

Remotely Managed Embedded Digital Signage System

Karan Bhavsar¹, S. N. Magdum², Abhijit Bokade³, Tejas Jain⁴, S. M. Ingawale⁵

^{2,5}Assistant Professor, Electronics and Telecommunication Department, Savitribai Phule
Pune University

^{1, 3, 4}UG Students, Electronics and Telecommunication Department, Savitribai Phule Pune
University

¹karan.bhavsar.1997@gmail.com

²shraddha.magdum_skncoe@sinhgad.edu

³abhijitbokade98@gmail.com

⁴getmetejas@gmail.com

⁵smingawale.skncoe@sinhgad.edu

Abstract

Digital signage boards are a cost-effective and advanced solution for today's advanced industry 4.0 to manage and gain maximum output. The fashionable digital signage boards may be accessed and controlled remotely using software like Mac, Linux & Windows. Digital signage system has advantages like reduced costs, integrating citizens with up-to-date technologies, being easy to achieve huge number of individuals, dynamic and effective content display, ability to deliver relevant information at proper time for correct mass. The proposed system will replace microcontroller based systems with raspberry pi which can drastically improve the performance and can consume less amount of power for operation.

Keywords— Raspberry pi, Digital signage Display board, web server, FTP, TCP.

I. INTRODUCTION

Digital signage technologies have become very talked-about between many alternative business domains. Companies use digital signage for several various purposes. Digital signage solutions are creating opportunity for customising the knowledge that they need to deliver. Main usage purposes of digital signage are announcements, advertising and promoting products, entertainment, public information systems like live traffic details, news, headlines, weather, and menu information like digital menu boards with information on pricing. Sensors and technologies allow digital signage boards to adapt to context like time and placement, many options appear to catch the audience's attention. Such features are called contextual signage.

II. LITERATURE REVIEW

Literature Review The Internet of Things is that the network of physical objects or "things" embedded with electronics, software, sensors and connectivity to enable it to attain greater value and repair by exchanging data with the manufacturer, operator and other connected devices.[3] Each thing is uniquely identifiable through its embedded ADP system but is ready to interoperate within the present Internet infrastructure.[1] With every breath technological entrepreneurs take, a brand new idea is pitched. Maintaining with these everyday breakthroughs may be tough.[8] In but 10 years we've got witnessed the launch of yet a brand new wave, Web 3.0. Components of this breakthrough are still new and not many folks are at home with these concepts.[7] So as to seize the chance to tell individuals, we developed a digital signage board system that's focused on the world of Internet of Things. Internet of Things may be a vision that was introduced in 2009. This vision encompasses the thought of connecting all devices and gadgets to the web.[4] The web of Things is actually changing our world.[6] It's enhancing our lives, businesses, health and society as a full by developing products which might ease our life. It's estimated that by 2020, 50 billion devices are going to be connected to the web.[3] While the standard print advertisements in newspapers and magazines have witnessed a decline that threatens the existence of print fourth estate outlets, and interest in interactive advertisement on web, mobile and other innovative media the arrival of affordable, interconnected,

high-definition flat digital displays has enabled content providers, including advertisers, to exchange static screens by timely targeted content delivered to the audience.[2] we define and use the term “digital signage” for a dynamic, networked, visual or audio-visual information system consisting of several decentralised digital displays, which are interconnected with a central system (consisting of a content management system and a user rights management system) that allows for a remote control of the displays. The main aim of this research is to design and develop a digital signage system which can display information and can be controlled remotely. The core contribution of this paper is a detailed analysis of the potential of digital signage. Emphasis is placed on challenges in performance measurement and implementation, operating and using a digital signage system, display blindness, and negative externalities.[8]

