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# RASPBERRY PI AS A TINY COMPUTER

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**Abstract -** *The Raspberry Pi Foundation, based in the United Kingdom, has released a powerful and cost-effective credit card-sized computer with the goal of enlightening and empowering computer science teaching in schools and other developing countries. Various open source communities have contributed a great deal to open source software, operating systems, and other small form factor computers similar to the Raspberry Pi since its inception. Until now, researchers, hobbyists, and other embedded systems enthusiasts all over the world have created incredible projects with the Raspberry Pi that look incredible and work right out of the box. Since its introduction, the Raspberry Pi has been subjected to continuous development and enhancement, both in terms of hardware and software, transforming it into a "Full-Fledged Computer" capable of performing nearly all computing-intensive tasks. The purpose of this research paper is to inform readers about what the Raspberry Pi is, why it is needed, the different generations of the Raspberry Pi, the different operating systems that are available for the Pi, and other hardware that can be used for project growth. This paper will lay the groundwork for numerous open source communities around the world to become aware of and use this credit card-sized device for projects ranging from everyday tasks to scientific and complex application creation.*

***Key Words*: *Raspberry pi, Tiny computer, online education, portable, small size, computer.***

## 1. INTRODUCTION

With the invention of microcontrollers and integrated circuits, the computer has evolved into a personal computer, which is no longer a privilege but a necessity in today's world. The Raspberry Pi is a credit-card-sized device that aims to give everyone on the planet access to a computer. It is designed to teach basic programming concepts at a low cost. The Raspberry Pi is designed to serve as a platform for students and enthusiasts to learn programming and create different projects. Because of its low cost and large number of interfaces, it is an effective foundation. The main goal of this project is to learn more about Raspberry Pi and how to use it as a tiny device for teaching applications. The main goal of this project is to create a Python-based computer that is both cost-effective and accessible to students. More information about the Raspberry Pi has been gathered. Which is a low-cost credit-card-sized device with a regular keyboard and mouse that plugs into a computer monitor or television. It is a capability that allows people of all ages to learn about programming and to programme in languages such as. We saw the Raspberry Pi being used by kids/students all over the world to learn to programme and understand how computers function, from music machines and parent deteters to whether stations and tweeting birdhouses with infrared cameras, we went to see the Raspberry Pi being used by kids/students all over the world to learn to programme and understand how computers work.

### 1.1 Relevance

Several researchers collaborated to develop the Raspberry Pi as a computer. Using a variety of input and output instruments. Here we present a project that can be used for online teaching as well as a cost-effective and portable computer for students.

### 1.2 Objective

Our main goal is to create a cost-effective online teaching solution. There are a few more goals we'd like to accomplish when planning the project, which are as follows:

1. To get a better understanding of the Raspberry Pi's capabilities.

2. Create a small, portable model.

3. To learn more about the Raspberry Pi's structure and operation.

## 2. LITERATURE REVIEW

**Gareth Mitchell [1]** The creators and producers of the Raspberry pi – or at least their PR people – seem to be suggesting that this new single board computer would revolutionize how students learn about computing, programming, and technology in school. Their whole premise is that today's consumer technology comes in perfectly wrapped "black boxes" that we simply turn on and expect to function miraculously. We won't have a

fundamental understanding of what's going on under the hood if technology is just something trendy that kids can take out of a box and plug in, according to the Raspberry Pi people. Furthermore, if an entire generation of students has no understanding of how things function, we would be in a very poor position in terms of creativity. Why not remove all of the glitz and glam and give kids a "naked machine" so they can see the code, experiment with it, and gain a better understanding of how computers and electronics work? The most important factor here is affordability. The Raspberry Pi costs $25, but for the price of the shoelaces on a stylish pair of sneakers, you can get your hands on some cutting-edge technology and get a head start on learning about computers.

**Crispin Andrews [2]** represents THIS IS A Popular HOUSEHOLD SCENE. When the computer begins to go wrong, a 16-year-old computer whiz (at least when it comes to playing games) who is talking and doing eight tasks at once on the machine hits a brick wall. On the Internet, Mum just finds jargon. Dad, a retired teacher, is at a loss about what to do. It's time to summon 'the nerd.' Everyone is familiar with one. He (they're usually blokes) used to spend hours disassembling and reprogramming computers when he was in his teens. He's now a computer whiz. The rest of us studied ICT in school, and some of us can type well. The landscape is shifting. Michael Gove, the secretary of state for education, wants to launch a new IT programmer this year that emphasizes computer science rather than secretarial skills. However, the British educational system is infamous for being slow to adapt to change. It remains to be seen if today's children or future generations' children would prosper. The new computer, which looks like something a geek would hold in his den but sounds like something you'd find in the school canteen, might help speed things up. The Raspberry Pi is an uncased device the size of a credit card that can be powered by the wall or a portable battery. The Raspberry Pi Foundation, the project's creator, claims that the computers would be provided to individual children rather than schools.

