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"Design of Computer/Laptop Independent Data Transfer System from One USB Flash Drive to another Using ARM11 Processor"

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Abstract

Generally, we use laptops or desktops to transfer data between two USB flash drives. It difficult to carry laptops or desktops device to the particular location and data transfer is done by using a computer or laptop means it consumes more power. So to overcome this problem, we are designing a hardware which is more compact to carry anywhere. With the help of this module we can not only transfer the data but also we can see the transfer of the particular file which we want to send by using touch screen display. Whenever we insert the USB flash drive into the USB port then a signal will be sent to the ARM11 processor indicating that source USB flash drive is inserted so now ARM11 processor will start fetching the data from the source USB flash drive into the buffer and ARM11 Processor waits for the signal from destination USB flash drive.

When ARM11 Processor gets the signal from the destination USB flash drive now ARM11 processor is ready to transfer the data between two USB drives. Only the ARM11 Processor should get the input from user, once the user press the hard key the ARM11 Processor gets the information to transfer the data between two USB flash drives. While transferring the data the led blinking rate will be increased when data transfer is completed then led will stop blinking. Being portable and battery operated is an added advantage of this system.

I. INTRODUCTION

Under normal circumstances, to copy or move data from one mass storage device to another, the computer/Laptop is used as an intermediate device. This system describes a device which can reduce the use of a computer/Laptop for transferring the data of one USB flash drive to another. The methodology shows that the system can be used to do data communication between two USB mass Storage devices without using computer/Laptop. This means this system can also transfer data between digital-cameras, phone memories and other similar devices. Consider a USB flash drive in which there is a large amount of data and there is urgent need to copy this data into another flash drive. This can be done without any hesitation by using this gadget. As a solution to the USB Flash drive, the system aims to develop a device that allows data transfers between two USB devices without the need for Laptop and computers.

The Proposed System is going to be executed on a pure embedded Linux platform. System will be developed using an Open Source front end GUI software i.e Qtopia, through which we can run the program as an standalone application and using the Linux internals only will identify the USB storage devices connected and allow the user to select individual file or complete transfer of the data from one device to the other.

II. LITERATURE SURVEY

USB drives are an external device which stores digital information and helps us to transfer it from one computer to another; they are also called pen drives. A USB flash drives is a data storage device that includes EEPROM (Flash) memory with a Universal Serial Bus (USB) interface. USB flash drives are typically removable and rewritable, and physically much smaller than a digital disc.

To copy data from one USB drive to another USB drive, third medium is needed since USB drives are pen drives device, USB slave devices cannot communicate directly with USB slave devices. The Third medium can be whole computer or laptop which has a CPU and Operating System which initiates data transfer between these two devices is called as USB host controller to handle the USB protocol and depending on the which firmware loaded it, It can handle the file system as well.

Another medium can be a wireless (Bluetooth or Wi-Fi) to create a link between two active devices to send or receive data from one device to another. The embedded systems are used to eliminate the use of whole computer or laptop for the purpose of just copying data from one USB device to other. This involves use of any third medium in between these two USB devices.

