

DigiBoard -A Smart Notice Board

Roshan Amrutkar, Snehal Danane, Poonam Jadhav, Swarup Waghmare, Santwana Gudadhe

Abstract— Notice board is primary issue in any institution or organization or public places like bus stops, railway stations or parks. But sending various notices day to day is a tedious process. This model can be used where any information has to be given to a large number of people. For example: in public places like railway stations, bus stations, colleges, banks etc ^[1].

The system is mainly to be implemented for educational organisations so as to facilitate and overcome the manual notice feed. This will help the organisations to pass on the notices at a fast rate and reduce the human errors in the notice passing. It can also be used for the farmers to know exactly what are going to be the weather conditions. Also the knowledge about the rates of crops at various markets can be flashed through this notice board. The Smart notice board can be used at rural places so as to help the farmers about the latest happenings.

BeagleBone Black, a credit card sized microcomputer has unimaginable applications. The proposed system uses the BeagleBone Black as the backbone. This system is developed with the help of Google Cloud Messenger (GCM), a cloud messaging service which is used to send direct-messages to the BeagleBone Black which enacts a task accordingly by perusing the messages. The algorithm for the system is developed as an Android application which is the conventional for programming and is open sourced. This project uses internet connectivity provided to teachers' computers to send the notices to the digital board. Using cloud services we also can send notices on students' smart phones and can be exploited according to the needs of an individual.

Index Terms— DigiBoard, Smart Notice Board, E-Notice, Digital Notice Board.

I. INTRODUCTION

Advanced changes have been brought about by digital technologies to the companies all over the world touching all organizational elements. DigiBoard is a name for a Smart Notice Board.

In the last couple of decades, communication technology has developed at a very fast rate. The use of "Embedded System in Communication" has given rise to many interesting applications. Due to the advent of technology, everything around us is becoming smart such as smart phones, smart refrigerators, so why not smart notice boards. Manual updating of information has to be done onto notice boards at present. By adding Android application interface to this system, the proposed system will overcome these limitations. Hence we have interfaced a LCD screen with a BeagleBone Black to receive messages and process them. The message on display is easily changed by sending it through the Android application. Wireless notice board is a means of wireless data transfer for quick display of messages in real time. Flexibility to display flash news or announcements faster than the

programmable system is possible due to it being an Android-based system. Android based display system can be used at various public places like institutions, hospitals, railway stations, organizations etc. This system is easy, robust, to use in normal life by anyone at anyplace with less errors and maintenance. ^[2]

It presents a Smartphone and Web Application based notice board incorporating the widely used embedded device technology to facilitate the communication of displaying message on notice board via user's smartphone or laptop/pc.

A DigiBoard bonds together everyone in your organization working on different floors/locations of your company/institution.

