Digital Notice Board Using Raspberry PI

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Abstract - In this paper, we propose a remotely send notice to Digital Monitor from an Android application based on Raspberry pi card. Notice Board has been recalled in the first stage. In the second stage an application has been developed based on the android system. The different diagrams have been presented. A Wi-Fi is using for Data transmission. At any time we can add or remove or alter the text according to our requirement. At transmitter authorized PC is used for sending a notices. At receiving end Wi-Fi is connected to raspberry pi. When an authorized user sends a notice from his system, it is received by receiver. Wireless is a popular technology that allows an electronic device to exchange data wirelessly over a computer network, including high speed wireless connections. The data is received from authenticated user.

Key Words: Android system, Web server, Raspberry pi card, Electronic components.

1. INTRODUCTION

In today's world of connectedness, people are becoming accustomed to easy access to information. Whether it's through the internet or television, people want to be informed and up-to-date with the latest events happening around the world (J. S. Lee 2007). Wired network connection such as Ethernet has many limitations depending on the need and type of connection. Now a day's people prefer wireless connection because they can interact with people easily and it require less time. The main objective of this project is to develop a wireless notice board that display message sent from the user and to design a simple, easy to install, user friendly system, which can receive and display notice in a particular manner with respect to date and time which will help the user to easily keep the track of notice board every day and each time he uses the system. GSM and Wi-Fi are the wireless technology used.

1.1 Internet of Things (IoT)

The **Internet of Things** (**IoT**) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

2. LITERATURE SURVEY

Table -1: Comparison Of Bluetooth, Zigbee And Wi-Fi Protocols.

Standard	Bluetooth	Zigbee	Wi-Fi
Application Focus	Cable replacement	Monitoring and control	Web, Email, Video
Frequency band	2.4 GHz	868.915MHz; 2.4GHz	2.4GHz;5GHz
Max signal rate	1Mb/s	250Kb/s	54Mb/s
Nominal Range	10m	10-100m	100m
Channel bandwidth	1MHz	0.3/0.6MHz; 2MHz	22MHz
Data protection	16-bit CRC	16-bit CRC	32-bit CRC
Max number of cell nodes	8	More than 65000	32

Wi-fi provides higher data rates for multimedia access as compared to both zigbee and bluetooth which provides lower data transfer rates.

3. REMOTE CONTROL EXAMPLE OF DOMESTIC EQUIPMENT FROM AN ANDROID APPLICATION:

We offer the example of a system for remotely send a notice, using a "Raspberry pi" card for receiving commands from an Android application on mobile phone. Our electronic system is composed of a "Raspberry pi" card for receipt of commands sent by the user, the card will send notice on Digital Monitor. The implementation of this system requires:

- The Programming of a Raspberry pi card capable of receiving commands sent by a remote user to send notice on Digital Monitor linked with this card.

- The development of a mobile application "Android" in order to control our system.

A. Solution Overview

The following diagram (Fig. 1) illustrates the components of the system, and the interactions between them.
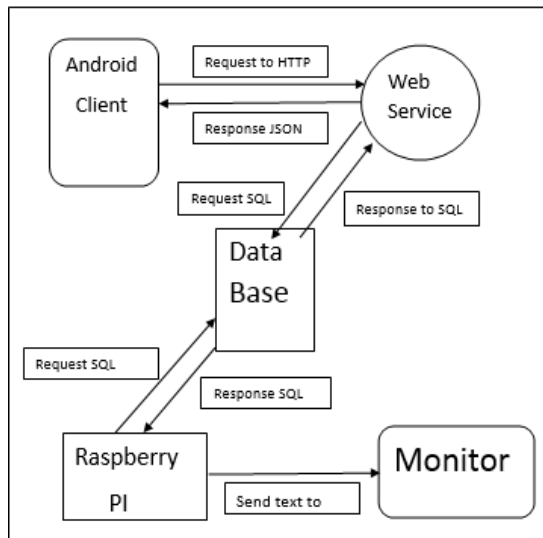

Fig -1: Solution overview schema

1) Representation of use case diagrams:

a) The actors: There are four actors: the main actor is the remote user, two secondary actors which are the web service and the "Raspberry pi" card, the fourth is an external actor : user manual.

