

Data Transfer Using ARM Processor

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Abstract- Nowadays portability is important. To achieve this we have designed a system that can be carried over anywhere. Using this system we can transfer the data from one pen drive to another without using PC. Generally, PC or laptop is used to transfer data between two pen drives. But it is not always possible to carry such a large device only to do data transfer. To overcome this problem we have designed a system with ARM processor which is more compact and easy to carry. After inserting two pen drives into the USB port of Raspberry Pi kit, using a python program we can perform the data transfer from one drive to another. Using the program we should select a pen drive as the source and another as the destination. After selecting that we can perform the transfer. Using this program we can transfer files of any format. We have also implemented Bluetooth functionality. Using this we can transfer a file from the pen drive to any paired devices like a mobile phone or a computer etc. The program transfers data wirelessly to the paired device.

I. INTRODUCTION

Today the need for the portable devices is well known to us. We can easily find the USB and its applications everywhere around us. The applications of the USB are computer peripherals such as keyboard, pointing devices, digital cameras, printers, portable media players, disk drives and network adapter, both to communicate and to supply electric power. It has become common place on other devices, such as smart phones, PDAs and video game consoles. USB has effectively replaced a variety of earlier interfaces, such as serial and parallel ports, as well as separate power chargers for portable devices.

The main disadvantage of USB devices is that it requires the use of PC for their operation. Carrying a PC just for the sake of data transfer is not affordable now because people want all their devices to be handy. Moreover, transferring data via a computer involves a lot of power consumption. Also, the threat of viruses and malware has made the life of computer users more complicated. These viruses get activated as soon as the device is plugged into the system and get copied along with other data from one device into another. A solution to this problem is providing a small device that carries out the required task. The small footprint and ease of portability makes it as a choice for the data transfer. This device will help the user to select a particular data file from the mass storage device connected to

one of the ports and transfers it to the other mass storage device using some controls like list, copy provided on the front panel.

Raspberry pi kit.

The Raspberry Pi is a small computer about the size of a credit card. It was developed in the UK by the Raspberry Pi Foundation with the hope of inspiring a generation of learners to be creative and to discover how computers are programmed and how they function. The device uses the ARM processor which does most of the hard work in order to run the Raspberry Pi. The reason for this is that ARM processors are extremely efficient and fast when used in small devices. This makes the ARM processor the obvious choice for the Raspberry Pi. Even though the Raspberry Pi is a computer and not having a hard drive like traditional computers, it relies on the SD card for the starting up and storing of information. For the Raspberry Pi, the SD card does the same job as a hard drive does in a traditional computer. The SD card must contain the operating system, programs and the data needed to run the Raspberry Pi. The operating system tells Raspberry Pi how to function, how to handle any input from the user and how to manage the running programs.

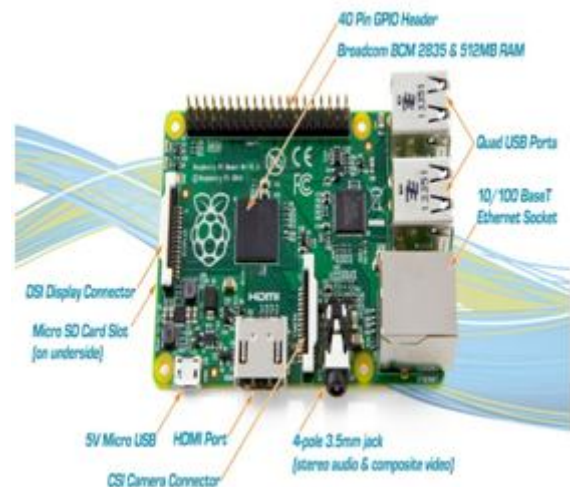


Fig 1.1 Raspberry Pi Kit

The following fig 1.1 represents components of Raspberry Pi kit,

Micro USB power port: The micro USB power port is used to power the Raspberry Pi device.

