

# Low Cost Digital Signage using Raspberry pi

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**ABSTRACT:** Internet of things (IoT) is a concept that considers pervasive presence in the environment of variety of objects that are interconnected through wireless or wired mediums having unique addressing schemes to communicate with each other to create new applications and reach common goals. Digital signage boards are an economical and advanced solution for today's static advertisement boards. The modern digital signage boards can be accessed and controlled remotely using internet. Digital signage system has advantages like reduced costs, integrating citizens with up-to-date technologies, being easy to reach huge number of people, dynamic and effective advertisements, ability to deliver relevant information at proper time for proper mass. The proposed system will replace microcontroller-based systems with raspberry pi which will drastically improve the performance and will consume less amount of power for operation.

**KEYWORDS:** Internet of things, Raspberry pi, Digital signage board, web server, HDMI, Advertisements, Internet

## I. INTRODUCTION

The network of digital displays that are centrally managed and addressable for targeted information and advertisements is known as digital advertising. The broadcasting of information can be done at road highways, subways, buses, train and train station, shopping malls, city squares, hospital, conference hall, colleges and schools for displaying notice for student information and displaying all institutional information for visitors. Digital signage technologies are becoming very popular between many different business domains. Companies use digital signage for many various purposes. Digital signage solutions are creating opportunity for customizing the information that they want to deliver. Main usage purposes of digital signage are announcements, advertising and promoting products, entertainment, public information systems such as live traffic details, news, headlines, weather, and menu information such as digital menu boards with information on pricing. Sensors and technologies allow digital signage boards to adapt to context such as time and location, many options appear to catch the audience's attention. Such features are called contextual signage.

## II. RELATED WORK

The Internet of Things is the network of physical objects or "things" embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator and other connected devices. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure with every breath technological entrepreneurs take, a new idea is pitched. Keeping up with these everyday breakthroughs can be tough. In less than 10 years we have witnessed the launch of yet a new wave, Web 3.0. Components of this breakthrough are still new and not many people are familiar with these concepts. In order to seize the opportunity to inform individuals, we developed a digital signage board system that is focused on the area of Internet of Things. Internet of Things is a vision that was introduced in 2009. This vision encompasses the idea of connecting all devices and gadgets to the internet. The Internet of Things is truly changing our world. It is enhancing our lives, businesses, health and society as a whole by developing products which would ease our life. It is estimated that by 2020, 50 billion devices will be connected to the internet. While the traditional print advertisements in newspapers and magazines have witnessed a decline that threatens the existence of print news media outlets, and interest in interactive advertisement on web, mobile and other innovative media the advent of affordable, interconnected, high-definition flat digital displays has enabled content providers, including advertisers, to replace static screens by timely targeted content delivered to the audience

### III. METHODOLOGY

The main aim of this research is to design and develop a digital signage system which can display advertisements as well as real time useful data like live traffic details, weather updates, news, etc and can be controlled remotely. The system consists of raspberry pi 3 which will act as the heart of the system, a node.js web server to host the front end as well as backend web interface. The Digital display is connected to raspberry pi using HDMI, no additional hardware is required for using display with raspberry pi 3. Raspberry pi 3 is connected to router and that router will provide internet to raspberry pi 3 so that the remote accessibility can take place. Real time data like news, weather and live traffic is extracted from internet using data scraping techniques wherein the system makes http calls to the application programming interface (API) and the API returns required data in json format, which must be beautified to process and display on the signage board. Features like uploading new advertisement or deleting old advertisements can be done via the control panel. To access the control panel, user needs to enter his username and password. If username and password is not present, then the user can register a new account and get valid username and password. After getting access to the control panel user can control the number of advertisements to display, the time to display an advertisement, the time to display real time traffic dashboard, the location of which live traffic details are required, etc. Images uploaded or deleted from the control panel will have a real time effect on the advertisement slide show without refreshing, this is achieved by using the concept of Web Socket.