III. SYSTEM ARCHITECTURE

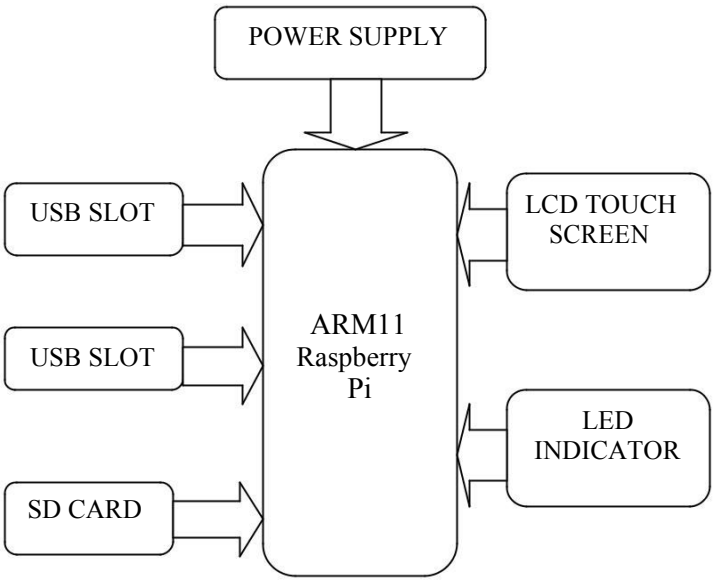

Fig.1 System Architecture

IV. HARDWARE REQUIREMENTS

➢ *ARM 11 Processor*

The ARM11 is nothing but a Reduced Instruction Set Computer (RISC) and it incorporates the following typical RISC Architecture features such as, It consists of a large uniform register file. It consists of a load/store architecture, in which the data-processing operations only operate on register contents, but not directly on memory contents. It also consists of very simple addressing modes, in which all load/store addresses being determined from register contents and instruction fields only. It consists of uniform and fixed-length instruction fields, to simplify instruction decode.

It has control over both the Arithmetic Logic Unit (ALU) and logical shifter in most data-processing instructions to maximize the use of an ALU and a shifter. It is built with auto-increment and auto-decrement addressing modes to optimize program loops. It is built with Load and Store Multiple instructions to maximize data throughput. It has conditional execution of instructions to boost the execution speed. All These features of ARM11 processors provide a high performance, least code size, less power consumption, and small size.

➢ *Raspberry Pi Board*

The Raspberry Pi is a small computer whose size can be compared with the size of a credit. Programmed and how they will function.

This small computer is having features like amazing HD (high-definition) quality audio and video playback, sports has the ability to play 3D games. This device uses the ARM processor which does most of the hard work in the Raspberry Pi. Therefore ARM processors can be thought of as the brain of the Raspberry pi.

In the devices such as cell phones and also in case of hand held mobile gaming devices and other small digital devices these processors are used. The reason behind this is that ARM11 processors are extremely efficient and will perform very fast when used in small devices. This advantage makes the ARM11 processor the best choice for the Raspberry Pi.

It consists of SD card for the starting up and storing of information. Therefore for the Raspberry Pi, the SD card will do the same job as a hard drive does in case of traditional computers. The SD card consists of the operating system, programs and the data needed to run the Raspberry Pi.

In the Raspberry Pi Models such as model A, B and B+ the chip Broadcom itself is used. Since the chip BCM2835 is a cost-optimized, having full HD and multimedia applications processor for advanced mobile. Since this chip is designed for the optimized for power efficiency, and Broadcom's Video Core® IV technology is used by the BCM2835 to enable applications in 3D gaming, imaging, camcorder, media playback, streaming media and graphics.

Fig.2 Raspberry Pi Hardware Module

➢ *SD Card*

A SD (Secure Digital) card is a storage device that incorporates many useful features which depends on how and where it is used. We can add the SD card to small devices such as mobile phones to extend the storage capacity for multimedia applications and other data. Since the Raspberry pi board does not include a built in hard disk, but uses an SD card for booting purpose and persistent storage.

As the Raspberry Pi has no internal storage or built-in operating system, therefore it requires an SD-Card that is set up to boot the Raspberry Pi. It can creates an own preloaded card using any suitable SD card. The SD Card was always quite a large storage medium in case of model B. But the new B+ model uses an improved storage device that provides for both a more compact storage medium and a positive experience in inserting and removing the card.