HDMI Port: The HDMI output is used to plug into a modern television or monitor.

Ethernet port:The Ethernet port is used to connect the raspberry Pi to the Internet or a local network.

USB port:USB 2.0 ports are used to plug in a keyboard, mouse, external hubs etc.

Audio output:The audio output can be used to plug into an external amplifier or an audio docking station.

GPIO headers: The GPIO headers are used to connect the Raspberry Pi to other hardware device. Such as LED’S, motors and other electronics components.

RCA video output:The video output is used to connect to an older type television.

ARM processor:ARM is a family of instruction set architectures based on a reduced instruction set computing architecture. ARM stands for Advanced RISC Machine. ARM designs microprocessor technology that lies at the heart of advanced digital products, from mobile phonesand digital cameras to games consoles etc.ARM microcontroller is very important part of the project that can do a lot of things such as monitoring and controlling the loads. Figure 3.2 shows ARM 11 MP CORE manufactured by ARM Holdings [1].

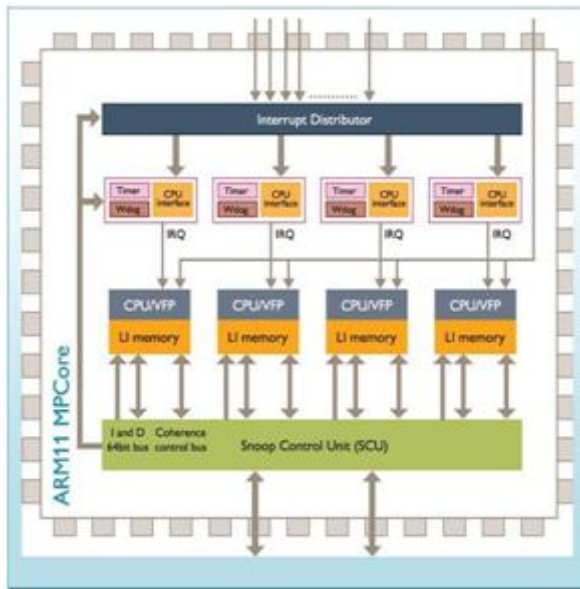


Fig 1.2 ARM 11 MP CORE

TFT LCD TOUCH SCREEN: The (TFT) is a liquid-crystal display (LCD) that uses thin-film transistor .We use (TFT) to improve image qualities such as addressability and contrast. A (TFT) LCD is an active-matrix LCD, in contrast to passive-matrix LCDs with a few segments.

TFT LCDs are used in appliances including television sets, computer monitors, mobile phones, handheld video game systems, personal digital assistants, navigation systems and projectors. More ARM devices are using 'smart LCD' displays to output visual information. TFT displays are inexpensive and easy to use. TFT LCD Module Touch offers an easier UI and can be used instead of traditional LCD screens [2].

USB: Ease of use was a major design goal for USB, and the result is an interface that’s a pleasure to use for many reasons:

USB is versatile enough for just about any standard PC peripheral function. Instead of having a different connector and cable type for each peripheral function, one interface serves many.

When a user connects a USB device to a PC, the operating system detects the device and loads the appropriate software driver. The first time the device connects, the operating system may prompt the user to insert a disc with driver software, but other than that, installation is automatic. Users don’t need to reboot before using the device [4].

Easy to connect: A typical PC has multiple USB ports, and hubs make it easy to add ports without Wireless options .USB originated as a wired interface, but technologies are now available for wireless communications.

