

Raspberry PI Inception, Application and Future

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Abstract— In today’s world computers are not only used as a working environment but also used in our day to day life. Computers not only help us to complete our day to day life activities but also help us to learn new things. As said by the greats in the industry computing help us to learn things logically. Programming in computers helps us to break down problems into solutions logically. Another such invention in the computing field is the invention of RASPBERRY PI. Developed in the laboratory of University of Cambridge it was later released by the Raspberry Pi Foundation which is a registered educational charity based in UK.

Key words: PI Inception, Raspberry PI

I. INTRODUCTION

Speaking of Raspberry PI It is a small credit card sized device that allows us to do a whole lot of things. Its main aim was to teach children the concept of programming and electronics. Because of its small size and simple architecture it is easy to understand the concepts of computing unlike in a personal computer or any other device. It not only allows children to learn new things but also allows techies and programming enthusiast to do a whole lot of things. Due to its small size and low cost it is currently the best option available to invent new things. The applications of Raspberry Pi are manifold and are not only limited to learning and teaching. Enthusiasts are every day inventing some or the other things that are developed using Raspberry Pi such as gaming, watching movies, robotics and many more.

Another important advantage of Raspberry Pi is its low power consumption than any other device in its category. For a simple comparison a Raspberry Pi consumes 4 watt of power as compared to a smart phone 5, a tablet 2.5, laptop 50, desktop 82 and a smart television 221.

Hence it solves the most common problem faced by today’s generation that is power consumption. Its small body allows it to drain much less power as compared to any other device in its category. It comes with nothing much more than the bare body and nothing else.

The technical details of raspberry pi can be stated as follows:

- All Raspberry Pis come with the same VideoCore IV Graphics Processing Unit(GPU).[1]
- A single core ARMv6-compatible CPU or newer ARMv7-compatible quad-core one(in Pi 2). [1]
- 1GB of RAM (in Pi 2), 512 MB (in Pi 1 B and B+) and 256MB in model A and A+ and older versions of model B. [1]
- It has two USB ports in model B and one in model A and 1 Ethernet port on model B. It also comes with and GPIO connectors so we can communicate with sensors, monitors and other embedded systems. [1]
- The Raspberry Pi 2comes with a 900MHz 32-bit quad-core ARM Cortex-A7 CPU and 1GB RAM. [1]
- It is just 85.6 X 56.5 mm (3.37 X 2.224 in) in size and weighs only 45g. [1]
- Price: Raspberry Pi 2 and Model B and Raspberry Pi 3 at US\$35. [1]
- On 29 February 2016 released the next generation Raspberry Pi, Raspberry Pi 3. [1]
- Raspberry Pi 3 boasts a 1.2 GHz quad-core ARM Cortex-A53 CPU which is based on ARM’s latest ARMv8-A architecture. [1]
- It comes with an integrated 802.11n wireless LAN and 4.1 Bluetooth. [1]
- It gives 6x better performance than Raspberry Pi 2 and 10x compared to Raspberry Pi 1. [1]
- It is now available for sale for US\$35. [1]
- Raspberry Pi primarily uses Linux-Kernel based OS. [1]
- No version of Raspberry Pi can run traditional windows but Raspberry Pi 2 supports Windows 10 IoT core OS. [1]

A. Simple Representation of a Raspberry Pi

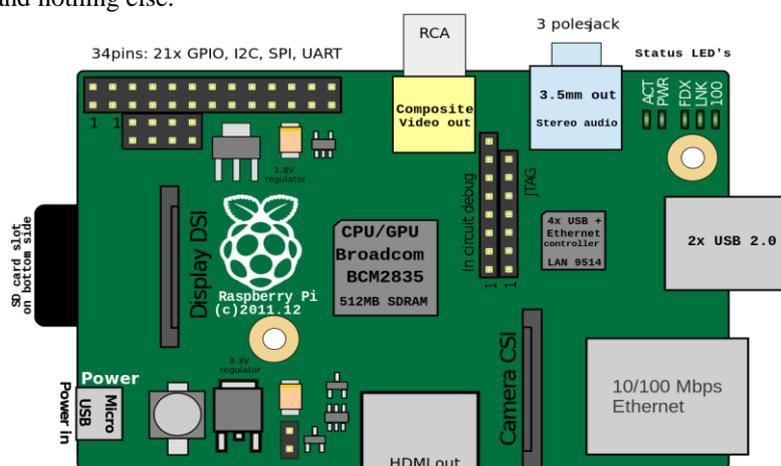


Fig. 1:

Energy comparison of Raspberry Pi with other devices in Kilo Joules per hour

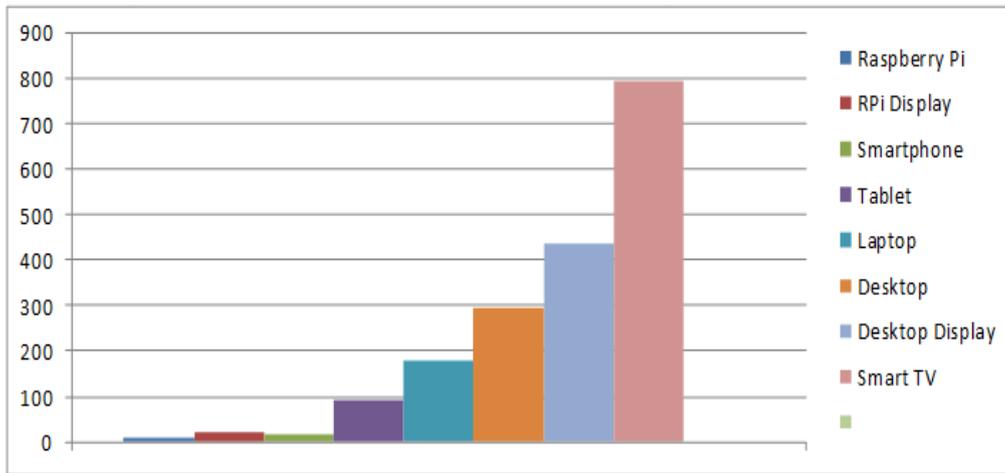


Fig. 2:

II. APPLICATIONS

As stated earlier Raspberry Pi has a vast range of application. It can be used to create custom device as per user requirements that would otherwise cost a whole lot of time and money. Some of these implementations can be stated as follows and a lot more can be explored.

A. Build Your Own Case



Fig. 3:

Requirement:
Raspberry Pi
Cardboard

When you buy a Raspberry Pi they are always shipped as shown in the above representation, i.e without any case or cover. They are sold such so that it allows the user to customize it as per his/her needs. You can always buy a case for your Raspberry Pi that comes in different sizes and shapes but the fun part is that you can always build one for yourself. Because of its small size a Raspberry Pi can almost fit into anything. With some modifications you can build a case for your Pi in no time by just using a cardboard or any other box.

B. Media Centre



Fig. 4:

Requirement:
Raspberry Pi
USB Adapter/Dongle
Television

Who wouldn't like to have an overall experience of entertainment with their television? With not more than a Raspberry Pi 2, a few cables and an open-source Linux we can network all our media together and display it on our Television [5]. Raspbmc is the default OS option in Raspberry Pi Foundation NOOBS installer. Once the OS is installed you can connect to your Wi-Fi network. Since there is no onboard WiFi on a Pi you will need a USB adapter/dongle [5]. Once all the settings are done you can plug in your flash drive or hard disk and the Raspberry Pi will automatically recognize it and bang you are done with your homemade overall media entertainment [5]. You now have your own media center that you can use to browse internet, watch movies and much more[5]. The fun not only lies in the end product but also creating it is a whole lot of fun and an experience of lifetime. You get to learn new things and are more comfortable using your device.

