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Wireless Projection Node using Raspberry Pi

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***Abstract:** This paper puts idea about how the use of a projector is most important in our day to day life. Projector has an important role in various places like in school, colleges, and conferences. Representing any concept orally instead of this visual presentation makes more impact and clear the concept. In this paper, using Raspicast application the video, YouTube videos and audio files which are present on the Android device are shared on the projector as well as laptop/PC screen. The proposed system goal is to substitute a laptop with a mobile device and Raspberry Pi 3 B+ with wi-fi dongle. So, it focuses on cost reduction and power consumption. This system will be controlled by using mobile device based remote control*
***Keywords:** Raspberry Pi 3 Model B+, Raspicast, Projector, OMX player, Remote access*

I. INTRODUCTION

Nowadays usage of projectors in various places are increased. We required a laptop, other portable devices, and cables for making a connection with the projector which is not every time possible to carry with us. This all requirements resulting in increased cost and power consumption which also makes a connection every time complex. This paper overcomes the problem by using a Raspberry Pi. We use Raspberry Pi 3 b+ which has its inbuilt wi-fi module so we not need to use separate wi-fi dongle. In this paper, we use Raspberry Pi and make a connection with the projector and show various audios, videos which are present on the mobile device using Raspicast application. The Raspberry Pi used to reduce the usage of cables and it replace the laptop so the cost is also reduced. So, we remotely operate the projector through a mobile device.

II. LITERATURE REVIEW

The authors [1] focuses on cost reduction by substituting laptops with Raspberry Pi. Also, this system will consume power. This paper proposed the use of Raspberry Pi to store the files and portable document files (PDF) and view these on the projector. In [2] authors used Raspberry Pi 2 model B for wireless connection to operate projector remotely it uses Virtual Network Computing (VNC). In [3] authors used Raspberry Pi 3 version model B. In [4] author proposes replacement of laptops with a low cost as well as low-power consuming storage device, which can be designed using Raspberry Pi. In [5] the author proposes the utilization of Raspberry Pi and its web interface, to store different records and then it remotely handles by the mobile device and displayed on the projector.

III.PROPOSED SYSTEM

Here we briefly introduce hardware and software which are used in our paper,

A. Etcher Software

The entire document should be in Times New Roman or Times font. Type 3 fonts must not be used. Other font types may be Etcher software used to install the operating system on SD card and to make it bootable. Etcher is a free open-source software that lets you quickly and easily flash an operating system image to a USB drive or SD card. With more and more devices unable to read optical media, users who want to install a new operating system need a simple, easy-to-use way to create a bootable drive or card.[6]

B. Raspicast

Raspicast app is used to streaming youtube videos and audios as well as local media files from our android device to our Raspberry Pi which is used to display it on the projector

C. OMX Player

OMX Player uses the Open MAX (omx) hardware acceleration interface (API) which is the officially supported media API on the Raspberry Pi. It is used to play many audio and video file format.[8]

D. Raspbian OS

Raspbian OS is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run.[9]

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IV. ABOUT RASPBERRY PI

A. *What is Raspberry Pi?*

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor, projectors or TV. It is small in size so portable and easy to explore computing knowledge. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video and audio. Raspberry Pi has the ability to interact with the outside world.[10] The Raspberry Pi is a very cheap computer that runs Linux, but it also provides a set of GPIO (general purpose input/output) pins that allow you to control electronic components for physical computing and explore the Internet of Things (IoT).

B. *Specifications and Model of Raspberry Pi*

1) 1GB LPDDR2 SDRAM memory
2) 5V/2.5A DC power input (micro USB) power supply
3) Wireless connectivity:
a) 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN and Bluetooth 4.2/BLE
b) Gigabit Ethernet over USB 2.0 (maximum throughput 300Mbps)
c) 4 x USB 2.0 ports
4) Extended 40-pin General Purpose Input Output (GPIO) header
5) Full-size HDMI video output
6) 4-pole stereo audio output and composite video port
7) Camera Serial Interface (CSI) camera port for connecting a Raspberry Pi camera
8) Display Serial Interface (DSI) display port for connecting a Raspberry Pi touchscreen display
9) Micro SD port for loading your operating system and storing data
10) 0°C to 50°C operating temperature range
11) 120mm x 75mm x 34mm dimension
12) Weights 75g [7]

