

Offline Data Stream using Raspberry Pi for Android

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Abstract - The Raspberry Pi is a very strong, minicomputer having the dimensions of credit card like which is invented with the hope of generation of learners to be creative. Raspberry Pi is the name of a series of single-board computers made by the Raspberry Pi Foundation, a UK charity that aims to educate people in computing and create lucid access to computing world. The Raspberry Pi was launched in 2012, and there have been several iterations and variations released since then. The actual and first Pi had a single-core 700MHz CPU and just 256MB RAM, and the latest model has a quad-core CPU clocking in at over 1.5GHz, and 4GB RAM. The price for Raspberry Pi has always been in the range of \$100 (usually around \$35 USD), most notably the Pi Zero, which costs just \$5. All over the world, people use the Raspberry Pi to learn programming skills, build hardware projects, do home automation, implement Kubernetes clusters and Edge computing, and even use them in various industrial applications. The Raspberry Pi is a very cheap computer that runs on Linux, but it also provides a set of GPIO (general purpose input/output) pins, allowing you to control electronic components for physical computing and explore the Internet of Things (IoT).

Key Words: Raspberry Pi, Android Studio, Wi-Fi, XAMPP.

1. INTRODUCTION

The Raspberry Pi is a small computer, similar to the computers with which we're already familiar. It uses a many various kinds of processors. But can install different versions of the Linux operating system that are almost like Windows operating system. Raspberry Pi is also used to browse the internet, to send an email or to write a letter using a word processor, but we can do so much more. Simple to use but powerful, cheap and in addition difficult to break, Raspberry Pi is almost the perfect device for upcoming computer scientists and engineers [1]. This small computer features amazing high-definition quality, video playback, also sports high quality audio and has the capability to play 3D games in it. The device uses the ARM processor which does almost all of the hard work in order to run the Raspberry Pi.

RASPBIAN, PIDORA, OPENELEC, RASPBMC, RISC OS, and ARCH LINUX are few software's which are used until now. All this software's can be downloaded easily and these are free from the official forum under the NOOBS (new out of the box software) category. It supports Python as the primary

programming language for functioning and coding. It also features BASIC, C, C++, JAVA, and Perl and Ruby languages [2].

2. HISTORY AND EXISTING SYSTEM

Eben Upton in UK-dependent Raspberry Pi Foundation at Cambridge University has started manufacturing a \$35, debit-card sized computer, engineered to make it affordable, cheap, tiny to teach basic computer science in schools all over the world. The Linux-based, single-board computer will have a 700-MHz ARM architecture, CPU, 256 Mbytes of RAM, two USB ports and a 10/100 Ethernet controller. The foundation later plans to propose a model with 128 Mbytes RAM, one USB port with no Ethernet controller. Both models have RCA and High-Definition Multimedia Interface outputs that enable users to plug the machines into a Television. Mice, keyboards, and other input devices could connect through a USB port.

The computers will exclude an HDD or SSD but instead will use a Standard Definition memory card to boot up and save data. The 45-gram machines will measure 85.6 × 53.98 × 17 millimeters, excluding the SD card and connectors, which will project a bit over the edge. For one computer it takes almost three to four weeks span of time. The foundation expects a primary production runs of around 10,000-15,000 machines.

Raspberry Pi was founded in 2009 with the stated goal of producing an affordable or cheap computer that young generation could use to learn computer programming. Various schools have constantly inquired about usage of Raspberry Pi machines. Proponents hope corporates will pay for computers that could be used in schools with fewer financial resources for academic purposes [3].

The line of work in Home Automation Systems has always been on rise and the undertaken projects are mostly developed on wireless microcontrollers with a combination of hardware's and software's on both sides. Making this concept a hit, its work differs from controlling home appliances through LAN using GSM/Bluetooth/Java to commercial building by allowing consolidated control of temperatures, aeration and illuminations. However, the only limitation to this study has always been the number of inputs being provided to the system. Also, if the system is being developed either by microprocessors or sensors or modems it would not only result in high installation costs but also make it impossible to access the system remotely if at all the architecture is Bluetooth based.

