

# A REVIEW STUDY OF RASPBERRY PI TECHNOLOGY

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**Abstract-** *The research of Raspberry Pi Technology is shown in this paper. The entire setup of the Home Automation System (HAS) involves a low-cost, long-distance connection between a Raspberry Pi module and an Android-based application and the IP machines at home. This study combines these two elements - people's security and the ease with which they may live their lives. This document is meant to aid and assist in all aspects of economics.* [9]

**Keywords** - Raspberry Pi, Home Automation System, GP, RPi.

## 1. INTRODUCTION

When compared to normal critical level programming vernaculars, application programming development has become self-governing from the stage, and by its design has become briefer and closer to the brand language. The possibility of a Raspberry Pi is based on the IT understudies' foresight. Because it uses a variety of CPUs, Microsoft Windows cannot be installed on it. The Raspberry Pi may be used to surf the web, send emails, and write letters using a word processor, but it may also be used to carry out a very unusual scheme. Raspberry Pi is the appropriate device for some PC-trained pros since it is simple to use but also astounding, moderate, and difficult to break. This little PC boasts incredible HD (high-definition) video playback, excellent sound, and the ability to play 30 games. The Raspberry Pi is powered by an ARM processor, which takes care of almost all of the tough work. . [9]

Many programming languages are used, including RASPBIAN, PIDORA, OPENELEC, RASPBMC, RISC OS, and ARCH LINUX. This product may be downloaded easily, and it falls within the NOOBS (new out of the crate programming) category, which is free of authority collecting. Python is regarded as the most important programming language for working and developing. It also supports BASIC, C, C++, JAVA, Perl, and Ruby programming languages. It's all about the class. Python is regarded as the most important programming language for working and developing. It also supports BASIC, C, C++, JAVA, Perl, and Ruby programming languages. [2], [9]