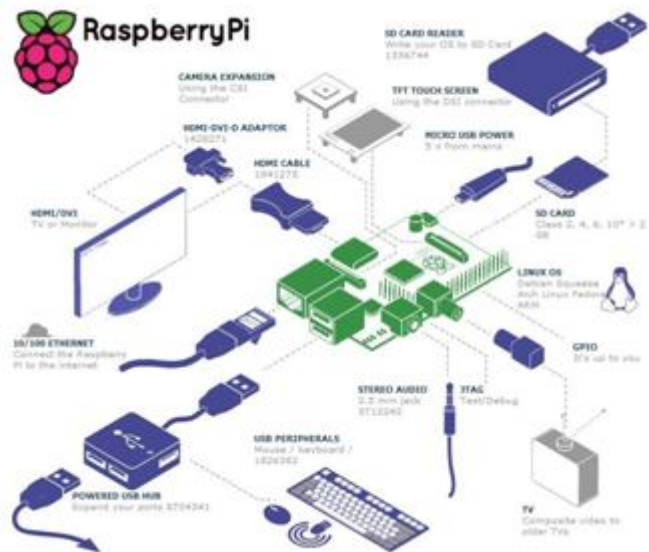


Fig 1.3 Connections between the components

LINUX

Linux was originally developed as a free operating system for Intel x86-based personal computers. It has since been ported to more computer hardware platforms than any

other operating system. It is a leading operating system on servers and other big iron systems such as mainframe computers and supercomputers. Linux supports a vast variety of hardware devices, probably more than any other OS. Linux supports a huge variety of applications and networking protocols. Linux is scalable, from small consumer-oriented devices to large, heavy-iron, carrier-class switches and routers. Linux can be deployed without the royalties required by traditional proprietary embedded operating systems. Linux has attracted a huge number of active developers, enabling rapid support of new hardware architectures, platforms, and devices.

PYTHON:

Python is a high-level programming language designed to be easy to read and simple to implement. It is open source, which means it is free to use, even for commercial applications. Python can run on Mac, Windows, and Unix systems and has also been ported to Java and .NET virtual machines.

Python is considered a scripting language, like Ruby or Perl and is often used for creating Web applications and dynamic Web content. It is also supported by a number of 2D and 3D imaging programs, enabling users to create custom plug-ins and extensions with Python.

Examples of applications that support a Python API include GIMP, Inkscape, Blender, and Autodesk Maya.

Scripts written in Python (.PY files) can be parsed and run immediately. They can also be saved as a compiled programs (.PYC files), which are often used as programming modules that can be referenced by other Python programs.

TKINTER

Python provides various options for developing graphical user interfaces. Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications.

II. IMPLEMENTATION

Connection procedure for booting Raspberry Pi

1. Insert an SD card that is 4GB or greater in size into your computer.
2. Format the SD card.
3. Go to <https://www.raspberrypi.org/downloads/> for downloading any one of the specific Operating System.
4. Burn that in the card using Win32DiskImager.

5. Plug the card in the pi.
6. Download PUTTY software. In PUTTY enable SSH option and create a secure tunnel in the format
ip_address:5901 (port_number)
7. Ping raspberrypi.mshome.net to get the ip_address
8. Login: pi
9. Password: raspberry
10. Enter the above login name and password in raspberry pi console.e4
11. For checking current session in Raspberry Pi use command

Command: whoami

12. 10.For shutting down Raspberry Pi use the following command

Command: sudo shutdown now

BLUETOOTH:Bluetooth is a telecommunications industry specification that describes how mobile phones, computers, and personal digital assistants (PDAs) can be easily interconnected using a short-range wireless connection. Using this technology, users of cellular phones, pagers, and personal digital assistants can buy a three-in-one phone that can double as a portable phone at home or in the office, get quickly synchronized with information in a desktop or notebook computer, initiate the sending or receiving fax, initiate a print-out, and, in general, have all mobile and fixed computer devices be totally coordinated [5].

Steps for installing Bluetooth

1. Plug the dongle into a USB port on your Pi and boot it up.
Command: sudo apt-get install bluetooth
2. Once the software is installed, type
Command: sudo service bluetooth status
3. For identifying any Bluetooth discoverable devices in the area

Command: hcitool scan

Now you are ready to use Bluetooth on the Raspberry Pi.

