

## Wireless Printer Fastener using Raspberry Pi

Apurva Bhoir, Sanika Shinde,  
Sonali Jalgaonkar  
Dept. of Computer Engineering,  
Datta Meghe College of  
Engineering, Airoli sector-3,  
Navi Mumbai.

Shreya Patankar  
Asst. Professor  
Dept. of Computer Engineering  
Datta Meghe College of Engineering  
Airoli sector-3, Navi Mumbai.

**Abstract---**In computing, a printer is a peripheral device which makes a persistent human-readable representation of graphics or text on paper or similar physical media. The wired printer have to be tethered to your computer, you cannot move it anywhere in your home or office, even up or down a floor or two. It does not have the ability to be located farther away from the computer. Technology development helps people to do their work easily and make them comfortable. The idea of Wireless Printer is using handheld device like Mobile phone through Wi-Fi we print the data. The common data printing procedure for wireless printer has to use notebook or desktop computer as a relay medium, first receiving the data from mobile and then sending it to printer using an appropriate printing method. This paper proposes a design of a device which directly prints the data stored inside the Mobile without the assistance of a notebook or desktop computer and can convert a traditional wired printer into a wireless one with minimal requirements. The design compromises Raspberry pi having Noobs as operating system. The configured Wi-Fi dongle accept file from Mobile and gives to Raspberry Pi. The Printer driver is a program to control a printer that is connected to your system. The CUPs installed on Raspberry Pi do the print job.

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### I. INTRODUCTION

Technology development should help people to do their work more easily and make them comfortable. Printing is useful stuff that helps people in day to day life. The proposed system aims at providing a means to directly send data stored in cell phone to printing device for printing without computer. Sometimes it is not possible to have internet but nowadays everyone has mobile internet facility if we can directly give printing from mobile then it minimizes efforts. The reason is that one has to use a notebook or desktop computer as a relay medium, receiving the data from a mobile and then sending it to the printer to an approximate printer driver. This is rather cumbersome. That is impossible to directly print the data stored inside the mobile without the assistance of a notebook or desktop computer. The input to the system is data file to the print and output of the system is serial data in printing format. We can wirelessly print documents, bills and invoices (MS Office: Word, Excel, PowerPoint; PDF and text files) from device memory, SD card even from Google Drive (Google Docs) by using the printing method. Instantly print emails from Gmail, print photos and images (JPG, PNG, GIF), also print contacts, agenda, SMS/mms, call log, web pages(HTML) and other digital content directly your device to printer right next to you or anywhere in the world. For printing purpose, we simply need to be on the device to add some premium feature. In prior to buying the key which is offered by some people highly recommend printing the test page to ensure compatibility with the printer. The

laptop/computer users wishing to have their document to be print would have to connect to a local printer, has to install print devices drivers which can be reduced by using proposed device. The approach can be used for time saving and it is simply practical. It is easier to print data from mobile device like mobile phones, laptops, PCs etc. which can send data via Wi-Fi.

### II. LITERATURE SURVEY

With embedded systems fast expanding its reach, subject matter related to this field is available in abundance. While working on this project we have studied matter from various sources such as books, online articles and reference manuals. The knowledge gained from this activity has been of great help to us in understanding the basic concepts related to our project and has ignited further interest in this topic. "Linux for Embedded and Real time Applications", by Doug Abbott has been of great help in providing an introduction to the process of building embedded systems in Linux. It has helped us understand the process of configuring and building the Linux kernel and installing tool chains. We understood the preponderance of the ARM processors in the field of embedded systems and the features of ARM processors from the document "The ARM Architecture" by Leonid Ryzhyk. The ARM architecture is a confluence of many useful features that makes it better than other peer processors. Being small in size and requiring less power, they prove useful in providing an efficient performance in embedded applications.

Wireless Printer Fastener using Raspberry Pi presented by P. Mahitha and P. Sreenivasulu:

This paper proposes idea of using Mobile phone Bluetooth print the data. For printing purpose, we need some mediator which mediates between a mobile device and a printer. The adapter which helps the printer to print by selecting either of the first operation modes in which data from the data supply device is received by wireless communication and before the completion of receiving the data; a print job is issued to the printer by wired communication. In second operation mode in which data from the supply device is received by wireless communication and after the completion of receiving the data, a print job is issued to the printer by wired communication.

The input to the system is data file to print and the output of the system is serial data in printing format. We can wirelessly print documents, bills and invoices from device memory, SD card and even from Google Drive by using the printing method. Instantly print emails from Gmail, print photos and images, also print contacts, agenda, SMS/mms, call log, web pages and other digital content directly from your device to a printer right next to you or anywhere in the world.

### III. DESIGN OF ARCHITECTURE

In the overall system, the user will be in the higher layer which will provide the commands to the application layer these will be included in the CUPS driver and the OS layer in raspberry pi and the hardware i.e. printer will take the required action which are in the kernel drivers. On other hand between user and OS required controlling action to access printer using Wi-Fi is done by LINUX administration tools i.e. CUPS (common UNIX printing system). A computer running CUPS is a host that can accept print jobs from client computers, process them, and send them to the appropriate printer. The print-data goes to a scheduler which sends jobs to a filter system that converts the print job into a format the printer will understand.

- **Kernel Drivers:** To detect the printer by using kernel driver module.
- **CUPS Drivers:** Adding PPD files to add the printer to the user.