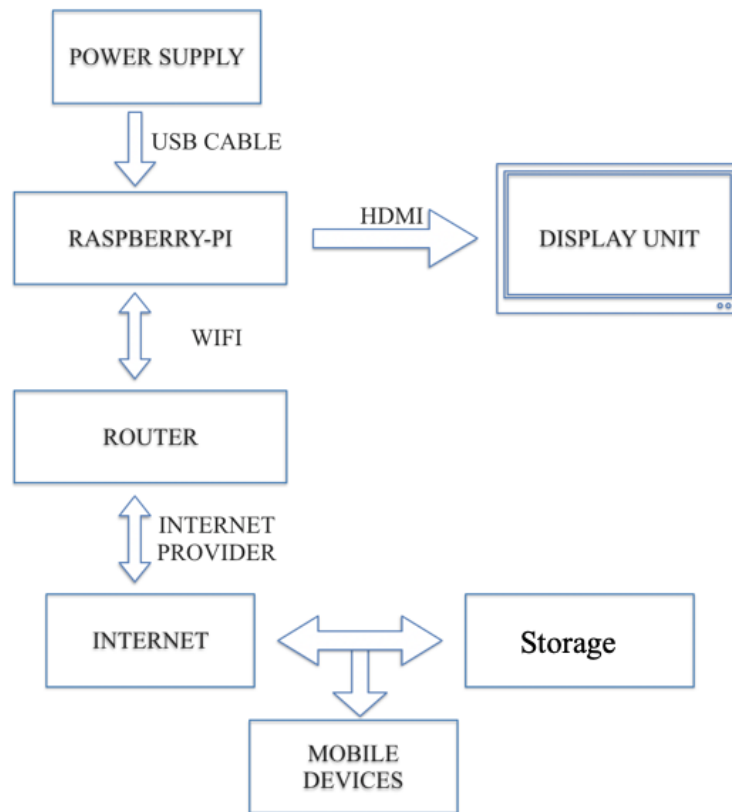
III. PROPOSED METHODOLOGY

In many Signage systems which have good quality and standard to its credentials sometimes loose its charismatic reputation and business status due to certain facts overlooked by their entrepreneurs. Facts like time-maintained quality service, human errors, unavailability of remote operation of i.e. very crucial in terms of usage of signage system to the purchasers and their satisfaction. This consumes lots of your time and hence generates intense service lag which ends up in disappointment. This provoked us to seek out an automatic solution to the current particular problem and hence we came up with the concept of this remotely managed Digitally signage system. On the opposite hand, this idea may also be used for revenue generation. Most of the purchasers visit the signage system just to work out the content being tailored to them. More and more customers seep in and then increase the business status in its respective market. So on acknowledge and solve the above problems, the remotely managed signage system is made. This technique will serve to its owner still as attract a large customer base in an efficient way. The block diagram of the system is shown in Figure-1.

Fig. 1 Example of an image with acceptable resolution

IV. RESEARCH

Research is one in all the foremost vital stage for development of any system. We researched about this technologies used for building digital signage boards and its market trends. We decided to make a digital signage solution for very user. We didn't develop a standalone application because it won't work on other software platforms and also because it isn't scalable. So we decided to use web application for building digital signage board as web application can run on any device on which internet connection may be provided. Besides, update and new release of application are more simple and user friendly in web development. Shell scripting is writing a series of command for the shell to

