WIRELESS DIGITAL NOTICE BOARD USING RASPBERRY PI

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Abstract: Notice Boards are one of the most common ways of displaying information to the public wherein important messages are written or printed on paper and stuck on bulletin boards at suitable places for the targeted audience to view. This is the most traditional way of displaying notices. But with the advancement of technology and the world entering into an era of smart and connected devices, it is high time to transform such a time and resource consuming process of displaying notices into a more technically advanced system by building a wireless digital notice board using a Raspberry Pi and GSM module.
Keywords: Raspberry pi, GSM Module, UI, HDMI, SMS, PDF, DOC file

I. INTRODUCTION

Traditionally, notice boards are boards which have a number of papers containing important information stuck on them. They are used in educational institutions like schools and colleges, public places like railway stations, bus stands and government offices, etc. Such a manual display of notices using paper leads to wastage of a lot of paper, manual labor, time consumption and possibility of those papers falling out of the board thereby failing to convey the notice to the targeted audience or someone may tamper the messages which questions the integrity of the message displayed.

To overcome all these disadvantages of the traditional notice boards, we are developing a Wireless Digital Notice Board using Raspberry and GSM module which is capable of displaying notices on an LCD screen focused on usage at educational institutions. Notices can also be accessed via an android application for android users and sent via SMS to non-Android users.

II. PROPOSED SYSTEM

The proposed solution method for the display of notices and messages is as follows:

- The system mainly consists of three modules: Raspberry Pi, GSM and User and Admin interface.
- Raspberry Pi model B is used which has wireless network and Bluetooth connectivity capability. This enables to receive messages from Android devices via Wifi or Bluetooth from the authenticated user.
- GSM module consists of a SIM which is capable of receiving text messages from a non android phone in case the admin user does not have an android device and no wireless network availability.
- User interface – An application is developed which provide a user interface for both the administration users and the viewers. It displays and reveals only the authorized and appropriate information to each kind of user.
- A user who wants to access or to get the content on the digital notice board must have the internet connection and should be logged in to the web application provided.
- Once the user is authenticated, he/she will get the privileges according to his role i.e. student or faculty.
- If he/she is a faculty, they will connect to the page where they can upload documents such as image, doc files and pdf's.
- These files will be sent to the cloud from the user's internet and will be passed on to the raspberry pi.
- Once the raspberry pi listens to the document, it will process it and displays it on the Display device through HDMI interface.
- This proposed solution will enable the authorized user's to receive SMS from the Raspberry pi through GSM module integrated which helps students to get notified whenever a notice has been published on the board.

III. IMPLEMENTATION

Software implementation model

In this project, we make use of the following 3 tier architecture for web requests and responses and used the following the tools mentioned in the Fig-1. We also make use of AWS EC2 instance for hosting the application and Amazon Relational Database Service (Amazon RDS) which makes it easy to set up, operates, and scales a relational database in the cloud.

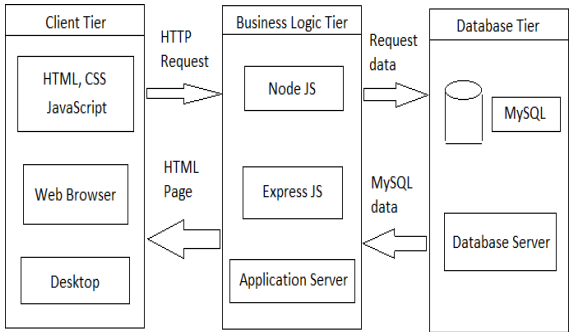

Fig - 1: Interaction of Web Application

User Interfaces

In this project, user interfaces as classified as two types, one is for Normal users to view the Documents and other is for the Admin who can manage the notices on board and has highest privileges.