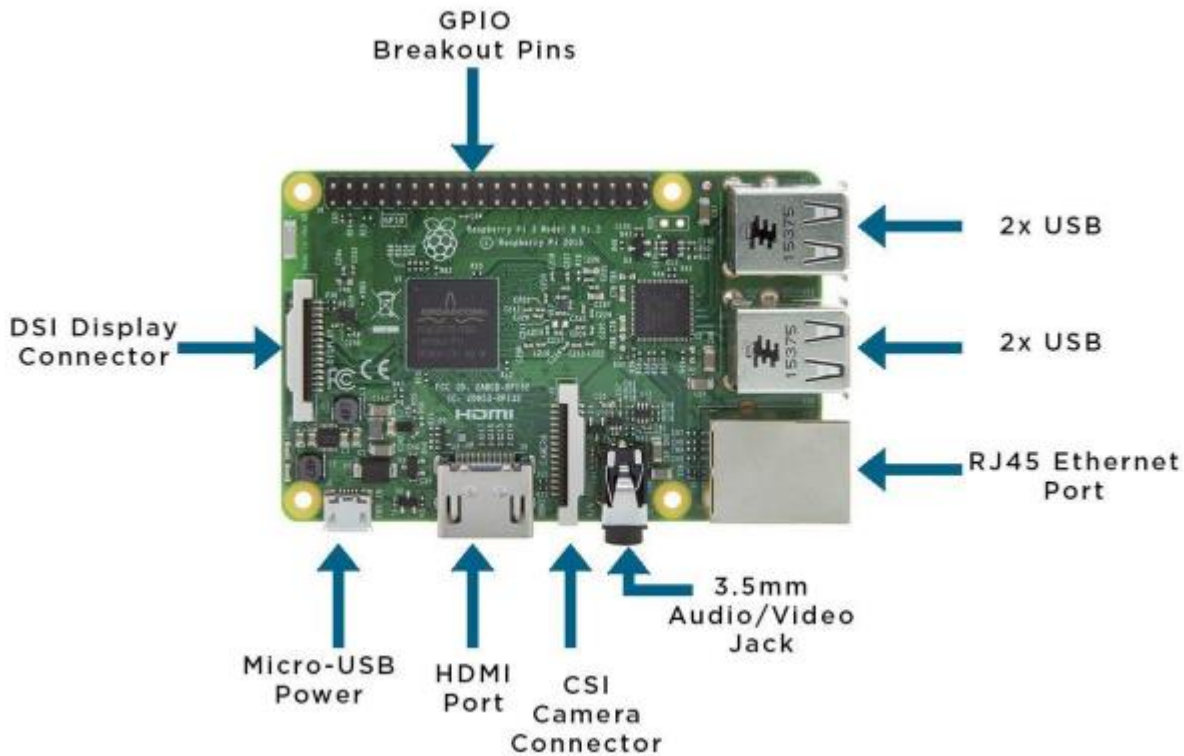
## 2. HISTORY

The Raspberry Pi Foundation was founded in 2006 by Eben Upton and his University of Cambridge friends, Pete Lomas and David Braben. To keep costs down, early Raspberry Pi versions used on the 8-digit Atmel ATmega644. Following versions utilised an ARM CPU, similar to the one found in the Raspberry Pi's shipping form. Later, the organization intends to present a \$25 variant with 128 MB of RAM, one USB connection, and no Ethernet regulator. The two versions offer RCA and High-Definition Multimedia Interface outputs, allowing customers to connect the machines to a television. A USB port may be used to connect mice, consoles, and other information devices. [9]

The PCs will not have a hard disk or a solid-state drive, instead relying on an SD memory card to boot and save data. The 45-gram devices will be 85.6 x 53.98 x 17 millimeters in size, omitting the SD card and cables, which will protrude a digit. It takes three to a month to complete one PC. The institution anticipates a 10,000-machine underlying creation run. Raspberry Pi was founded in 2009 with the stated goal of providing a low-cost computer that children could use to learn computer programming. Several schools have reportedly inquired in using Raspberry Pi devices. Defenders believe that charitable groups will pay for computers that might be used in schools with little financial resources. [3], [9]

## 3. HARDWARE SETUP

[9] It's not difficult to use the board since it was designed with curious younger pupils in mind. The Raspberry Pi board encases a CPU and includes processors, RAM, and several interfaces as well as ports for external devices. RPI functions in the same way as a conventional PC, demanding a console for the order section, a presentation unit, and a force supply. The Raspberry Pi makes use of an SD Flash memory card, which is similar to a hard drive in a computer. The RPI will 'stack the Operating System into RAM' (boot) from this card in the same way that a PC does when it boots up from its hard drive. [5]. The essential portrayal appears in figure 1.



**Fig 1: Board Representation [9]**

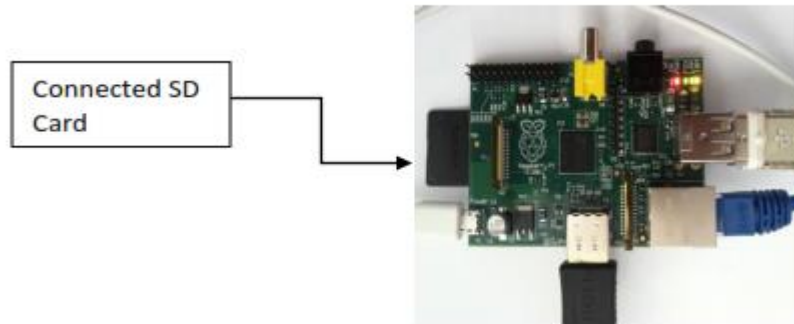
Fundamental parts utilized in RPi equipment are:

- ❖ 802.11n Wireless LAN
- ❖ A 1.2GHz 64-bit quad-core ARMv8 CPU
- ❖ Bluetooth 4.1
- ❖ Bluetooth Low Energy (BLE)
- ❖ GB RAM
- ❖ 4 USB ports
- ❖ 40 GPIO pins
- ❖ Full HDMI port
- ❖ Ethernet port
- ❖ Combined 3.5mm audio jack and composite video
- ❖ Camera interface (CSI)
- ❖ Display interface (DSI)
- ❖ Micro SD card slot (now push-pull rather than push-push)
- ❖ Video Core IV 3D graphics core
- ❖