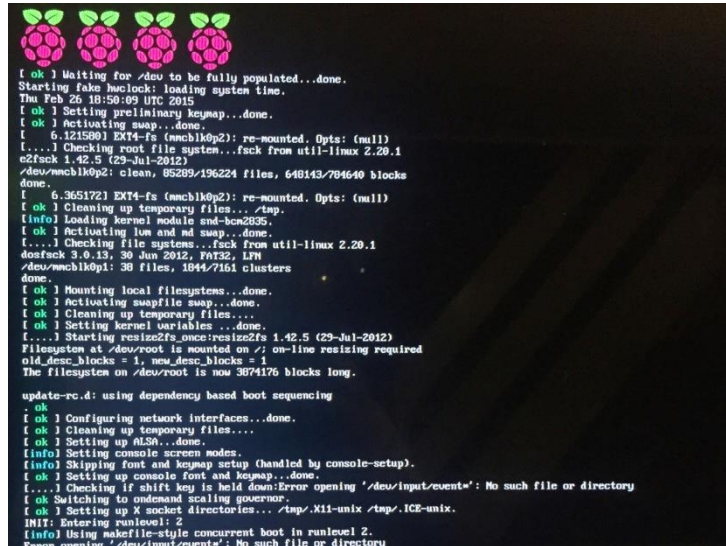


execute. It can combine lengthy and repetitive sequences of

commands into a single and simple script, which can be stored and executed anytime. This reduces the effort required by the end user. Raspbian is a Debian-based computer operating system for Raspberry Pi. There are several versions of Raspbian including Raspbian Buster and Raspbian Stretch. Since 2015 it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the family of Raspberry Pi single-board computers. The operating system is still under active development. Raspbian is highly optimised for the Raspberry Pi line's low-performance ARM CPUs. Raspbian uses PIXEL, Pi Improved X-Window Environment, Lightweight as its main desktop environment as of the latest update. Theme and few other changes. It even has the excellent Thonny Python development environment in Raspbian. In this release, it's now the default Python editor, and so no longer including IDLE by default. NumPy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python. Besides its obvious scientific uses, NumPy can also be used as an efficient multi-dimensional container of generic data. Arbitrary data-types can be defined using Numpy which allows NumPy to seamlessly and speedily integrate with a wide variety of databases.

V. KIOSK DEVELOPMENT

Digital signage kiosks, particularly, are highly versatile and might tackle a spread of roles across industries — from interactive travel and tourism solutions to retail, healthcare and more. Despite the actual fact that these solutions have exploded in popularity and located their way into schools, hospitals, office buildings, stores and public spaces across the country, businesses and organisations often struggle to tell apart the difference between self-service solutions, like digital signage kiosks,



```
[ ok ] Waiting for /dev to be fully populated...done.
Starting fake huclock: loading system time.
Thu Feb 26 18:50:09 UTC 2015
[ ok ] Setting preliminary keymap...done.
[ ok ] Activating swap...done.
[ 6.121580] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[....] Checking root file system...fsck from util-linux 2.20.1
e2fsck 1.42.5 (29-Jul-2012)
/dev/mmcblk0p2: clean, 85289/196224 files, 648143/704640 blocks
done.
[ 6.365172] EXT4-fs (mmcblk0p2): re-mounted. Opts: (null)
[ ok ] Cleaning up temporary files.../tmp.
[info] Loading kernel module end-bm2835.
[ ok ] Activating lua and sd swap...done.
[....] Checking file systems...fsck from util-linux 2.20.1
dosfsck 3.0.13, 30 Jun 2012, FAT32, LFN
/dev/mmcblk0p1: 30 files, 1844/7161 clusters
done.
[ ok ] Mounting local filesystems...done.
[ ok ] Activating swapfile swap...done.
[ ok ] Cleaning up temporary files...
[ ok ] Setting kernel variables...done.
[....] Starting resize2fs:resize2fs 1.42.5 (29-Jul-2012)
Filesystem at /dev/root is mounted on /; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 1
The filesystem on /dev/root is now 3874176 blocks long.

update-rc.d: using dependency based boot sequencing
. ok
[ ok ] Configuring network interfaces...done.
[ ok ] Cleaning up temporary files...
[ ok ] Setting up ALSA...done.
[info] Setting console screen modes.
[info] Skipping font and keymap setup (handled by console-setup).
[ ok ] Setting up console font and keymap...done.
[....] Checking if shift key is held down:Error opening '/dev/input/event': No such file or directory
[ ok ] Switching to ondemand scaling governor.
[ ok ] Setting up X socket directories... /tmp/.X11-unix /tmp/.ICE-unix.
INFO: Entering runlevel: 2
[info] Using makefile-style concurrent boot in runlevel 2.
Error opening '/dev/input/event': No such file or directory
```

and straightforward digital displays. While there is no denying the worth that every one types of technology brings to the table, there are several key differentiators between digital signage kiosks and digital displays that one should consider when exploring and weighing their options.

