Design, Control & Performance Analysis of Electronic Noticeboard

An android controlled electronic noticeboard

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Abstract— this paper introduces an Electronic Noticeboard that is based on user-friendly smart technology. The Electronic Noticeboard is controlled via smartphone android app. This Electronic Noticeboard is build and functioned in replace of human effort especially educational campus service to hang important notice digitally without any human existence. Individual account via web based android app for all faculties is facilitated in this system so that faculties can easily post their important messages in the noticeboard. Individual account for students is also facilitated to every student to check up if there is any update notice or not. Special design features is introduced in the Electronic Noticeboard that ensures the total security, added new dimension in electronic noticeboard technology. Performance analysis is shown to evaluate how Electronic Noticeboard is unique. The efficiency of the entire system is established through practical studies. The end result denotes the sustainability, affordability and reliability of the Electronic Noticeboard. This paper also enables the immense possible research scope among educational institutions.

Keywords— smartphone; technology; electronic noticeboard; android; analysis;

I. INTRODUCTION

In the last couple of decades, communication technology has developed by leaps and bounds. Wireless communication has announced its arrival on big stage. We want to control everything and without moving an inch. This Android Based Electronic Notice board will be proved very beneficial as it is going to reduce the paper workload to publish any notice. Teachers can publish their notice without physically present in the campus and students can also know their important notices from their home by this app. In this system security issues are strictly maintained in case of publishing any notices by providing a unique id password to the faculties to publish the notices through the app and the SIM no of GSM module is also secured and it's completely hidden from the app. In case If that SIM no is somehow leaked then the unauthorized users can send fake notices to the GSM module but It won't be displayed on the LCD display as the Microcontroller (Arduino Mega 2560) is logically designed in this way like messages from unauthorized users will not be shown in the notice board as well as notice list of android app.

II. LITERATURE REVIEW

Present scenario of usages of electronic noticeboard in third country is not satisfactory. On the contrary, the first world countries are way ahead using this electronic noticeboard at a good percentage though the average cost of the device is much higher. The third world countries are lack behind due to lack of technological update, high costs of available devices and absence of educational awareness. As it is clear that situation needs to be changed, we need to be concern more about this issue. We have a plenty of modern technology that can be applied. Due to higher production cost, some of the modern devices are not affordable to them [1]. The electronic noticeboard that proposed here can contribute a lot for the institution and students life faster, worthy with its features, like reduced paper work, easy monitor, flexibility, secured use & affordability.

III. METHODOLOGY

A list of methodologies is studied to make the research of electronic noticeboard a reliable one. Firstly, a few techniques from previous researches to design the app are reviewed with modification [2-5]. Arduino board is the control part and Android interfacial application is developed using android studio & other electronic components are used to precise the control system. Simulation studies are done using practical data. End result denotes the practical system a sustainable one. A brief planning is shown below for the purpose of easier understanding.

Step 1:
Total planning for the system, facilities, and required hardware. Hardware's that are available and affordable.

Step 2:
In this step we started working for designing the Android app interface and perform the parsing task with the database.

Step 3:
Connecting the required hardware according to pin diagram and displaying the notice in the LCD screen sending from Android app.