#### 4. INTERFACING RASPBERRY Pi

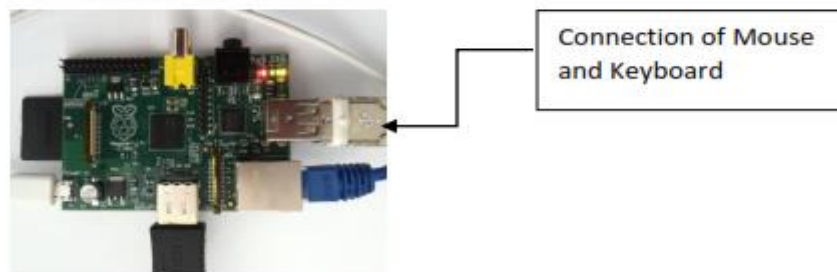
Following are the means of associating RPi given underneath [5]:

1. 1 Pay mindfulness in regards to the gold 1connectors on the SD card. These gold connectors ought to interface with the gold connectors on the Raspberry Pi.



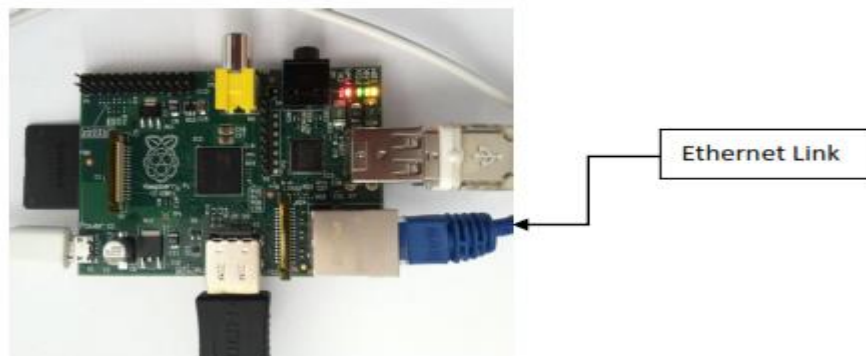
**Fig 2: Connect SD Card to RPI [9]**

2. Infix your mouse and console into the USB ports



**Fig 3: mouse and keyboard connection [9]**

3. If you need to interface your Raspberry Pi to the web or an organization, you should connect the Ethernet link



**Fig 4: Ethernet cable [9]**

4. If you have an HDMI TV or screen, you may plug the HDMI connection into the Raspberry Pi and attach the far edge to your television. Assuming you have a connected video connection on your TV, go to step 5. (If your TV/screen doesn't have an HDMI port, you'll need to utilize a converter, such as an HDMI to DVI or HDMI to VGA.)



Figure 5: HDMI Cable[9]

The project aims at implementing the following:

### 5. TESTING ON LIGHT BOARD:

The connection to control appliances such as lights is shown in the diagram, which is shown by attaching an LED to a breadboard. When the Lights slider on the application is pressed, the action containing the lighting settings appears. The page has a number of buttons that may be used to alter the lighting of a particular area with a single click.



The android application is downloaded on the android gadget to give the client an interface to collaborate with the Raspberry Pi. This application permits the client to control the lighting, interface with the speakers through Bluetooth. [9]

### Advantages And Disadvantages

Some of the merits are:

- Is the Raspberry Pi a fair device with an effectively modest price that anybody from teenagers to PC enthusiasts may grab a piece of for themselves? Whereas business partners for specialized Raspberry Pi applications might cost hundreds of dollars, Pi provides a far less costly solution for a fraction of the price. [9]
- The Raspberry Pi is about the size of a Visa card. We all know that when it comes to invention, the more modest it is, the better. Raspberry Pi may be hidden behind TVs, within partitions, or even in your wallet due to its small size. . [9]
- The Raspberry Pi, despite its inexpensive cost and small size, does not demonstrate poor execution. Despite the fact that you won't be able to play the latest no-nonsense 3D games on your system, RPi supports High Definition (HD) video streaming and other key PC functions like as word processing and web browsing. Pi was designed to be a programming platform for beginners, and as a result, it is versatile, fantastic, and all-around. [9]