I. PROPOSED SYSTEM

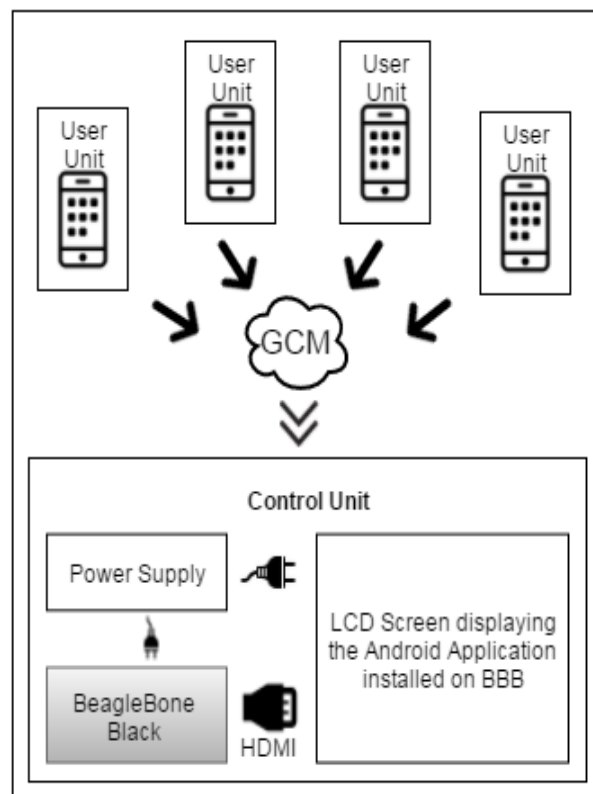


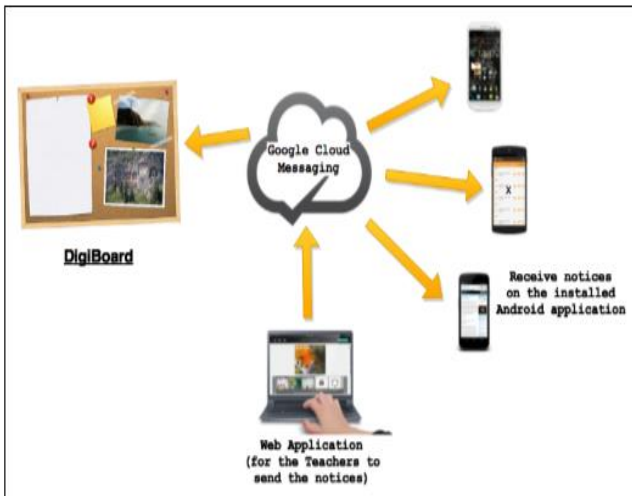
Figure 1. Block diagram of the DigiBoard

Figure 1 shows the block diagram of the system. The control unit consists of LCD display, BeagleBone Black board and power unit. The BeagleBone Black is used to receive messages and then process them and send it to the LCD. The liquid crystal display is used to display the messages. The power supply unit supplies power to the BeagleBone Black and the display ^[1]. The user unit actually is the mobile phone with the DigiBoard application installed on it. The figure above gives us a rough overview about the system.

II. SYSTEM COMPONENTS

The components used in the system are hardware as well as software components. We shall discuss them in detail below.

A. Software Components



The major software components of this project will consist of:

1. Embedded Device Application

This will be the application for the LCD screen. The display will consist of active tiles. The tiles will be of different sizes so as to suit the needs. Offline or online contents will be displayed on the tiles when there are no available notices. Content will be like inspirational quotes, weather updates, technology or any educational news. The content may vary as per the use of the notice board. As soon as a notice is received the appropriate tile will be replaced with the notice.

2. Android Smartphone Application

This application will be installed on the students' smartphones (considering an educational institution). It will have options like viewing of archived notices (Removed notices). It helps in sending notices to be displayed. Sending the notices to display will require admin approval. Notices will be sent to the smart phone application as soon as they are sent for display on the notice board. Achievements will also be notified on the smart phone application. Important notices will be benefited a lot because of this application.

3. Web Application

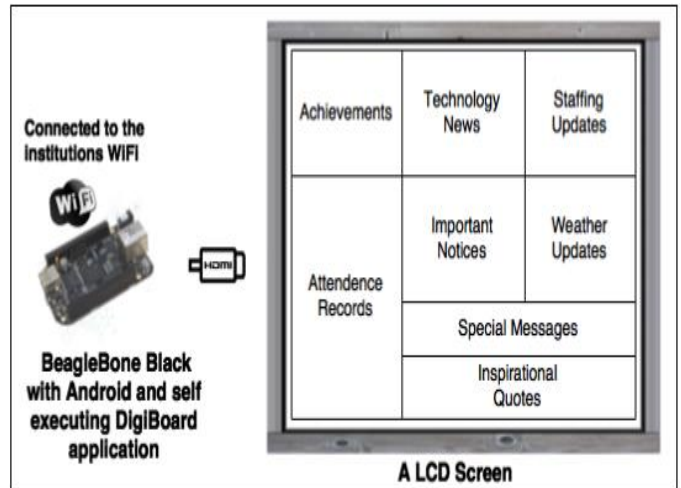
The web application will be for the teachers and administrators. All the notices will be sent from the web application. Notices from the smart phone will also be approved only from the web application. The timetables can be linked to the existing timetable management system through this web application (for an educational institution). Inspirational quotes, Rules and Regulations, Holiday messages, and other content can also be managed from here.

