used in stationaries, rail- way stations, banks, etc. everywhere in the daily occupational life. This LEDs are preprogrammed in sense that they are already programmed to display a particular message; in case of editing or manipulating the message a person is needed around the display either by leased media or some kind of wireless media(within a limited area) which itself is an disadvantage because a the person cannot be always present at the location of the display board; a person might be at some other place and it is urgent for the person to display the message on the LED display board which is at a distant place, so this type of Scrolling LED Displays are not effective in all situations and also this display board cannot be placed anywhere because of complex and deli- cate wiring. GSM based LED Scrolling Display Board is a model for displaying notices or messages within any networked area through SMS which can be send by mobiles]. The Proposed system aims to provide the services of communication with LED displays remotely using GSM (that is by using SIMs via mobile phones) and updating message instantly on display board unlikea desk bound device such as PC or laptop. The user can update it even from a remote distant with simple user interaction.

Everything around us is becoming smart such as smart phones, smart televisions, smart refrigerators, so why not smart displays boards for advertisements and notices. Display boards are primary thing in any institute, organization, public utility places like bus stops, railway stations, parks, shopping malls to display information regarding platforms, various advertisements about the products, or important notices. People are now adapted to the idea of the world at its fingertips.

The old wired display boards are controlled by microcontroller. To change message, we need to change the microcontroller program code again and again. By adding GSM wireless communication interface, we can overcome these limitations [6]. It is a start to the era of smart and real-time displaying of messages on display boards. This paper explains the development of GSM based Smart LED Display Boards using Short Message Service (SMS).

## SYSTEM DESIGN

### Overview

Design is a meaningful engineering representation of something that is to be built. It is the most crucial phase in the developments of a system. Software design is a process through which the requirements are translated into a representation of software. Design is a place where design is fostered in software Engineering. Based on the user requirements and the detailed analysis of the existing system, the new system must be designed. This is the phase of system designing. Design is the perfect way to accurately translate a customer requirement in the finished software product. Design creates a representation or model, provides details about software data structure, architecture, interfaces and components that are necessary to implement a system. The logical system design arrived at as a result of systems analysis is converted into physical system design. System development methodology System development method is a process through which a product will get completed or a product gets rid from any problem. Software development process is described as a number of phases, procedures and steps that gives the complete software. It follows series of steps which is used for product progress. The development method followed in this proposed system is waterfall model.

### Model phases

The waterfall model is a sequential software development process, in which progress is seen as flowing steadily downwards (like a waterfall) through the phases of Requirement initiation, Analysis, Design, Implementation, Testing and maintenance. Requirement Analysis: This phase is concerned about collection of requirement of the system. This process involves generating document and requirement review.

**System Design:** Keeping the requirements in mind the system specifications are translated in to a software representation. In this phase the designer emphasizes on:- algorithm, data structure, software architecture etc. Coding: In this phase programmer starts his coding in order to give a full sketch of

product. In other words system specifications are only converted in to machine readable compute code. Implementation: The implementation phase involves the actual coding or programming of the software. The output of this phase is typically the library, executable, user manuals and additional software documentation.

**Testing:** In this phase all programs (models) are integrated and tested to ensure that the complete system meets the software requirements. The testing is concerned with verification and validation.

**Maintenance:** The maintenance phase is the longest phase in which the software is updated to fulfill the changing customer need, adapt to accommodate change in the external environment, correct errors and oversights previously undetected in the testing phase, enhance the efficiency of the software.

**Reason for choosing Waterfall Model as development methods:**

1.Clear proposed system objectives.

2. Stable proposed system requirements.

3. Progress of system is measurable.

4. Strict sign-off requirements.

5.Helps you to be perfect.

6. Logic of software development is clearly understood.

7. Production of a formal specification.

8. Better resource allocation.

9. Improves quality.

The emphasis on requirements and design before writing a single line of code ensures minimal wastage of time and effort and reduces the risk of schedule slippage.

**Architectural design**

The overall logical structure of the proposed system is divided into processing modules and a conceptual data structure is defined as Architectural Design. From the above figure 6.2 we can observe that the dot matrix is connected to NodeMCU10 by 3 wired SPI protocol connection. The NodeMCU10 has one wifi module inbuilt in it.The NodeMCU10 has 12pins.Here in this we are using only 3 pins. The rest of the pins we are leaving free. The user connect the device and Google Assistant application with the same hot spot. The user then open the app and press the ip address of the hot spot then after establishment of the connection between device and Google Assistant application, User will type the content to be displayed in the text box provided for text in the Google Assistant application and then user

will press enter then the message will be transferred from application to device through wifi and it will be displayed in dot matrix display.

## Performance analysis

16 * 2 LCD DISPLAY: These LCDs are ideal for displaying text/characters only, hence the name 'Character LCD'. The display has an LED backlight and can display 32 ASCII characters in two rows with 16 characters on each row. Although they display only text, they do come in many sizes and colors: for example, 16×1, 16×4, 20×4, with white text on blue background, with black text on green and many more.

## Conclusion

The prototype of the proposed WI-FI based electronic notice board was successfully designed. It can be easily integrated with all general-purpose display board thus proving its mobility. The message is transferred using wireless technology and is eventually obtained on the LED matrix. Thus we are using modern technology to replace conventional display boards the Google Assistant app interface can make this system even more user friendly and popular.

The system accepts the message from app to be displayed in the form of Short Message Service (SMS) stores it, checks for its validation and then displays it on the display unit if it meant for that particular display unit, it decided based on IP ad- dress. This system supports only one message at a time. The proposed system can be efficiently used for transfer of message instantly on campus.

The WI-FI based smart electronic notice board is efficiently designed. The smart electronic notice board system accepts new SMS, validate it, store it and display it on 8X8 LED panel. It reduces the overall development cost and also minimizes the complexity. Therefore, smart electronic notice board system becomes smarter, efficient, robust and portable.

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