➢ *3.2" inch Touch screen*

Fig.3 LCD **Touch Screen Module**

- It has TFT type Display
- Serial SPI Interface
- LCD touch screen panel control chip XPT2046
- Memory storage capacity is 65536
- It has LED backlight
- Screen Resolution is of 320x240 (Pixel)
- Aspect size ratio 4:3
- Low power consumption TBD
- Low backlight current TBD
- Low operating Temperature TBD

➢ USB Slots

Fig.4 USB Slots

The most obvious improvement in this project is perhaps, the addition of a further two USB 2.0 ports bringing it to the total to four. This will helps to them those who want to plug in a Wi-Fi dongle and an external hard drive in addition to the keyboard and mouse. The Pi B+ also manages over current behavior and hot plugging in the USB ports, in an improved manner over the model B.

V. SOFTWARE REQUIREMENTS

➢ *Embedded Linux:*

Linux operating system provides a powerful, flexible kernel and run time infrastructure that is continuously being improved by the open source access and extended by hardware providers in order to support the new processors, buses, devices, and protocols. These embedded device projects reduces the hardware costs by taking advantage of the power and flexibility. The Linux kernel and the associated open source infrastructure is the heart of embedded operating system, and application prototyping, optimization, infrastructure and deployment.

➢ *Raspbian Operating System*

Raspbian is the operating system for normal use on a Raspberry Pi. Raspbian is a free operating system optimized for the Raspberry Pi board. An OS is the set of basic programs and utilities that make our Raspberry Pi board to run program. It provides more than a 35,000 packages and pre-compiled software bundles in a nice format for easy installation on your Raspberry Pi.

➢ *Qtopia GUI*

Qtopia is a graphical environment for the embedded devices and we can develop Qtopia application on Linux. Qtopia Platform is a comprehensive C++ platform to interface Linux-based consumer electronics applications. It offers an intuitive environment for embedded GUI applications and includes a rich set of controls that provide standard GUI functionality and event handling.

VI. ALGORITHM

- Step-1 Start
- Step-2 Initialize Touch screen and Display string.
- Step-3 Wait for detection of both drive A and B.
- Step-4 If both drives are connected and detected then select drive as per user requirement.
- Step-5 Display contents of the selected drive.
- Step-6 Perform required operation on selected file from selected drive A to B.
- Step-7 checks the contents of drive B.
- Step-8 Operation done then go to step 5.
- Step-9 Stop

VII. RESULTS

➢ *Procedure to check the Result*

Fig.5 Model of the USB Flash drive to USB Flash drive data transfer

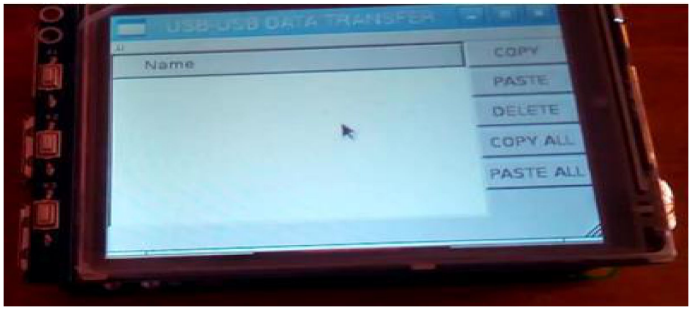

Fig.6 Display showing delete, paste, copy all, and Paste all options.

Fig.7 USB Flash drive A is inserted

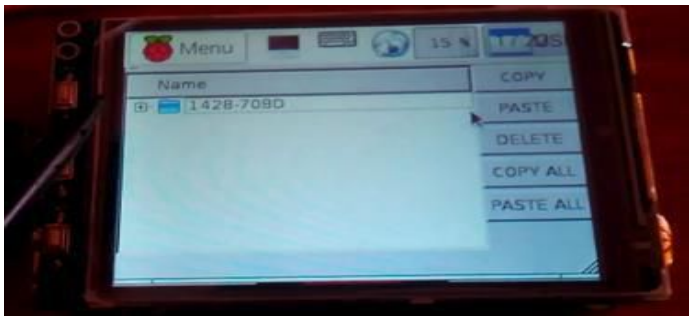

Fig.8 USB Flash drive A is detected.