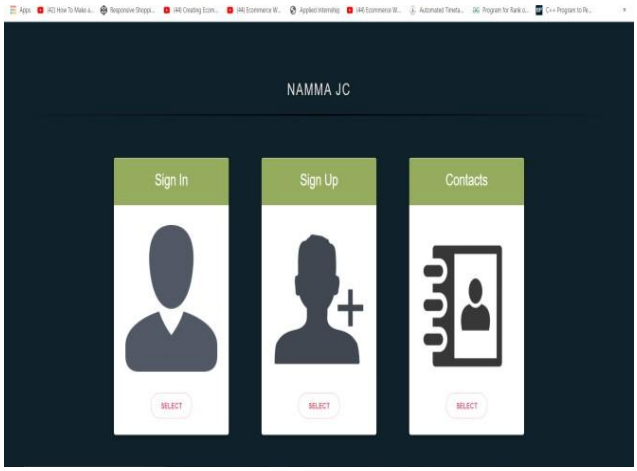

Fig – 2: Landing page for both Admin and Users

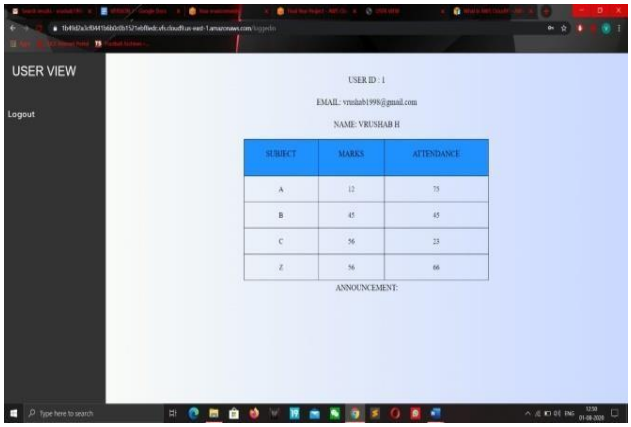

Fig - 3: User view page to see marks and attendance in respective subject

Hardware Implementation and Connections

Interaction between Raspberry Pi and the Monitor

- Raspberry pi can be connected to the monitor either by the VGA cable or by the HDMI cable. (We used HDMI cable)
- A software program has been written in the Raspberry pi to receive files or documents or any announcement texts from the authorized users or to be precise Admins.
- The textual contents or multimedia files has been received by the Pi and upload the same into the notice boar, which is the Monitor.

Interaction between Raspberry pi and the GSM Module

- Place a valid SIM card from a wireless carrier into a mobile phone or GSM modem, which is then connected to a Raspberry pi.
- After connecting a mobile phone or GSM modem to a computer, you can control the mobile phone or GSM modem by sending instructions to it.
- The instructions used for controlling the mobile phone or GSM modem are called AT commands (ATtension commands).