Table I

Step 4:
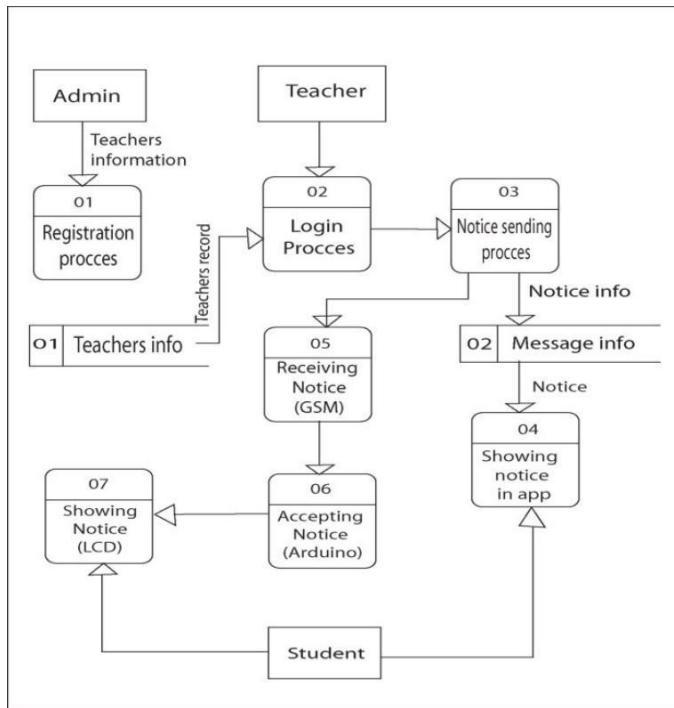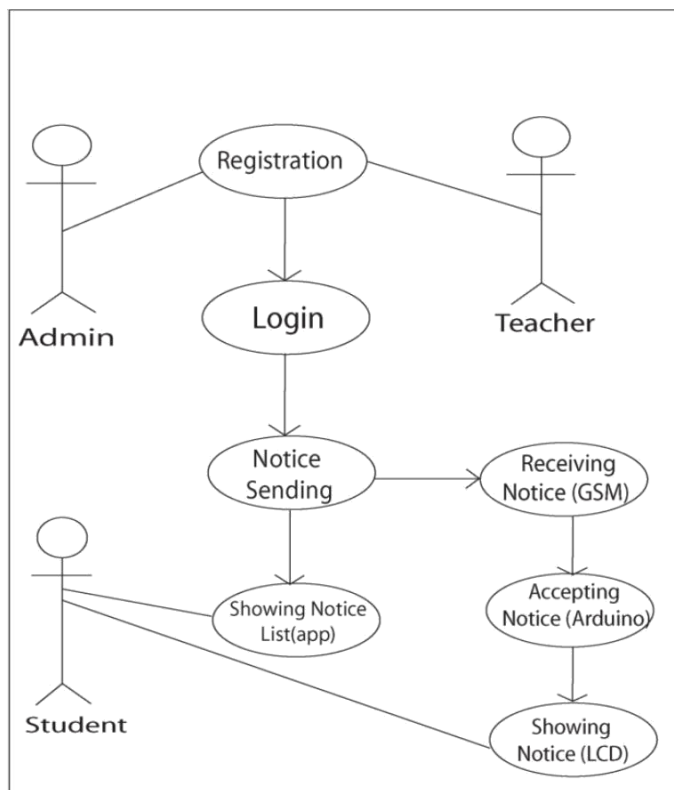Finally summarize all activities regarding development and Write the project documentation for submission.

Login & Registration
Table structure for teachers info

User _id	Usern ame	Email	Pas swo rd	Fulln ame	Short name	Dept	Designa tion
1	mina	mina@g amil.co m	….	Mina	Mina	CSE	Lecturer
2	tom	tom@ga mil.com	….	tom tom	Tom	EEE	Lecturer
3	rina	rina@ga mil.com	….	rina	Rina	CSE	Lecturer
4	jony	jony@g amil.co m	….	jony	Jony	CSE	Lecturer
5	pinky	jony@g amil.co m	….	pinky Rahm an	PNR	CSE	Lecturer

Table Structure for message info

Name	Type
user_id	int(5)
Msgid	int(10)
short_name	varchar(10)
Msg	Text
Time	Datetime

Figure 1.   Data Flow Diagram

All the programming code of this research is referred in the reference section **[8]**.

IV. APPLICATION & SYSTEM DESIGN

The Electronic Noticeboard app is modeled and designed using HTML, CSS, MySQL, PHP Java, Android SDK, Volley and XML **[2]**.
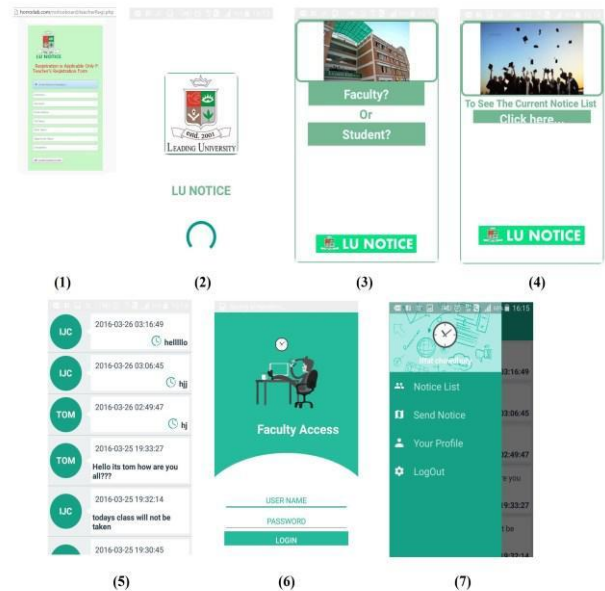