### B. Disadvantage

Although it has merits but it has some demerits also some of them are:

- Because the Raspberry Pi does not support X86 operating systems, it is not possible for it to run 32-bit operating systems such as Microsoft Windows, Mac OS X, or a few varieties of Linux. This may be a huge disaster for those who aren't very computer savvy. For experienced customers, this isn't a major issue since Raspberry Pi runs on another well-known operating system. . [9]

Some applications which require high requests on CPU preparing are beyond reach. For example, "Model B took 107 ms to finish one computation of the totally manufactured indivisible number test and a mid-range work area Core 2 Duo E8400 took just 0.85ms."(By Collins, 2012) appeared in Tabel. :-

**Table 1: Comparison between Rpi and Intel [9]**

Synthetic Prime Number Test	
Raspberry Pi	Intel
Model B	Core 2 Duo E8400
107ms	0.85ms

## 6. APPLICATIONS

Raspberry Pi is intended to pique people's interest in registration, programming, or even dealing with their overall needs. Younger students, schoolchildren, youngsters, and the innovation circle's senior citizens have all started chipping away at this board. People are encouraged to use this board for tinkering, for improving daily experiences such as using the FAX machine, improving Home-robots, media players, and camcorder decorations. Some of the applications that include [3]: -

- Games application-Due to amazing media and 3D design abilities, Raspberry Pi can possibly be utilized as the stage of a game.
- Pi in the sky: This load-up is a GPS collector, radio transmitter intended for following high height expand flights.
  - R2D2 fueled by Rasp Pi: Xiang's R2D2 tracks faces and movement and is mechanized for development which has the ability to react to voice orders.
  - Electronics gadgets: Otto is a camera item that catches pictures with a contort. It changes over them into enlivened GIFs, period slips; it can likewise add numerous impacts to an image or to a GIF.
  - Live bots: Live bots is plot that permits clients to control numerous robots dependent on Raspberry Pi over the web.
  - Lap pi: The scheme features a laptop assembled from scratch which is based on the Raspberry pi board

## 6. CONCLUSION

With the use of an android application, the proposed framework gives the owner or regulator all of the powers to make decisions and control the household appliances. It provides simple as well as varied ways to operate the electronics in the home, so making life easier while also being accessible remotely through mobile devices like as Android phones. Raspberry Pi is a brilliant invention.

With the use of an android application, the proposed framework gives the owner or regulator all of the powers to make decisions and control the household appliances. It provides simple as well as varied ways to operate the electronics in the home, so making life easier while also being accessible remotely through mobile devices like as Android phones. The device will undoubtedly assist anybody who needs to learn about hardware and computers. Raising the handling force will undoubtedly benefit the item in the long run. Additionally, providing a case and a fitted instruction manual will enhance the product. Similarly, due to the ARM CPU, Windows operating systems are now unusable. If the CPU is upgraded, or if a workaround for running Windows directly on the Raspberry Pi is discovered, it might be a huge step forward for the Pi. The Raspberry Pi is a fantastic piece of equipment since it combines the features of a traditional PC with those of an embedded device. It supports PC operating systems like as Linux and provides simple data/yield lines like as the GPIO, making it excellent for controlling almost anything. Programming the GPIO is a much easier and faster than programming a traditional FPGA or chip. Finally, if the Raspberry Pi's processing power is recalled, it is possible to say that it can be used effectively. It can act as a stand-alone computer, but it cannot be traded. [9]

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- [7] Figure 1: Board Representation Link: <https://i.pinimg.com/originals/ab/66/af/ab66afffe2b860a01dc79472f82e6bae.jpg>
- [8] Figure 2,3,4,5: contact of SD card and RPi, mouse and keyboard connection, Ethernet cable, HDMI Cable Link: <https://techcrunch.com/wp-content/uploads/2012/10/raspberry-pi.jpg>
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