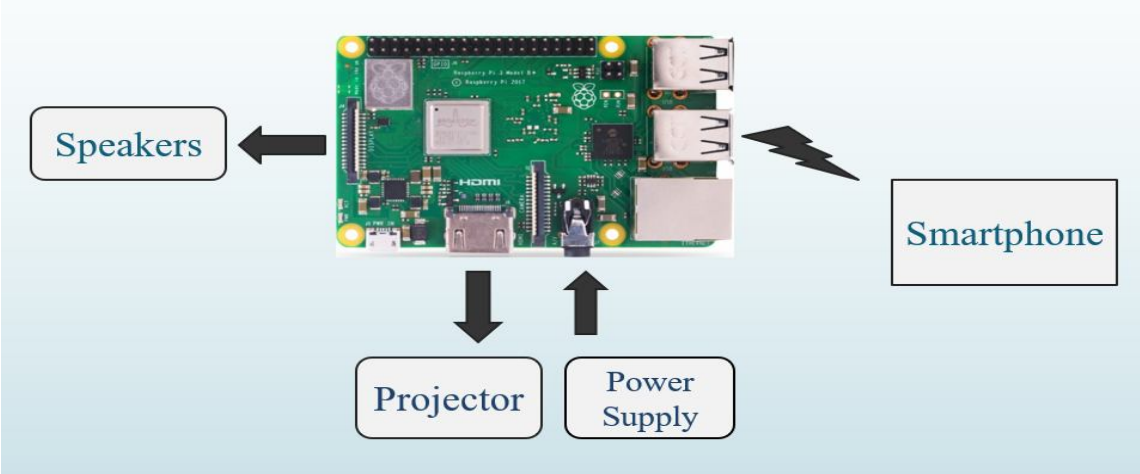


Fig. 1 Miracast on Raspberry Pi 3 model B+

V. CONFIGURATION STEPS

A. *Formatting SD card*

Format SD card using the SD card formatter App. It is an open source application. We need to insert the SD card in Raspberry Pi because it doesn't have memory.

B. *Installation of OS*

For Raspberry Pi, we need to download raspberian OS which has available on raspberry pi official website. We can install OS on SD card using Etcher software. Following are the steps for installing raspberian OS using Etcher-

a) A select image file of OS.
b) Select the SD card.
c) Click on flash to write the OS on SD card.

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C. Configure Raspberry Pi

1) We can configure Raspberry Pi using Raspberry Pi software configuration tool. When we boot raspbian OS you will be shown raspi-config.

a) To open this tool, run the following command in terminal:- sudo raspi-config

2) The sudo is required because you will be changing files that you do not own as the pi user. Here default user as pi and password as raspberry are already given. We can change the password and username of raspberry pi. Also, we can set hostname, select language, change time zone and Wi-Fi country.

D. Raspbian OS

OMX player is a command line player. we need to install the omx player to display videos and playing audio files.

1) For installing omx player on Raspberry Pi we can use the following command: sudo apt-get install omxplayer

E. After this all Installations, Reboot the Raspberry Pi.

F. Installation of Raspicast

1) Find the IP address of Raspberry Pi using ipconfig command on terminal.

2) Download Raspicast application which is freely available on play store.

G. Connect Raspberry Pi with a projector

1) Connect Raspberry Pi with a projector using HDMI cable.

2) Turn on mobile hotspot on which raspicast is installed and connect with Raspberry Pi using wifi.

3) Enter IP address, username and password of your Raspberry Pi in raspicast and click on “Ok”.

4) Click on "cast" and share your video, audio. Also, share youtube videos by choosing share option below youtube video and then click on "cast".

VI. CONCLUSION AND FUTURE SCOPE

A. Conclusion

We have designed a system which is cost effective and also power consuming with 5V power supply. The proposed system share audios, youtube video and local media files on the projector remotely via mobile devices which are connected to Raspberry Pi. So you can explain and handle this media on the projector by moving in conferences/college seminars. This sharing is done using Raspicast software which is freely available.