• **Remote User:** this actor has the right to send the text from its Android application and remotely using his mobile phone to the Digital Notice Board.

• **Raspberry pi card:** this actor will access the database to verify the existence of a "Text Message" saved.

• **Web Service:** its role is to register the commands from the remote user in the database, retrieve the current state of the Notice, and return a failure / success message under the JSON as a response on the commands performed by the user.

• **Manual user:** This actor will put a notice on Notice Board manually.
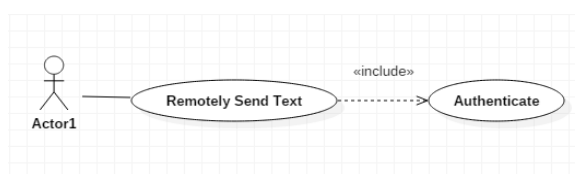
B. General use cases:

Fig -2: General use cases

Authenticate: allows the user to access the application after entering his login and password.

Remotely send Text/Notice: allows the remote user to send text on Digital Notice Board.
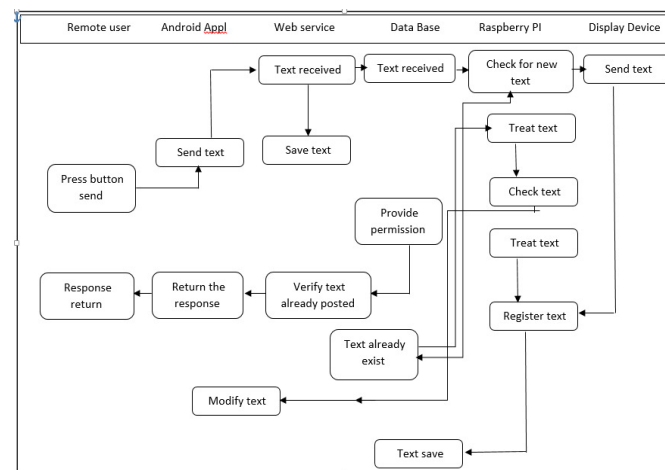
2) Activity diagram:

Fig -3: Activity Diagram

B. Proposed technologies for the programming part:

1) Architecture at three levels (3-tiers):

The architecture we adopted for our application (side: Android application, web service and database) is the threetier architecture, which is a stack of three levels: The presentation of data (Level 1), Treatment business data (Level 2) and access to persistent data (Level 3).

2) JSON:
   JSON (JavaScript Object Notation) is a data structure format. The data are considered as objects with properties and sub-properties. This formalism is close enough is based on XML and JavaScript.

3) MySQL: MySQL is a relational database management system (RDBMS). It is distributed under a dual GPL and proprietary license. It is one of the database management software most used in the world.

C) Proposed solution for the hardware part:

The solution that we have adopted consists of the exploitation of the Raspberry pi card. It is a single nanocomputer card ARM processor designed by designer David Braben video games, as part of its foundation "Raspberry pi". The following photo presents the Raspberry pi card :
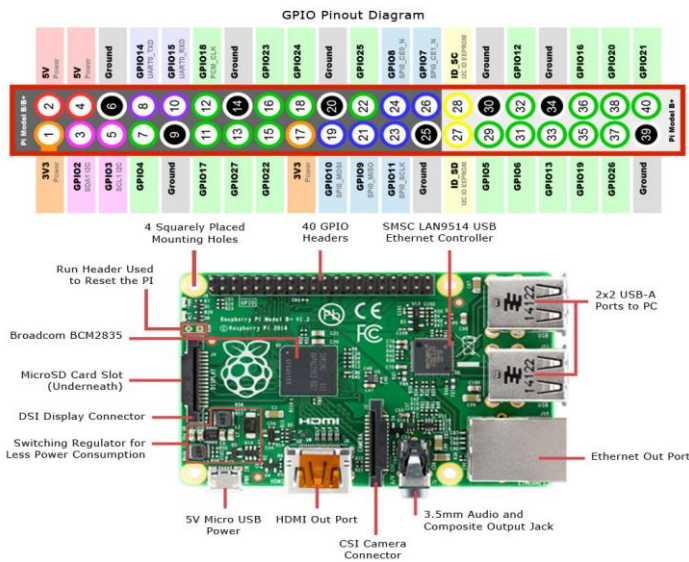
This computer has the size of a credit card, allows the execution of several variants of the free operating system GNU / Linux and compatible software. It is supplied bare (single motherboard, without housing, power supply, keyboard, mouse and screen) with the aim to reduce costs and enable the use of recovery equipment. Around the central part, there are different connectors for connecting devices to interact with the computer and range of connections offered by GPIO Pins.