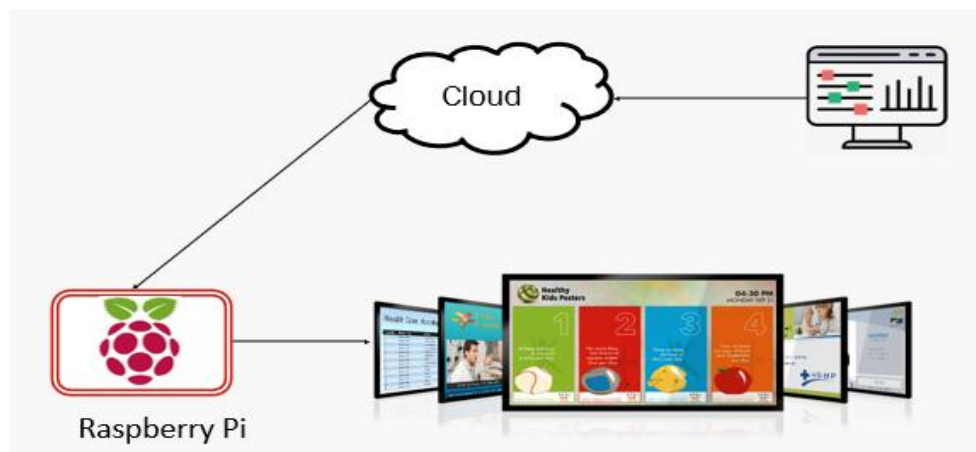


Fig1. System Architecture

### IV. EXPERIMENTAL RESULTS

#### RESULT-CLIENT UI:

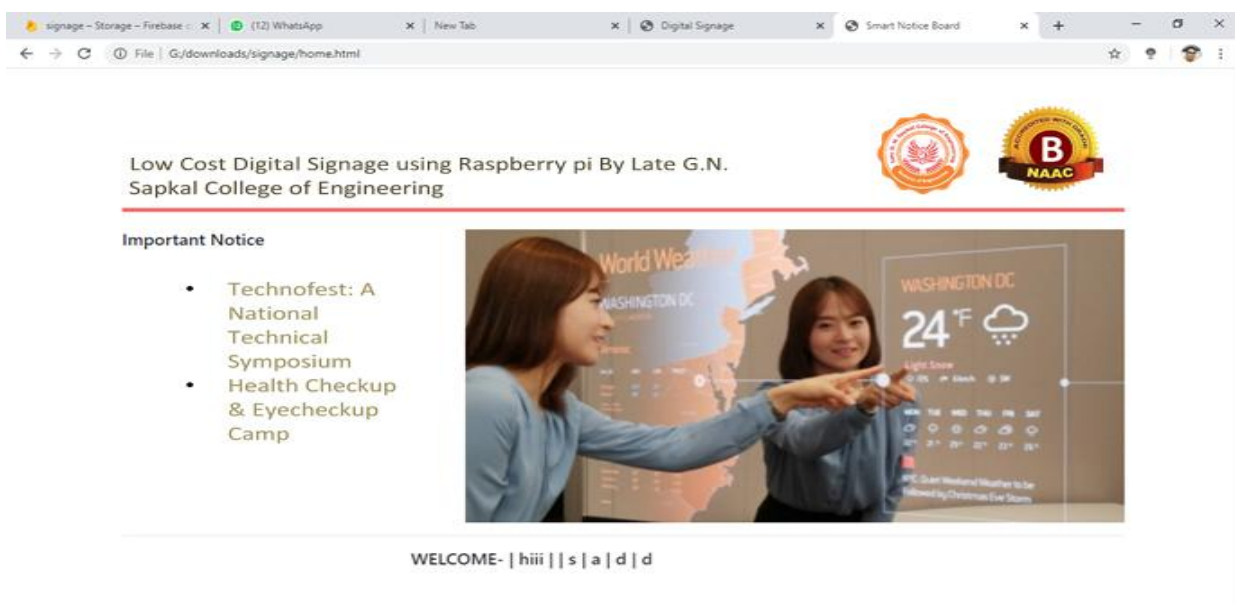


Fig 2. Result-client UI

Result – Admin – Panel – Login:

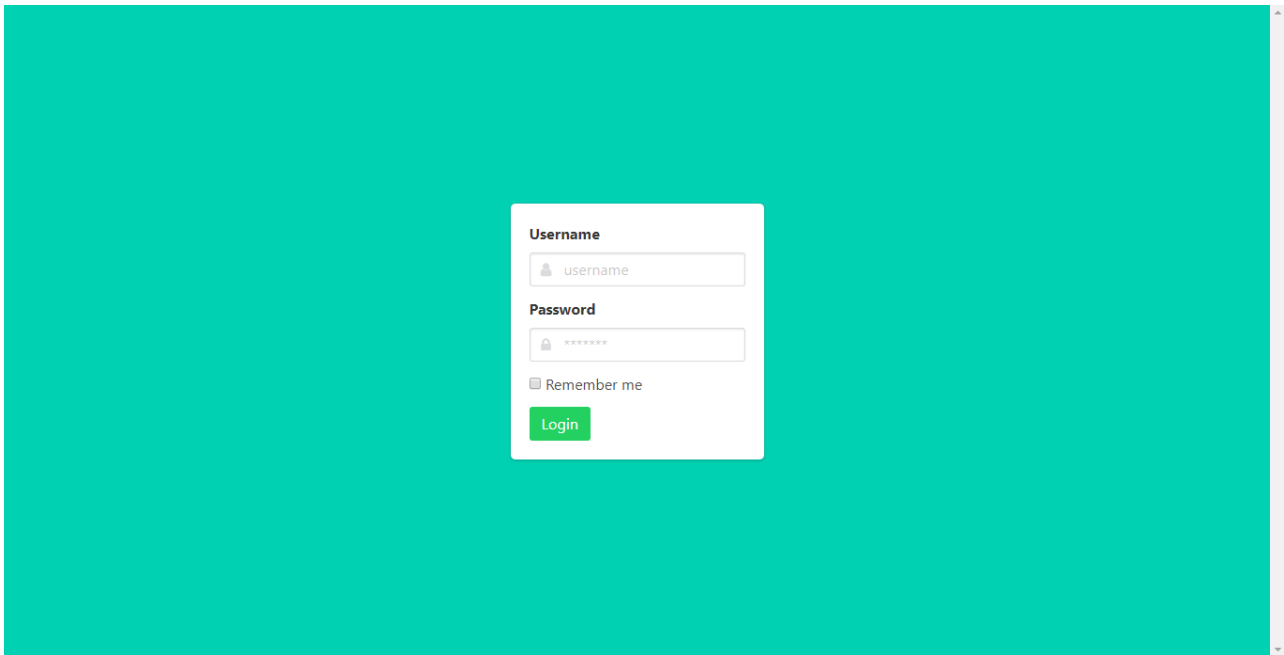


Fig 3. Result – Admin – Panel – Login

Result – Admin – Panel – 1:

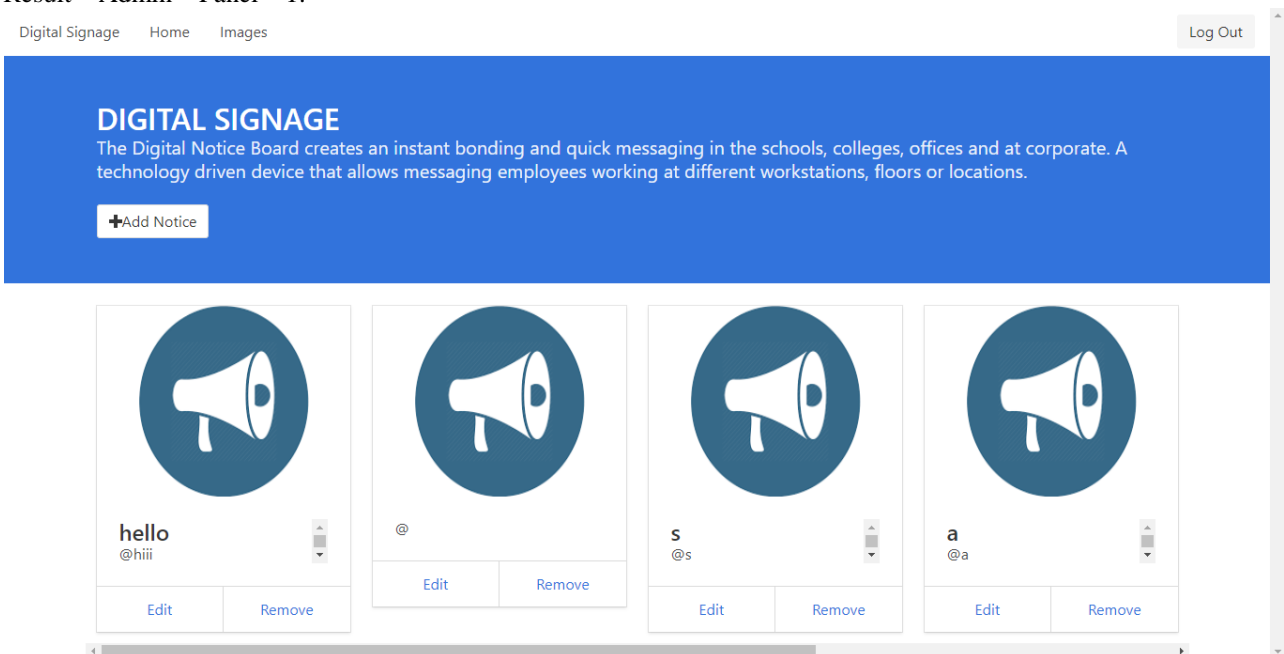
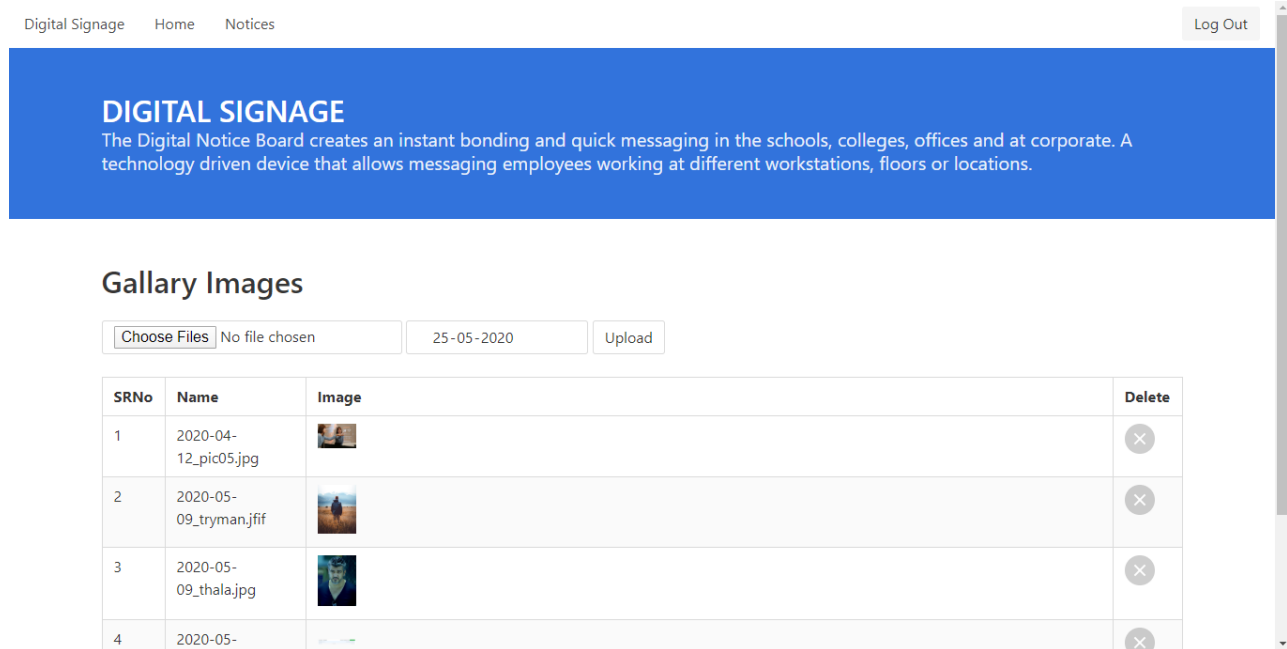