Fig (a) is the complete block diagram of the proposed system. The user i.e. the mobile or through laptop will communicate via WiFi with the Raspberry pi system which has a built in WiFi, the Raspberry Pi will process the commands and information needed for printing. The memory unit of controller saves the data temporarily and gives it to the extraction unit. The extraction unit retrieves information and the compiling unit converts it into printing format and sends it to the configured printer via the USB dongle.

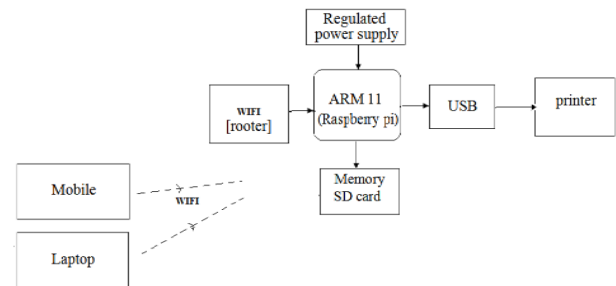


Fig (a) System Block Diagram

### IV. DESIGN IMPLEMENTATION

To implement the system, we will have to start by installing our hardware i.e. Raspberry Pi with an appropriate Operating System. We prefer Noobs, an easy operating system installer which contains Noobs. It will contain the required drivers for the Raspberry Pi to communicate with the printer. Noobs provides more than a pure OS: it comes with over 35,000 packages; pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi. Once this is done, we will need to configure CUPS on the Raspberry Pi.

CUPS allows users to send different data to the CUPS server and have that data converted into a format the printer will understand and be able to print. CUPS consist of a print spooler and scheduler, a filter system that converts the print data to a format that the printer will understand, and a backend system that sends this data to the print device.

The port 631 also needs to be configured. When the setup is ready, the printer's profile should be changed to "sharing". Once the printer and the system are connected successfully via the USB, the system will be ready for utilization. CUPS uses PPD drivers for all of its PostScript printers, and has even extended the concept to allow for PostScript printing to non-PostScript printing devices, by directing output through a CUPS filter. Such a file is no longer a standard PPD, but rather a "CUPS-PPD". CUPS clients usually read the current PPD file from the server every time a new print job is created.

We install and configure CUPS drivers and then add and configure our printer in cups print server by uploading PPD (Postscript Printer Description) file. A PPD file is a file that describes the fonts, paper sizes, resolution and other capabilities that are standard for a particular Postscript printer. A printer driver program uses a PPD file to understand the capabilities of a particular printer. PPDs function as drivers for all PostScript printers, by providing a unified interface for the printer's capabilities and features. The entire scope is to print the transaction data from the raspberry pi to Printer through USB interface.

The device driver is developed using Real Time Operating system. ARM compiler and debugger provided by ARM.

The printer class driver handles the printer specific request. The printer class driver will be designed to support Printer. The USB Bus Driver (USB D) is involved in mediating bus access at two general times: While a device is attached to the bus during configuration and during normal transfers. Where we are using USB 2.0 is connected between the raspberry pi and printer.

The following diagram indicates the flow of activity the system is supposed to perform. It thoroughly describes how the system will go through different phases and what each phase will achieve.

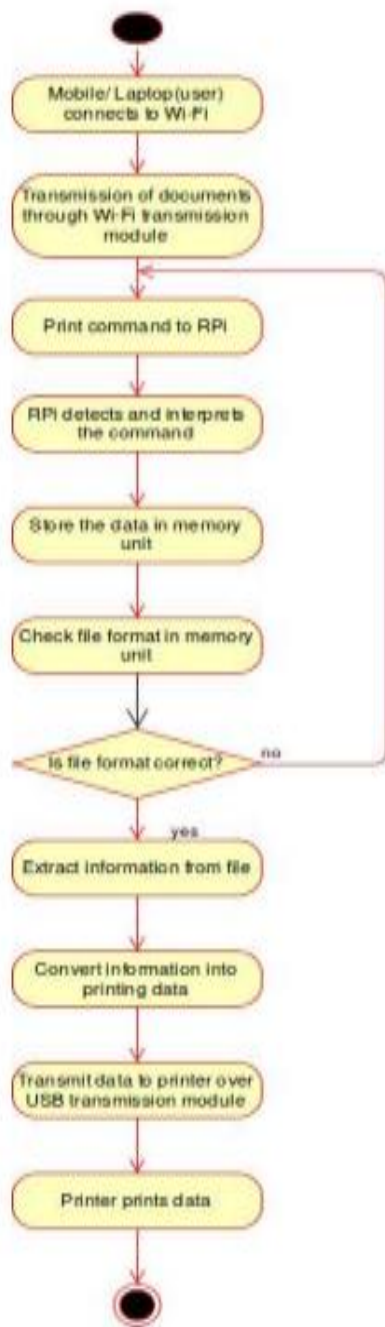


Fig4: Activity Diagram of the System

## V. CONCLUSION

The paper discusses the issue of printing and how the traditional methods can be improved to match up at less cost and with feasible mechanism. This approach can be used for time saving and it is simple and practical. By using this approach, we can more easily print data from mobile device. Users can print data anytime, anywhere using only their Mobile phone or laptop without any manual wired connection through it. They will be able to instantly print PDF files, text files and png, jpg format file more directly from the devices through a printer. There few restrictions even for the current system which can be further improved as future scope.

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