



## DESIGN AND IMPLEMENTATION OF REMOTELY MANAGED EMBEDDED DIGITAL SIGNAGE USING RASPBERRY PI FOR RAILWAY SYSTEM

Devayani Nandedkar<sup>1</sup>, Dinesh Adokar<sup>2</sup>

<sup>1</sup>DIGITAL ELECTRONICS,SSBT'S COET JALGAON

<sup>2</sup>E&TC,SSBT'S COET JALGAON

**Abstract**—This paper describes the digital signage system using Raspberry pi based on embedded system which is remotely managed by android phone. Digital Signage is a system of electronic displays installed in public places. Its aim is usually to display news, traveler information or location-specific information as image or text & advertisements - photos, video etc. This paper describes about the Digital signage system using Raspberry pi for Railway system. The Raspberry Pi is a credit-card sized single-board low cost computer. The aim of this paper is to provide the required information to the Railway passenger.

### I. INTRODUCTION

The Raspberry Pi is a credit-card sized computer that plugs into your TV and a keyboard. It is a able little computer which can be used in such projects, & for lots of of the things that desktop PC does, as spreadsheets, games & word-processing . Therefore plays high-definition video too. Raspberry Pi has the ability to interact with the outside world, and has been used in a wide array of digital maker project works, from music machines & parent detectors to weather stations & tweeting birdhouses along with infra-red cameras. With the changing needs and time management a delay in Train schedule affect the passengers daily schedule in big way, and affect the timings of passengers schedule and at present system time Tables are displayed at Railway Station providing quite delayed information which created chaos in passengers. Trains are often delayed and passengers didn't informed about the schedule of trains on time and thus created a chaotic and this creates various troubles to passengers to have smooth and timely travel.This paper is about digital signage system which is remotely managed and for that an android application is developed so that the controller can change add from the smart phone by using that application. Every person who is on the railway station and if he has that android application can check the train status on just one click. The web page on which the information related to is and advertisement is shown is developed in css,HTML,javascript.

### II. DEVELOPMENT TOOLS

The simplest definition of this study is “remotely managed digital display, typically tied in with sales and advertising”. In this paper, the aim is to develop a dynamic, web- based, low cost, effective and small sized digital signage system which can be controlled and modified by the users. Digital signage management interface gives the opportunity to users, customize their own web marketing panel over any device which can access to Internet. This implementation brings practical. This design brings practical solutions to digital signage sector. Simple web browsers can act like a digital advertising panel.

#### 2.1 APACHE WEB SERVER

Apache HTTP Web Server is a web server in basic manner .On our cloud server we are using LAMP stack. Therefore we're using Apache tomcat as web server for this project. And Apache supports a variety of features lots of which implemented as compiled modules which extend the core functionality. They can range from server-side programming language support to authentication schemes.

#### 2.2 CSS3

CSS3 is used in this study to customize the front-end. CSS; that means Cascading Style Sheet defines how to display HTML elements. Cascading Style Sheets custom, colours, margins, fonts ,lines, width, background images, advanced positions height and lots of more things. CSS gives the benefit of controlling the layout of multiple documents from a single style sheet.

#### 2.3 JAVASCRIPT

JavaScript (JS) is one of the most popular dynamic web programming language in the world [8]. JavaScript is used for making web pages interactive. syntax of Javascript was inspired from C. JavaScript is used in this work due to the following reasons;

- Uploading and submitting data and posting new content to the server without refreshing the page.

- Creating web page contents for resizing them and fading them in and out.
- Interactive content like audio and video.

## **2.4 HTML**

HTML, in other words Hyper Text Markup Language, is a programming language for describing web sites. HTML is used here because Twitter Bootstrap theme supports HTML [6]. This language brings practical solutions to development process. e.g <video> element was used very effectively here. Data attribute is a crucial HTML features. Admin panel theme of Digital Signage System is very much responsive, it is an important reason for working with HTML.

## **2.5 Raspbian OS**

Raspbian is an OS which is distributed by Linux. Linux specially developed this OS for Raspberry Pi devices [16]. Last version was published in January 2014. We used the latest version in this project. The most popular OS for the Raspberry Pi is Linux. Several Linux distributions are available for the Pi, and chose Debian. Nowadays the Debian team has frozen the latest version named Wheezy, and due to the great efforts of the Raspbian team, and is available for the Pi. Raspbian supersedes Debian squeeze, which has been the reference OS for the Pi for long time. The Raspbian distribution has lots of advantages over all its processors. It is much faster and has more recent and be will be more stable. AlTherefore, it is most preferred solution of the Raspbian team, Therefore the focus is on Raspbian.

## **2.6 MYSQL**

With over 10 million installations, MySQL is the most popular database management system for web servers. MySQL was developed in the starting of 1990s, now it's the most common used database engine [5]. Main reason for its success, like PHP, it's free to use. MySQL is fast and it can run on basic hardware easily. MySQL is a database system. Data is stored on tables. We used MySQL in our project because it can run stable with Apache Web Server and PHP. It's one of the elements of LAMP stack.