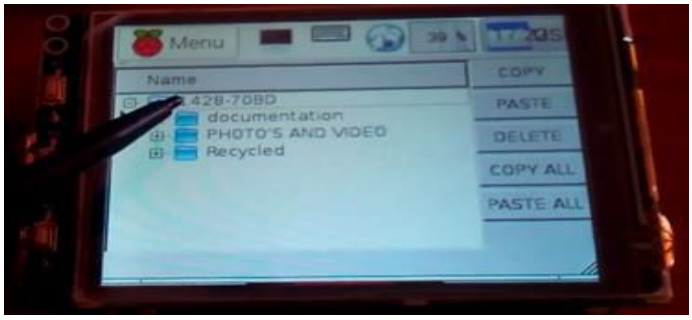

Fig.9 USB Flash drive A is opened to view folders.

Fig.10 USB Flash drive B is inserted

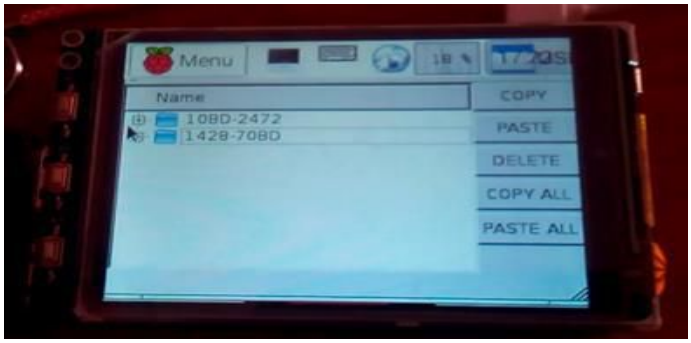

Fig.11 USB Flash drive B is detected.

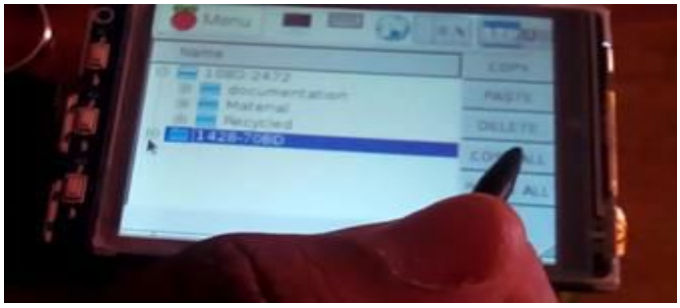

Fig.12 Copy the folder from USB Flash drive A

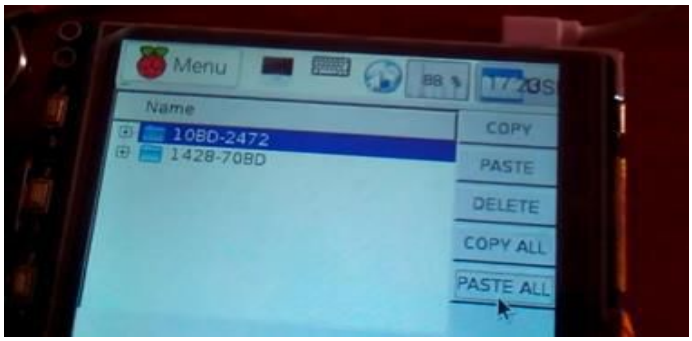

Fig.13 Paste copied folder into USB Flash drive B.

VIII. APPLICATIONS

- Transfer the data between two USB flash drives.
- Transfer the data between two digital cameras.
- Transfer the data between two Mobile devices.
- Transfer the data between USB flash drives and digital Cameras.
- Transfer the data between USB flash drives and mobiles.
- Transfer the data between Mobiles and digital cameras.

IX. CONCLUSION

The project "Design of computer/laptop independent data transfer system from one USB Flash drive to another using ARM11 Processor "is successfully designed and tested. It is developed by integrating features of all the hardware components and software used. Secondly, using highly advanced Raspberry Pi board and with the help of growing technology the project is completed.

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