If you don't see anything, make sure that you have a phone or other Bluetooth-enabled device near the Pi and discoverable.

III. SYSTEM DESIGN

Copy

Here, we implemented copying files between two

USB flash drives. First the user has to select the list of files copied to the destination USB. Finally the user must select the destination USB location where the files are to be transferred.



Fig 3.1 Home Screen



Fig 3.4 Data Transfer Details



Fig 3.2 Source File Selection

Delete

Here, we implemented deleting files in any of the selected USB flash drive. First the user has to select the list of files to be deleted. Then the user should confirm the list of files to be deleted.

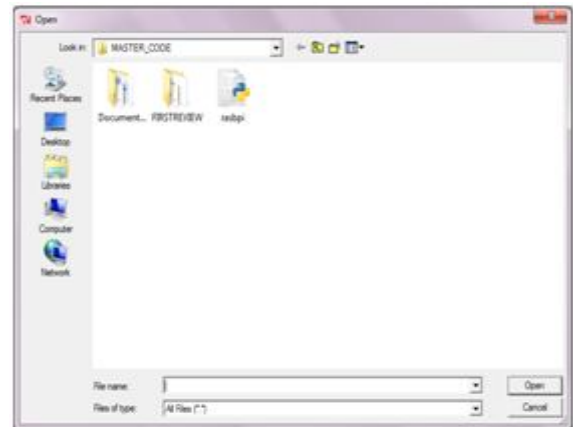


Fig 3.4 Source File Selection Window

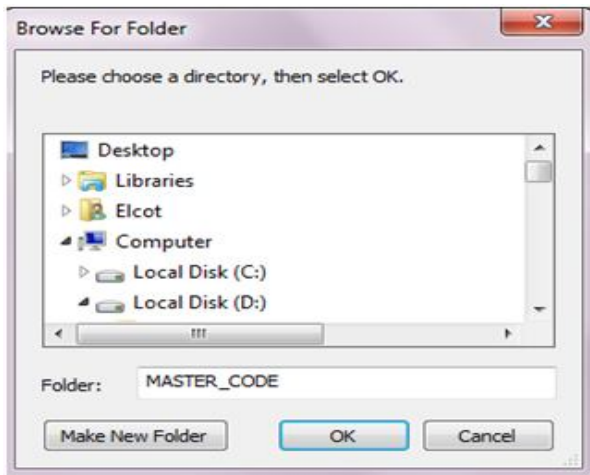


Fig 3.3 Selecting Destination Location

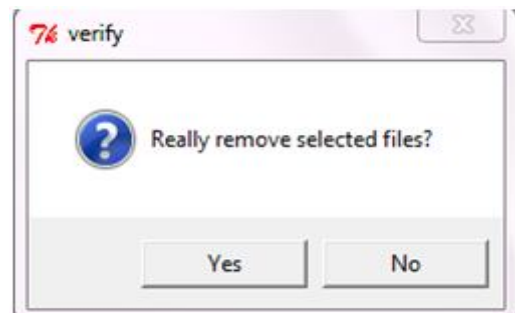


Fig 3.5 Confirmation Prompt

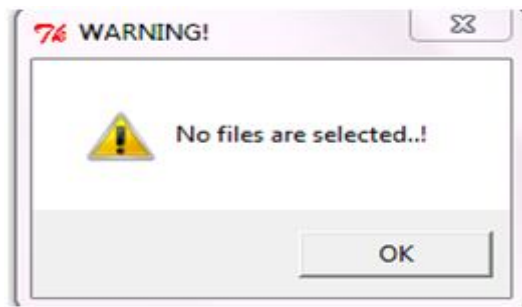


Fig 3.6 Alert Prompt

IV. CONCLUSION

In this study, we proposed a portable handy device which can perform data transfer between two USB flash drives. This method provides secure data transfer because of Raspbian wheeze , a linux based operating system. This is cheap, portable, low power consuming when compared to laptops and personal computers.

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