## **III. Technology & Methodology**

This Project includes digital signage, Raspberry Pi, Raspbian, Linux OS, HTML, CSS, JavaScript programming technologies. The back– end side of the project is based on css language and the front–end side is HTML5. Server side of the system has to be developed on Web Server client side is on ARM board. About the ARM board we research and decide to use Raspberry Pi. There are two models of raspberry pi i.e. Model A & Model B. In this system Model B is used because raspberry pi required an internet connection and Model B has ethernet port.

## **IV. Development of Digital Signage System**

There are 3 phases of development. They are Development of front-end, development on back end and development on Raspberry pi.

### **3.1 Development on front end**

Pages like Login page, Dashboard which allows to login into the dashboard so that user can see the information related to train like train name, train schedule & time.

### **3.2 Development of Back end**

Development of back end is developed in android so that the controller can change the advertise or he can upload any news or anything from his android phone. One more advantage of this application is that the user can see the information related to canteen, book stall, waiting room, ticket counter by just clicking on the station info option in the android application. This station information is included in the raspberry pi by using MySQL database.

### **3.3 Development on Raspberry Pi**

Raspbian OS wants a username and a password from android application user to login. The user can access the application by connecting to raspberry pi through the wifi network. For this network the apache tomcat server is installed on raspberry pi. The android user can connect to raspberry pi server through the wifi USB adapter 802.11n standard. The user just have to turn on the wifi on his mobile and then he will find the MyPi network and then he has to enter the password. After this the user will get connected to raspberry pi and will be able to use the android application. The main advantage of this system is that not every user will required an internet connection to use the android application. Only the raspberry pi will be required internet to connect to the IRCTC website to fetch the train related information. This information is fetched by using the railway api's. In simple language the android user will send request to IRCTC and IRCTC will respond to application in json format. **Technical specifications**

There are two models of raspberry pi i.e. Model A & Model B. In this system Model B is used because raspberry pi required an internet connection and Model B has ethernet port.

#### IV. RESULTS



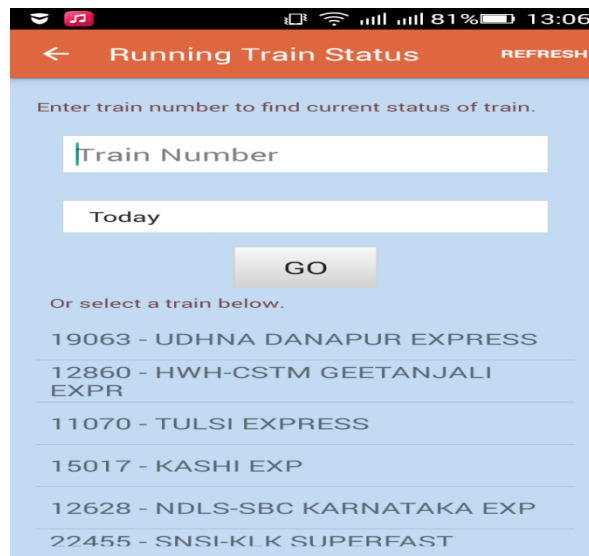
Dashboard

This is a predefined advertisement. Change it through the android app.

Train Number	Train Name	Scheduled Time	Actual Time
19063	UDHNA DANAPUR EXPRESS	13:10	13:15
12860	HWH-CSTM GEETANJALI EXPR	13:10	13:16
11070	TULSI EXPRESS	13:25	13:25
15017	KASHI EXP	13:25	13:28
12628	NDLS-SBC KARNATAKA EXP	12:45	13:45
22455	SNSI-KLK SUPERFAST EXPRESS	14:00	14:00
00834	SRC-ADI AC SPECIAL	14:15	14:16
51197	BILVR PASSENGER	SRC	SRC
12336	LTT-SQP EXP	14:30	14:30
1012534	PURPAK SF EXP	14:55	15:11
	SURAT-PURB		

Fig.1 Digital signage showing train list

Above figure is the result of digital signage..This is the digital signage on which the train schedule can be shown.



Running Train Status

Enter train number to find current status of train.

Train Number

Today

GO

Or select a train below.

- 19063 - UDHNA DANAPUR EXPRESS
- 12860 - HWH-CSTM GEETANJALI EXPR
- 11070 - TULSI EXPRESS
- 15017 - KASHI EXP
- 12628 - NDLS-SBC KARNATAKA EXP
- 22455 - SNSI-KLK SUPERFAST

Fig. 2 Android application showing train list

This is the android application result on which the train list is shown. The user can get information about a particular train by just clicking on the train name. User can also get the PNR status by just entering the PNR no. This is shown in fig below



PNR Status

PNR 8642445158

Train Information

Train Number 11093

Train Name MAHANAGARI EXP

Date Of Journey 11-1-2016

From Station MUMBAI CST (CSTM)

To Station JALGAON JN (JL)

Boarding At MUMBAI CST (CSTM)

Reservation Upto JALGAON JN (JL)

Passenger List

NO	BOOKING STATUS	CURRENT STATUS
1	S4,53,GN	CNF

Fig. 3 Android application showing PNR status

## **V. CONCLUSION**

By using this system the passenger can get the required information regarding railway and data can be easily managed and synchronized over the server. This system is very secure and easy to access to user due to technology used in this system. This system can be easily managed remotely due to android application. The main advantage of this system is that each user will not require internet connectivity. anybody can use this system due to its simplicity.

## **REFERENCES**

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