4. Google Cloud Messenger / (Equivalent push notifications service)

Push notifications let your application notify a user of events or new notices even when the user is not actively using your application. When an android device receives a push notification, the application's icon and a message appear in the status bar^[3].

Google cloud messaging (GCM) is an Android platform Application Programming Interface (API) provided by Google for sending and receiving push notifications to and from an Android application. Part A – A custom web application running in an application server. This will connect to Google GCM server and it will post a notification. Part B – An application running in the BeagleBone Black with Intent capable of receiving the push notification from the GCM server^[4]. Then the BeagleBone Black application will process the received push notifications thereafter and post the news or content accordingly.

B. Hardware Components



The major hardware components of this project will consist of:

1. The BeagleBone Black Board

The BeagleBoard is a low-power and open-sourced hardware single-board computer produced by Texas Instruments in association with Digi-Key and Newark element14^[5].

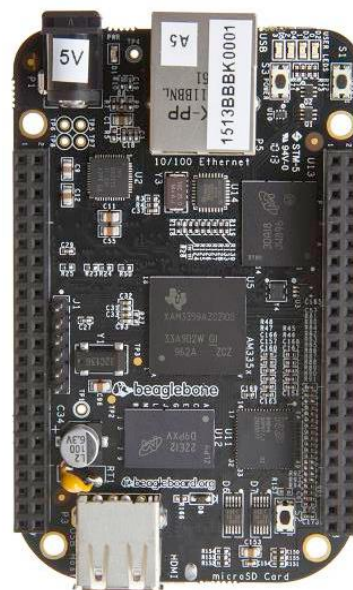


Fig. 2 The BeagleBone Black board

The BeagleBoard measures approximately 75 by 75 mm and has all the functionality of a basic computer. Video out is provided through separate S-Video and HDMI connections. A single SD/MMC card slot supporting SDIO, a USB On-The-Go port, a JTAG connection, an RS-232 serial connection, and two stereo 3.5 mm jacks for audio in/out are provided.

Built-in storage and memory are provided through a PoP chip that includes 256 MB of NAND flash memory and 256 MB of RAM (128 MB on earlier models). The board uses up to 2 W of power and can be powered from the USB connector, or a separate 5 V power supply. Because of the low power consumption, no additional cooling or heat sinks are required.

2. A LCD Screen

A liquid crystal display (LCD) is a thin, flat display device made up of monochrome pixels arrayed in front of a light source or reflector. All pixels consists of a column of liquid crystal molecules bound or suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other^[2].

The LCD screen would be the most visible part. It will be a blend of pixel quality enough to view from close and cost effectiveness. The display on the LCD screen would be controlled and managed through the application running on the BeagleBone Black.

III. SYSTEM WORKING

The BeagleBone Black is loaded with Android as the primary operating system. The DigiBoard application on the BeagleBone Black will auto load so as to show up on the LCD screen. As soon as the application runs it will check for notices and display them according to the priority.

The notices will be displayed on the active tiles. The empty tiles will display the predefined content stored on the app. When a new notice is received the application will verify the sender of the notice. If the sender is valid the priority of the notice will be checked. If the priority is higher than the currently displayed notices then the lowest priority notice will be replaced. If the priority of the new notice is lower than the previously displayed notices than the notices are queued for display. When a previous notice reaches the deadline the queued notice is put up on that spot.

The predefined content stored in the application differs according to the place where it is going to be put up. If the Board is going to be put up at a Gram Panchayat office it will have preloaded information about how to get high yield on the crops or tips for better farming practices.