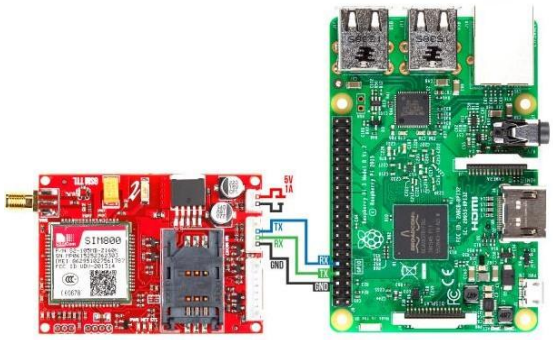

Fig - 4: Connecting Raspberry pi to GSM module

IV. EXPERIMENTAL RESULTS AND SCREENSHOTS

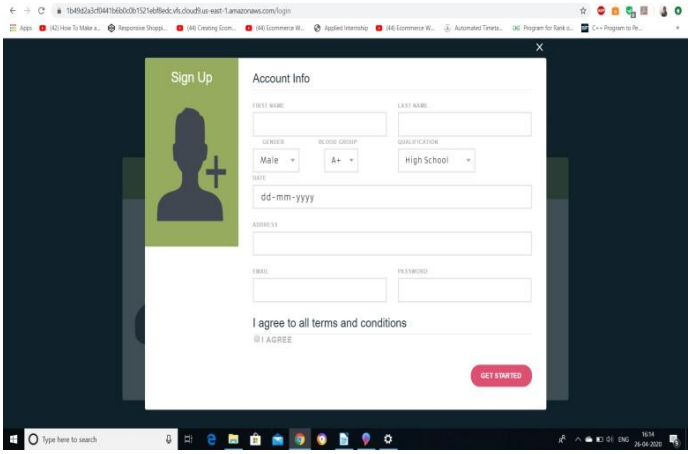

Fig - 5: Sign Up Page for both Admin and Users

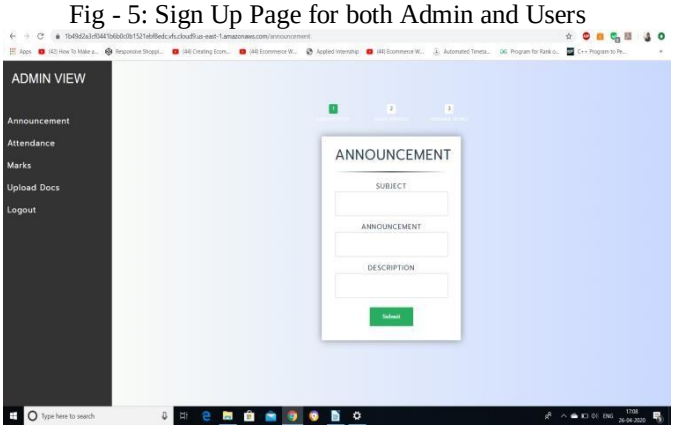

Fig – 6: Announcement Page for Admin to announce a notice

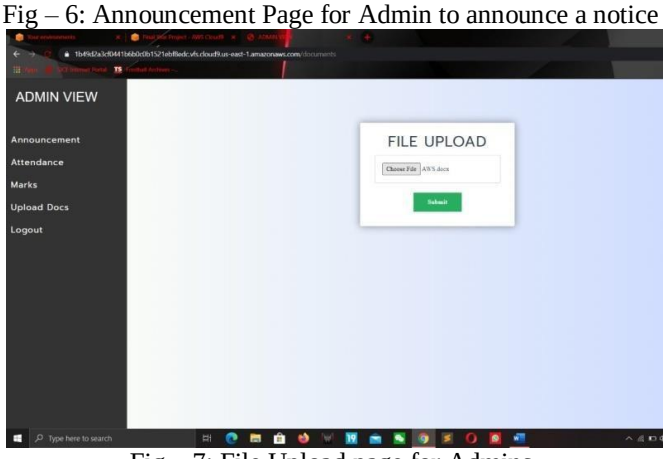

Fig – 7: File Upload page for Admins

V. CONCLUSION AND FUTURE WORK

The wireless digital notice board developed helps to ease the process of displaying notices. It makes use of Raspberry Pi and GSM module to be able to display and view important messages to the public via the internet on Android phones and as a text message on non Android phones. This overcomes the difficulties of manually typing notices, printing it, getting it approved by the authority and then sticking it up on the notice board which most of the time goes unnoticed by the targeted public.

The proposed and presented system gives the administration officials to directly send notice via their phones which is given admin privileges wherein they can choose what to send and whom to send it to. If the notice is meant for the teachers, it will be directed to them, similarly to students and parents whomsoever it concerns.

The futuristic scopes of this project are the following features:

- Display of QR code for the public to scan and view any notices or images or website, which can be displayed on the monitor situated in campus.
- Display the information about the status of the classes currently going on. For example, a student can view which classroom to go to at a particular hour and also know if there has been a cancellation of any class or if the class has been moved to a different room or slot.
- Provide a page for faculty and facility feedback from which can be filled by all students and then analyzed by the department administration to realize what improvements and changes need to be done to give satisfactory education to the students.
- Get daily news updates on the happenings in colleges by various clubs and the activities they are conducting. Also provide option for enrolling to these events online itself.

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