3. PROPOSED SYSTEM AND BASIC SETUP

The Raspberry Pi board has a processor and graphics chip, program memory (RAM) and various interfaces, and connectors for external devices. RPi operates in the same way as a standard computer, demanding a keyboard used for command entry, a display unit, a power supply. RPi use a SD memory card generally used in digital cameras, configured in a same as a hard drive used in computer. RPi will 'load the Operating System into RAM' (boot) from this card in the same way as a PC 'boots up' into Windows from its hard disk [5]. The basic representation is shown in figure 1:



Fig -1: Circuit Board Representation

A. Recommended components used in hardware are:

- SD card consisting of Linux Operating system.
- Keyboard.
- Monitor having HDMI, DVI, Composite or SCART input.
- Power supply.
- Video cable suited with the TV.

B. Optional components are:

- USB mouse
- Model A or B: USB Wi-Fi adaptor
- Model B only: LAN (Ethernet) cable.
- Powered USB hub.
- Case.

4. ASSEMBLING RASPBERRY PI

Following are the steps of connecting RPi given below [5]:

- Pay attention to the gold connectors on the SD card. These gold connectors must contact the gold connectors on the Raspberry Pi.
- Plug in your mouse and keyboard into the USB ports.
- If you want to connect your Raspberry Pi to the internet or a network you will need to plug in the Ethernet cable.

- If you have a HDMI TV or monitor then you can plug in your HDMI cable into the Raspberry Pi and plug the other end into your TV. If you have a combined video connection on your TV and then goes to step (If your TV/monitor does not have a HDMI port you will need to use an adapter - this will either be a HDMI to DVI or a HDMI to VGA.)
- Insert the merged video connection if you are using a TV that does not support HDMI and plug it into your television.
- Insert your power cable into the Raspberry Pi power connector.

5. ADVANTAGES AND DISADVANTAGES

A. ADVANTAGES

- Low cost.
- Huge processing power in a compact board.
- Many interfaces (HDMI, multiple USB, Ethernet, onboard Wi-Fi and Bluetooth, many GPIOs, USB powered, etc.)
- Supports Linux, Python (making it easy to build applications).
- Readily available examples with community support.
- Developing such an embedded board is going to cost a lot of money and effort.

B. DISADVANTAGES

- There is not any fuse protection on the Rpi, so if you connect pins incorrectly, you can damage the board
- It is not as fast in terms of CPU processing speed nor does it have as much memory as traditional PC or laptops.
- There is no built-in analog to digital conversion on the GPIO pins like there is in Arduino.
- So, you need to have an ADC chip to work with analog signals when you need more accuracy

6. APPLICATIONS

- This application can be used in school and colleges.
- User can use this application at any place.
- This application saves the time of user.
- If the user wants to see offline videos and books. Then user can download this content.
- It has extensive use in household day-to-day life also as it is in offline mode
- Raspberry Pi as Desktop.
- Home Automation System Based on Raspberry Pi.
- Raspberry Pi Based Camcorder.
- The Zero Phone – Raspberry Pi Based Smartphone
- Xbox Zero – Raspberry Pi Based Xbox Controller.
- Raspberry Pi Based Google AI Assistant.

- Raspberry Pi Based Home Arcade System.
- Live bots: Live bots is scheme that allows users to control many robots based on Raspberry Pi over the internet.

7. CONCLUSIONS

With upcoming technologies where everything is reduced to computations and permutations, comforting the lives of people IoT based smart home systems helps achieving the objectives via raspberry pi. Any Smartphone device can be used to control and monitor the devices and its respective environment. Making use of raspberry pi in this proposed system not only makes the implementation economical but also wastage of electricity and is less time consuming.

Raspberry Pi is an innovative technology. The number of users and fan base support the fact that the device can see a great future ahead. The device can certainly help anyone who actually needs to learn electronics and computers. Increasing the processing power can certainly help the product in the future. The Raspberry Pi is a great piece of hardware because of the combination of the features of a traditional computer and an embedded device. It assists computer operating systems like Linux and provides easy input/output lines i.e. the GPIO makes it ideal for controlling almost anything. Programming the GPIO is much easy and perceptible than a traditional microprocessor. Lastly it can be said that Raspberry Pi can be efficiently used if its processing power is kept in mind. It can work as an individual computer but cannot swap it.

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