Fig. 2 Kiosk Development

VI. DATA PROCESSING

Raspbian OS needs a username and a password from user to log into the package. This phase removed, because it's improper for user therefore, changes are made in terminal by using some scripts and therefore the path of the webpage to be opened at startup is given in rc.local file which can execute the digital signage board code immediately after the package is booted at startup. The Raspberry Pi 3 Model B is third generation model that maintains the identical popular board format because the Raspberry Pi 2 and Raspberry Pi B+, but boasts a faster 1.2GHz 64Bit SOC, and on board WiFi and Bluetooth. The Raspberry Pi 3 features a Broadcom BCM2835 system on a chip (SOC), which has an ARM11 700 MHz processor, VideoCore IV GPU. It doesn't include a built-in disk or solid-state drive, but it uses an SD card for booting and chronic storage, with the Model B+ employing a Micro SD. The muse provides Debian and Arch Linux ARM distributions for download. The Raspberry Pi 3 has the same form factor to the previous Pi 2 and has complete compatibility with Raspberry Pi 1 and a pair of. it's recommended to use a 2.5A Power Supply with the Raspberry Pi 3. Designed to be both functional and aesthetically appealing, digital signage kiosks can be customised to complement the appearance of the location in which they will be placed. In addition to a durable enclosure, digital signage kiosk enclosures can be equipped with security locks to prevent unauthorised access and tampering and safety glass to protect the screen and the components inside. Digital displays, on the other hand, often lack an enclosure, which makes them significantly more susceptible to security issues and damage — and also reduces their expected useful life.

VII. RESULT

This project has helped industry to come with the unique solution for the upgradation to industry 4.0 norms.

Fig. 3 Result



VIII. CONCLUSIONS

As the technology is advancing every passing day the 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 meant, implemented, developed using raspberry pi 3 and FTP server. The strength of our work lies not only in developing a compact size embedded digital signage systems, but also in implementing it within the reach of current hardware and software engineering technology. There are sizeable amount of applications for the system developed which may transform the advertising and marketing industry. The project is meant to assist organisation display content digitally across the signage system. publicly places advertising firm can display advertisement by using scheduling feature provided.

REFERENCES

1. Xiaolan, Din zhang, Jingying fu, Dong jiang, Chongchong yu and Min jin “Location Recommendation of Digital Signage Based on Multi-Source Information Fusion”
2. Qing chen, Francois malric, To zhang, Muhammad Abid, Albino corderio, Emil m petriu, Nicolas d georganas“Interacting with Digital Signage Using Hand Gestures”, Hangzhou, 2012 International Symposium on Computer, Consumer and Control, pp 169- 172.
3. Swapnil alase and Vaibhavichinchur ,”IoT BASED DIGITAL SIGNAGE BOARD USING RASPBERRY PI 3”, International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181, IJERTV4IS020549 www.ijert.org Vol. 4 Issue 02, February-2015.
4. Christine bauer, Natalia kryvinska & Christine strauss “The Business with Digital Signage for Advertising” Department of Electronics and Communication Engineering National Institute of Technology Rourkela 2007.
5. Eric A. Meyer, (2006) “CSS: The Definitive Guide”, ISBN: 978-0-596-52733-4.
6. Jimmy Schaeffler, “Digital Signage”, Focal Press Media Technology Professional, ISBN: 978-0-240-81041, 2008.
7. Umakant B. Gohatre, V. D. Chaudhari," Digital Advertising of Still and Moving Images using Raspberry Pi”.
8. Shaik Qadeer, Mohammed Faizuddin," Internet Equipped Notice Board an Application of Internet of Things", Proc. of Int. Conf. on Advances in Signal Processing and Communication, SPC.