Figure 3.   Web Interface & Android Interface

Figure 2.   Use Case Tool Diagram

In this System web panel is used to register the faculties for the app. For each faculty this registration process [Figure 3 (1)] is done to keep their records and then when they will use the app they need to use their user name and password which will be given after completing the teacher registration form successfully. After completing the registration successfully all the records of the teachers will be stored in the database. Then this information will help in the upcoming tasks of the system. This system is operated through an android app by the user. When we open the app it will start with a welcome Splash Activity [Figure 3 (2)]. The user need to choose his/her option if the user is a student then he would choose press student button or if the user is a faculty member then he would choose to press faculty button [Figure 3 (3)].The user (student) will choose to press "click here" to check the current notice list [Figure 3 (4)].We can see that students can check that notice list [Figure 3 (5)]. If the user is a faculty member then he will insert his user name and password to publish any notice [Figure 3 (6)]. We can see a navigation drawer it will come after inserting the correct username and password. We can see there are four options notice list, send notice, your profile and logout option [Figure 3 (7)]
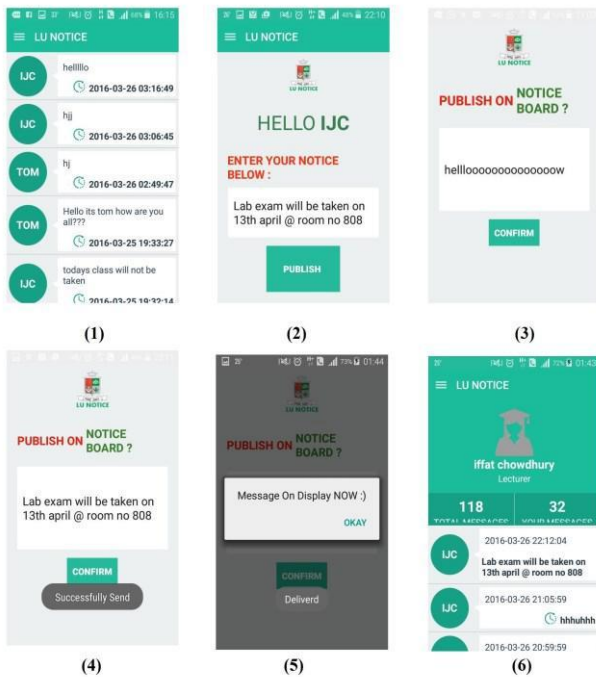

Figure 4.   Android Interface

We can see the notice list. By selecting the notice list option user can check the currently published notice [Figure 4 (1)]. By choosing the send notice option user will enter a sub activity where at the top of the page there short name will be mentioned and there will be a text field to write the notice .After pressing the publish button this notice will be stored in the database and added to the notice list and then the user will enter another activity [Figure 4 (2)]

We can see that user needs to press the confirm button to publish that notice to the display screen [Figure 4 (3)] After pressing the confirm button toast messages will be seen in the app to confirm that notice has published successfully to the display [Figure 4 (4, 5)]. We can see the update profile interface where the user will know how many notices he has published with the total no of notices has published [Figure 4 (6)]. All the programming code of this research is referred in the reference section [8].

V. CONTROLLER DESIGN

The Electronic Noticeboard is controlled by using Android smartphone. Arduino platform is used & mobile app is build using Android studio. The Smartphone device is paired with a GSM module which communicates with smartphone to post messages using android app.
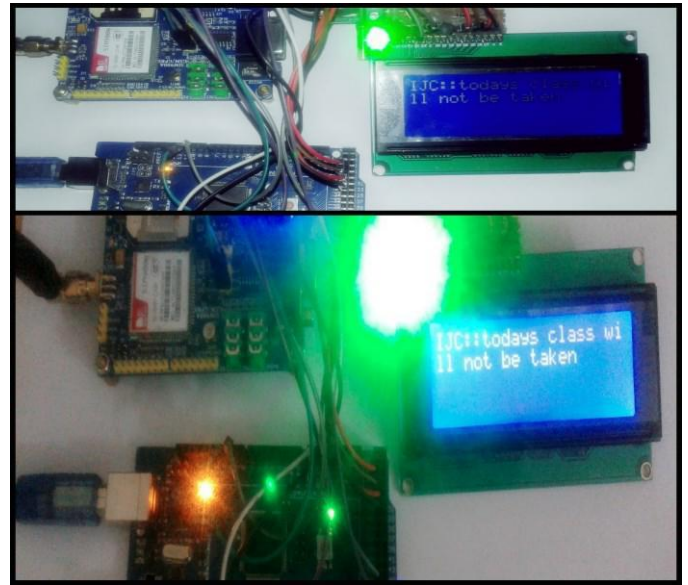