Fig. 4. Result – Admin – Panel – 1

Result – Admin – Panel – 2:



Digital Signage Home Notices Log Out

## DIGITAL SIGNAGE

The Digital Notice Board creates an instant bonding and quick messaging in the schools, colleges, offices and at corporate. A technology driven device that allows messaging employees working at different workstations, floors or locations.

### Gallery Images

Choose Files No file chosen 25-05-2020 Upload





SRNo	Name	Image	Delete
1	2020-04-12_pic05.jpg		<input type="button" value="X"/>
2	2020-05-09_tryman.jiff		<input type="button" value="X"/>
3	2020-05-09_thala.jpg		<input type="button" value="X"/>
4	2020-05-		<input type="button" value="X"/>

Fig 5. Result – Admin – Panel – 2

Result – Firebase Realtime DB:



signage Database Realtime Database

Data Rules Backups Usage

```

signage-ccf90
├── signage_copy
│   ├── body: "\ALL THE STUDENTS ARE EXPECTED TO ARRIVE AT COL"
│   ├── heading: "\R.H. SAPKAL COLLEGE OF ENGINEERING"
│   ├── img: "\https:\\\\firebasestorage.googleapis.com\\v0\\
│   ├── s1body: ""
│   ├── s1heading: ""
│   ├── s1img: "\https:\\\\firebasestorage.googleapis.com\\v0\\
│   ├── s1scrolling: ""
│   ├── s1time: ""
│   └── scrolling: "\hello"
    
```

Fig 6. Result – Firebase Realtime DB

Result – Firebase Storage:

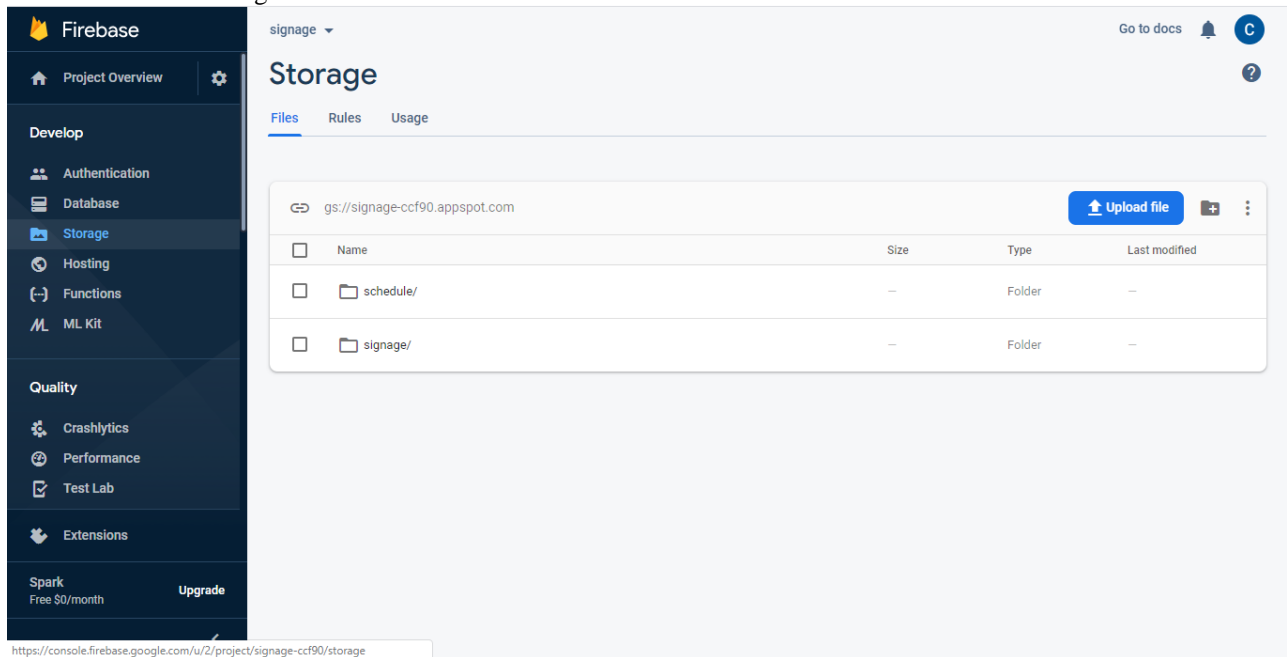


Fig 7. Result – Firebase Storage

Result – Firebase:

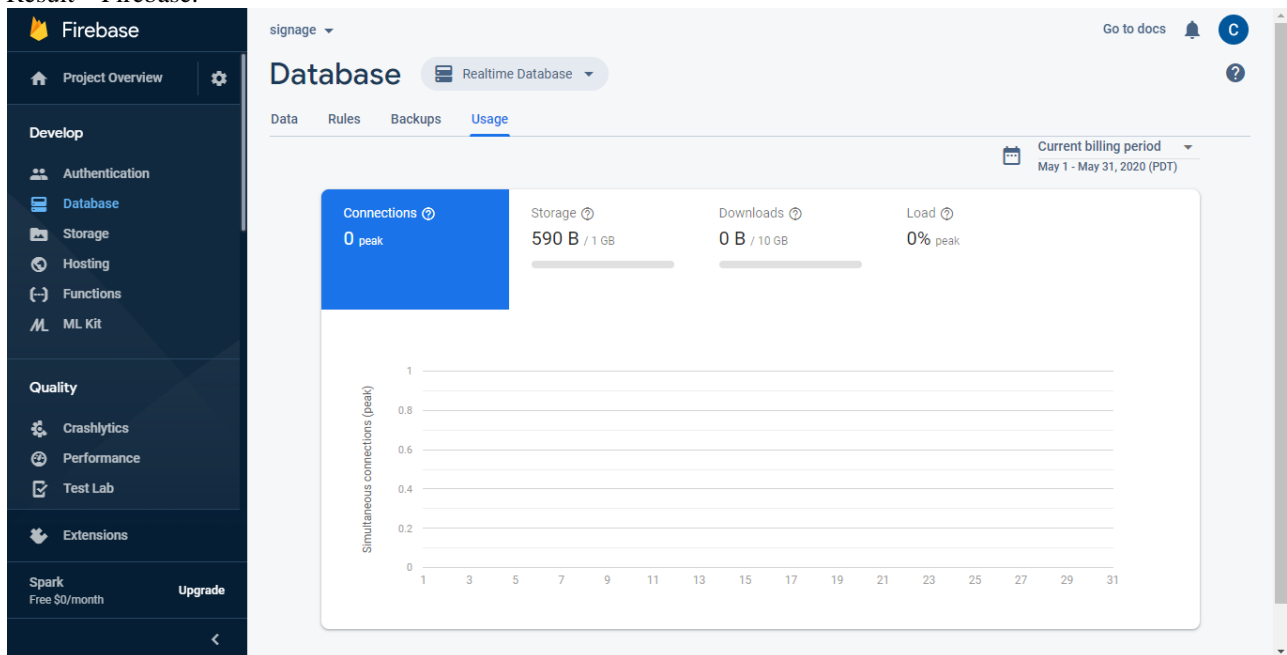


Fig 8. Result – Firebase

## V. CONCLUSION

As the technology is advancing every passing day the display board systems are moving from static boards display to digital signage display. An efficient, effective, fast and cheap remotely managed embedded Digital Signage System architecture is designed, implemented, developed using raspberry pi 3 and web application. The strength of our work lies not only in developing a compact size embedded digital signage system, but also in implementing it within the reach of current hardware and software engineering technology. There are large number of applications for the system developed which can transform the advertising and marketing industry.

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