**Ram Chandra Karde & Prof R P Chaudhar [3]** represents a real-time industrial monitoring and control device using a Raspberry Pi and sensors such as a water flow sensor, a flame sensor, a temperature sensor, and an ultrasonic distance sensor. For smart surveillance, this device includes digital sensors and a camera. If a fire is detected by the Flame sensor, or a liquid overflow or underflow is detected by the Water Flow Sensor, this device sends a Short Message Service (SMS) to the Admin User and the Concerned Plant Manager. The camera would send a picture of the intruder to the Admin and Plant in-charge via email, allowing them to take appropriate action. Its benefit is that it can track and manage industrial threats remotely using the Thing Speak Android App before they become a full-fledged issue.

**Donald Norris [4]** This hands-on resource takes you on a tour of the Raspberry Pi hardware, operating system, and IDE... then gets you up and running with Python and the GPIO library so you can get started on your projects right away. You'll learn how to put together a prototype board for use in your projects, and then you'll dive right in with illustrated, step-by-step instructions that guide you through projects that progressively become more complex.

**Shaik Riyaz Hussain et.al [5]** represents the creation of a 2D game on the Raspberry Pi. The Raspberry Pi is a single-board computer with an ARM11 microprocessor that is about the size of a credit card. The key idea of this paper is to use an accelerometer and hand gestures to manipulate a game written in Python Tkinter. The game is controlled by a Raspberry Pi and an accelerometer. The accelerometer detects left and right movements, and the game is controlled by the tilting of the unit. Hand movements will be recorded by a camera module that is connected to the Raspberry Pi, and the hand gestures will be determined using Simple CV and a python image processing programme that is installed on the Raspberry Pi.

## 3. ARCHITECTURE AND IMPLEMENTATION

He came up with the idea for Raspberry Pi in 2006, when he and his colleagues at the University of Calicut's computer lab were overwhelmed by the low number of students joining the programme and their low skill levels. Upton aimed to build a low-cost, easily programmable machine that would reintroduce the creative spirit of computing's past by allowing everyone to tinker with it without fear of making costly mistakes. This board is the size of a credit card, making it cost-effective. in comparison to a real machine It has a micro USB power port with a 5V, 700mA rating and weighs less than 50 grams. To put our system together, we use all of the above-mentioned components and interface them all with a Raspberry Pi. Using the python language and pi libraries, all of the modules are related to the Raspberry Pi.

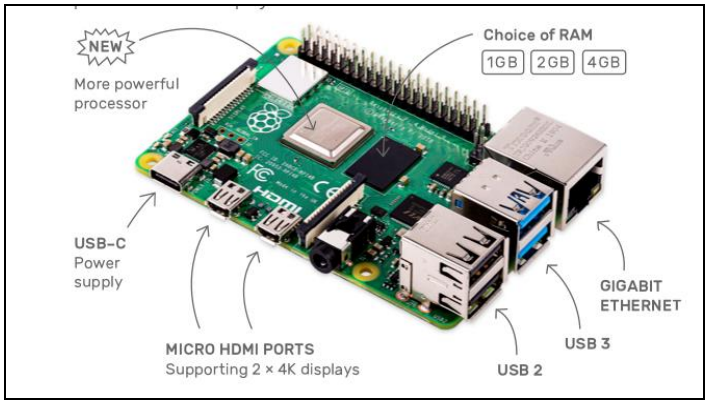


**Fig -1**: Raspberry pi model

A Raspberry Pi can be turned into a small computer that can be used for online learning using the proposed process. It's a light, compact Pi board with many extra ports, including a camera connector and a 3.5mm audio jack for connecting to a camera. With all of these features, the Raspberry Pi is not limited to a single programme; depending on the application,

it can be used in a variety of ways. Pi Board implementations are fully open source, making them highly adaptable and realistic.

## 4. CONCLUSIONS

Raspberry Pi is a cutting-edge product. The device's large user base and fan base indicate that it has a bright future ahead of it. Anyone who is serious about learning electronics and computers would benefit greatly from the system. Increasing computing power would almost certainly benefit the product in the future. Including a case and a comprehensive instruction manual would enhance the product. Also, since Windows operating systems are currently incompatible with the Raspberry Pi, if the ARM processor is improved or a solution is found to run Windows directly on the Pi, it could be a huge step forward for the Pi. Since it combines the characteristics of a typical computer and an embedded system, the Raspberry Pi is a fantastic piece of hardware. Finally, if the computing capacity of the Raspberry Pi is considered, it can be assumed that it can be used efficiently. It can act as a personal computer, but it cannot take the place of one.

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