Figure 5. Hardware Interfacing using Arduino Mega 2560, GSM900a Module, SIMCom SIM900A GSM Module, MAX232 IC, Serial Port/DB9 Connector, Power On/Off GSM Switch, SIM Card Slot, Indicator LEDs, LCD Display

To make this system functional, the above connection system is maintained that is the Arduino pin 46 with lcd pin RS, Arduino pin 48 with lcd pin EN, Arduino pin 26 with lcd pin D4, Arduino pin 28 with lcd pin D5, Arduino pin 30 with lcd pin D6, Arduino pin 32 with lcd pin D7 and the GSM is using the Arduino pin 10, 11. The LCD display will show the current four notices from the notice list [3-5, 8].

VI. TESTING, SECURITY & COST ANALYSIS

Testing is mainly done for rectifying the error from the program that the program that is design for particular problem. Before doing the testing of Electronic Noticeboard few points are kept in mind that are mentioned below

- All tests should be traceable to university authority's requirements.
- Test should be planned long before testing begins.
- The principle should be applies to software testing.
- Exhaustive testing is not possible.
- To be most effective, testing should be conducted by an independents third party.

In this system security issues are strictly maintained in case of publishing any notices by providing a unique id password to the faculties to publish the notices through the app and the SIM no of GSM module is also secured and it's completely hidden from the app. In case If that SIM no is somehow leaked then the unauthorized users can send fake notices to the GSM module but It won't be displayed on the LCD display as the Microcontroller (Arduino Mega 2560) is logically designed in this way like messages from unauthorized users will not be shown in the notice board as well as notice list of android app. This system is tested more than fifty times by sending different notices from different accounts and this testing system run in a different way during the testing session. Each and every notice from different accounts was successfully displayed on LCD screen without any error. There was no data loss during the testing session. For any unavoidable circumstances the power supply of the display screen is stopped the previous notices will be remain safe it never be lost. When the power supply is on the previous notices will be displayed again on the noticeboard screen **[6]**.

Smartphone acts instantly by giving smooth performance. Smartphone is easier to carry and nowadays everyone has one in their hand. The major difference between this Electronic Noticeboard and the available electronic noticeboard in market is its performance during heavy duty time. Besides, the size of the composition and compact size of it is very flexible for user both to use and carry. User can easily use the app to post desired messages publicly **[7]**.

Another unique thing and big difference of this Electronic Noticeboard is its low price. Available electronic noticeboard in markets are higher in price, as result third world country people can't afford despite of their need. But this Electronic Noticeboard has reduced the cost almost 3 times compared to the available electric bomb disposal robots in the market. To wrap things up, it is obvious that the performance and cost analysis of the Electronic Noticeboard is much better regulated and cheaper **[1]**. A table of cost analysis is shown in table below.

TABLE II

Serial No.	Components	Price
1	Arduino and jumper wires	$10
2	GSM and other components	$50
3	Battery and power supply components	$20
4	Lcd monitor and display components	$20
	Total Cost	$100

VII. CONCLUSION

Our prototype was successfully developed and this concept of project can be used to develop a new system for all types of educational institute as well as other organizations, garments factory and other similar industries. For an example if a manager of the industry needs to pass any urgent message to the workers then it would be easier to send his message through this app and message will be displayed on the LCD screen which would be placed where the workers work so that the manager does not need to send the message all the workers personally. It creates easier communication between workers and the authority. This proposed Electronic Noticeboard surely will be the best choice of for educational and institution system as it enables them to avoid many troubles, cost in publishing notice. Technology mentioned here in this paper are simple, efficient and cost effective. Further studies on Electronic Noticeboard, may help researchers in great extent in future for greater benefits of humankind.

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