C. Create Games

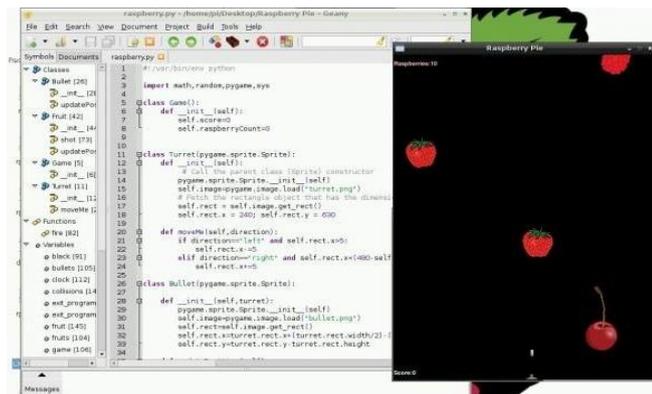


Fig. 5:

Requirement: Raspberry Pi

You know what's more fun than playing games? Its building them. Raspberry Pi is the perfect platform for budding programmers and learners. The Raspbian OS comes with preinstalled program that makes it easy to learn and understand coding. So the best way to do it is to create your own custom game. At the end you get a complete functional result that you can run and play with your friends.

The OS comes with a selection of programming environments pre-build into its debian-based linux distribution but the easiest way to get started is Scratch which is created by the Media Labs at MIT [6]. It allows children to learn fundamentals of programming without the need to learn complex syntax [6]. It comes with the drag and drop feature.

III. ADVANTAGES AND DISADVANTAGES

As everything has two sides it has its own advantages and disadvantages. We cannot say that the Raspberry Pi was a complete package with no disadvantages or limitations. But since Raspberry Pi has so many applications and uses we could only trace a few limitations of the same. Let us take a look at some of its advantages and disadvantages.

A. Advantages

- It is small and very inexpensive.
- It runs on an Linux OS so there is no issues like Virus
- Its open source so it can be modified as per user need and requirements
- Can be used as an developing platform
- Can be coupled to work as a low cost server
- Low power consumption
- No noise, no fans its completely silent
- Can be expanded as per user requirements and necessity
- It has a huge community support
- With so many advantages it is difficult to find a disadvantage or limitation to Raspberry Pi but we list a few.

B. Disadvantage

- A Raspberry Pi comes with all the component soldered to its motherboard so you cannot increase your RAM performance even if you want to.

- You cannot compare Raspberry Pi performance with the traditional computer but even though there are some tasks or applications that require high CPU processing which are off-limits.
- It can work as personal computer but cannot completely replace it.

IV. FUTURE ENHANCEMENT

Raspberry Pi was developed with the sole purpose of teaching kids the concepts of computing and programming. Its simple design and ease to use made it possible for kids to learn programming and electronics at an early age. The main aim of Raspberry Pi was to make a personal computer available to each and every person at a reasonable price. People wanted something that they can understand which was the case with Raspberry Pi.

Being an educational foundation Raspberry Pi is not keen making it a business and rather wants to make sure that every person is made available with a personal computer. It doesn't consider it as a solution to technology and engineering skills but is a positive step towards it. They believe that if people get access to technology and tools at an early age they can excel in any field. This was the reason they wanted to make computing available to kids at an early age, so that they develop interest in computing and programming and learn to be great computer programmers. There are tasks that are best done by people with experience or extreme programmers but when exposed to technology at an early age people develop interest and can even excel in the same. The applications of Raspberry Pi are not limited to teaching and learning but also its applications inspire enthusiast to develop devices and stuffs that are otherwise expensive or difficult to build.

With a million of Raspberry Pi sold and the others pre-booked the foundation aims at making personal computer available to each and every person at an affordable price. The foundation aims at providing a better chip with each and every Raspberry Pi they sell and develop in future. The size of the Raspberry Pi is the heart and soul of the device which makes it more affordable and portable. It allows the foundation to reach that price bracket that the Pi is being sold currently.

To sum it all we can say that children exposed to learning and computing at an early age can grasp things much faster and develop interest rather then later in their life. For which Raspberry Pi can act as a solution. The kids can use, play, experiment with it to learn new things and develop interest in computing and programming. They would learn things in a much more logical way rather than theoretically. Any further technical enhancement in Raspberry Pi will only add to, much faster computing and easier usage.

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