B. Future Scope

Now, we are using this casting system for audio, youtube video, and local media files, in future, we will implement the system which can be share pdf files, presentations and other documents on the projector via Raspicast software. Also, try to display a live screen of the mobile device on the projector.

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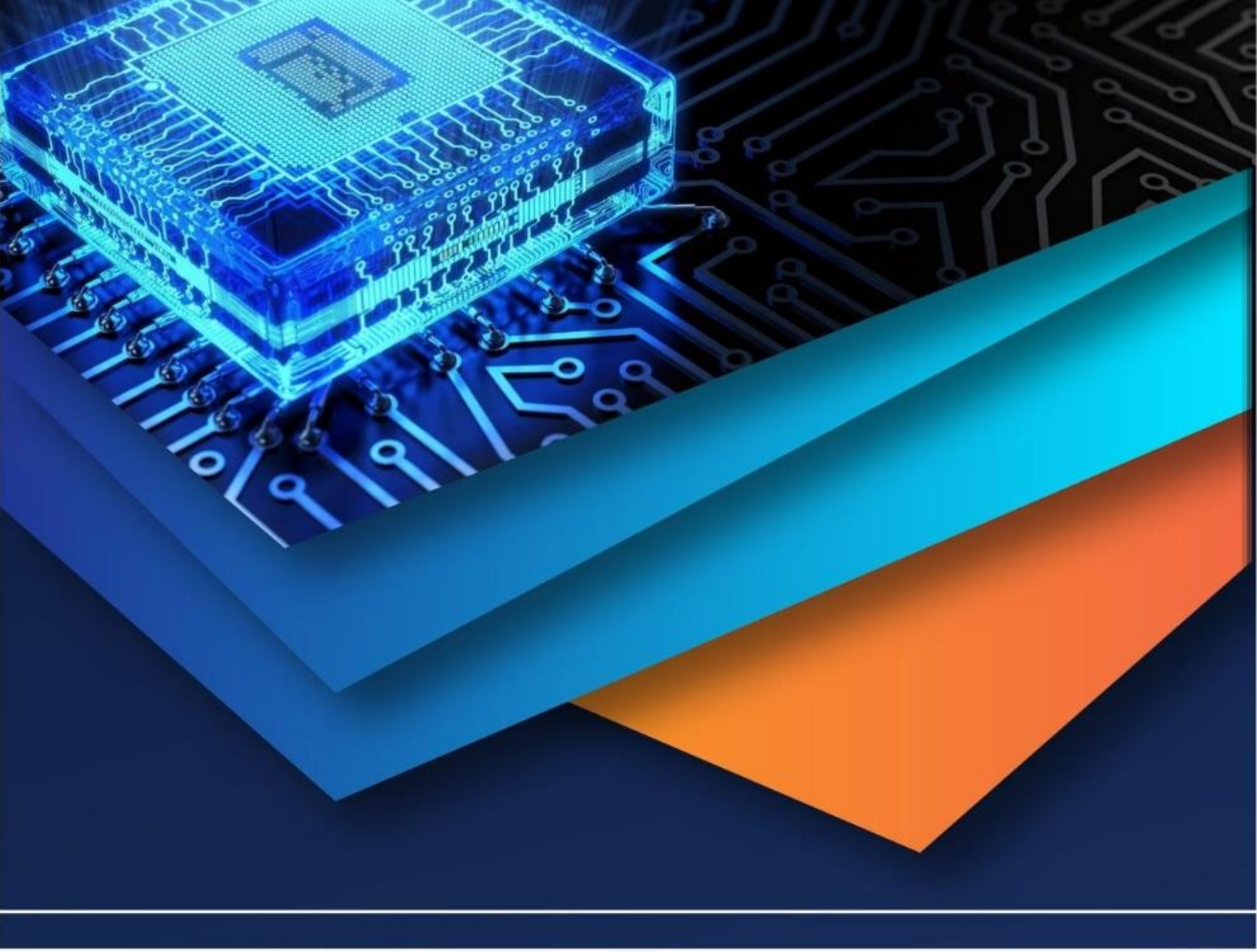
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