D) Android Client:

In this section there are some interfaces of our Android application.

First, the user is prompted to enter his login and password in order to use the application, in case the internet connection is not present, an error message is displayed to invite him to check its connection internet. If there is not a connection problem, "Please wait" message appears, in this case the system checks the validity of the login and password, if they are incorrect, an error message invites him to check them.
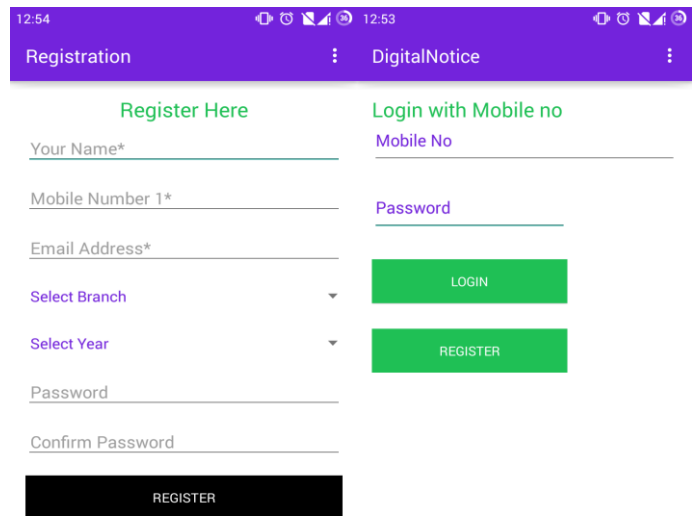
Fig -3: Registration and login

After authenticate correctly, the user is redirected to the **main interface**: This interface provides the user the ability to send Notice on Digital Monitor.

By pressing the **sendTo** button, the user can select Academic year for send notice individually and then type **Subject** of Notice & its **Content**.
By pressing the **SMS** button, the user can send notice. Shown in below Fig.4.

For « sending text » the user receives a success or failure response (Fig. 19).
« Please wait » message is displayed to the user while waiting for the response.
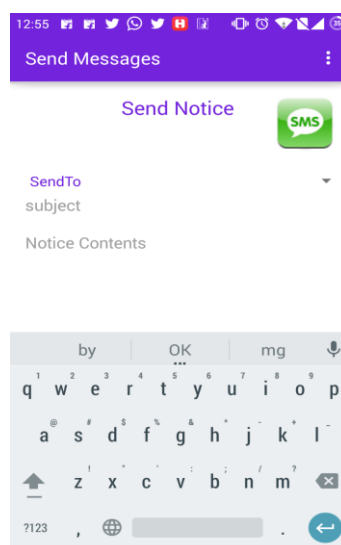
Fig -4: main interface

3. CONCLUSIONS

Now the world is moving towards automation, so in this world if we want to do some changes in the previously used system we have to use the new techniques. Wireless operation provides fast transmission over long range communication. It saves resources and time. Data can be sent from remote location. User authentication is provided. Previously the notice board using GSM was used in that there was the limit of messages but in our system Multimedia data can be stored on chip or on SD card. Text messages and multimedia data can be seen whenever we want to see.

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BIOGRAPHIES

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