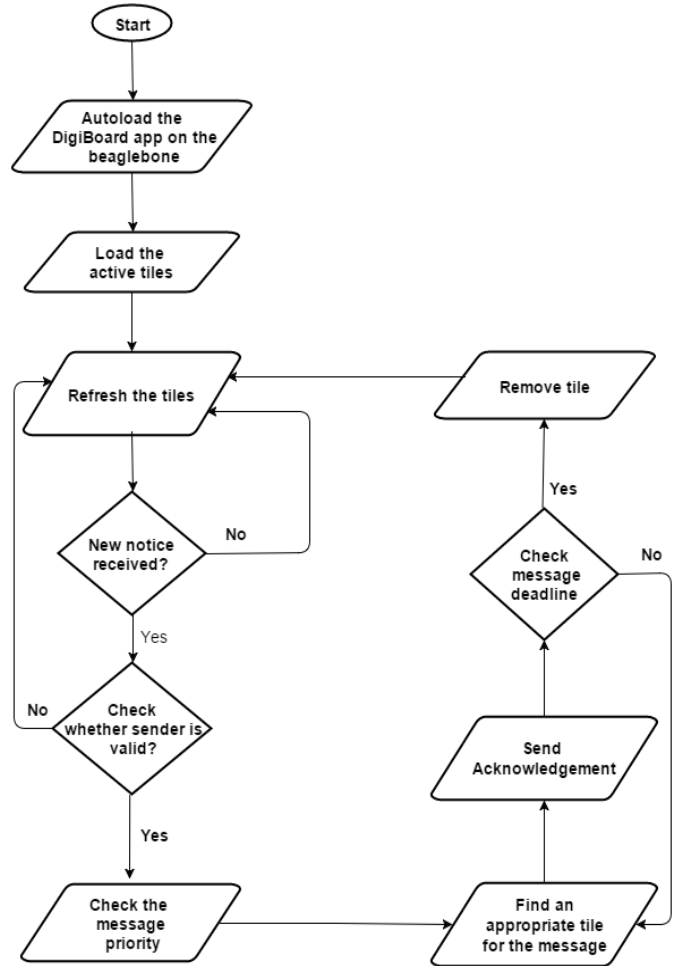


Fig. 3 Flowchart of the BeagleBone Application

IV. CONCLUSIONS

BeagleBone Black is a safe bet in this age of technological development. DigiBoard implemented using is BeagleBone Black reliable and robust. The paper explains how a DigiBoard -smart notice board can be developed using the least number of components in a short span of time. This prototype developed can be used to eliminate the need of huge billboards. Thus it is also a better method of going green. The only change with respect to different locations where it has to be put up will be that the preloaded content will change to configure only appropriate and desired words/ sentences^[2]. This project reduces the cost and is also marketable. The components used are not very complex and easily available in the market. It is our belief that our project can become commercial and can be used in places such as institutions, organizations, banks, railway station etc.

V. FUTURE SCOPE

The DigiBoard can be connected to large LED screens to be further used alongside highways like the billboards.

ACKNOWLEDGMENT

We would like to thank our project guide Prof. Santwana Gudadhe for her abundant co-operation and guidance. We are extremely grateful to our guide who whole heartedly supported the project and gave freely of her precious time

while making this project. The technical guidance provided by her was more than useful and made the project successful. We would also like to thank our Department of Computer Engineering, Pimpri Chinchwad College of Engineering.

REFERENCES

- [1] Shruthi K., Harsha Chawla and Abhishek Bhaduri, "Smart Notice Board," Research & Technology in the Coming Decades (CRT 2013), National Conference on Challenges, pp. 1-4, 2013.
- [2] Bhumi Merai, Rohit Jain, Ruby Mishra, "Smart Notice Board," in International Journal of Advanced Research in Computer and Communication Engineering, Vol. 4, Issue 4, April 2015.
- [3] www.parse.com/tutorials/android-push-notifications.
- [4] www.javapapers.com/android/google-cloud-messaging-gcm-for-android-and-push-notifications.
- [5] www.wikipedia.org/wiki/BeagleBoard#Rev._C4_specifications.