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Pocket Laptop using Rasberry PI

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Abstract: *Raspberry Pi, an efficient and cost-effective credit card sized computer comes under light of sun by United Kingdom-Raspberry Pi foundation with the aim to enlighten and empower computer science teaching in schools and other developing countries. Since its inception, various open-source communities have contributed tons towards open-source apps, operating systems and various other small form factor computers similar to Raspberry Pi. Till date, researchers, hobbyists and other embedded systems enthusiast across the planet are making amazing projects using Pi which looks unbelievable and have out-of-the-box implementation. Raspberry Pi since its launch is regularly under constant development cum improvement both in terms of hardware and software which in-turn making Pi a " Full Fledged Computer " with possibility to be considered for almost all computing intensive tasks. The aim of this research paper is to enlighten regarding what is Raspberry Pi, Why Raspberry Pi is Required, Generations of Raspberry Pi, operating systems available till date in Pi and other hardware available for project development. This paper will lay foundation for various open-source communities across planet to become aware and use this credit card sized computer for making projects ranging from day-to-day activities to scientific and complex applications development.*
the Internet of Things – IoT, can be looked as a highly dynamic and radically distributed networked system. The presence of smart devices able to sense physical phenomena and translate them into a stream of information data, as well as the presence of devices able to trigger actions, maximizes safety, security, comfort, convenience and energy-savings. The Raspberry Pi brings the advantages of a PC to the domain of sensor network, what makes it the perfect platform for interfacing with wide variety of external peripherals. The main purpose of this paper is to introduce an all-in-one and portable computational device. This computer is approximately 40% smaller than the laptop. This computer has complete and easy functionality as it contains the key components like a battery pack, a working motherboard, a display unit, a wireless keyboard and lastly a sleek case, all the components are assembled together.

Keywords: Raspberry, 7 inch IPS display, battery pack, wireless keyboard with inbuilt mouse

I. INTRODUCTION

Mini laptops, also known as netbooks or ultra portables, are small, lightweight, and compact laptops designed for basic computing tasks. Here's an introduction to mini laptops:

Characteristics:

1. Size: Typically 5-12 inches (13-30 cm) in screen size.
2. Weight: Usually under 3 pounds (1.4 kg).
3. Processor: Intel Atom, Celeron, or Pentium processors.
4. Memory: 2-4 GB of RAM.
5. Storage: 32-128 GB of storage (eMMC or SSD).
6. Battery Life: Up to 10 hours.

Popular Mini Laptop Brands:

1. Acer
2. Asus
3. Dell

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4. HP
5. Lenovo

II. INTRODUCTION TO RASPBERRY PI MOTHER BOARD

Raspberry Pi is a series of small single-board computers (SBCs) developed in the United Kingdom. The original Raspberry Pi computer was developed by the Raspberry Pi Foundation in association with Broadcom.

Since 2012, all Raspberry Pi products have been developed by Raspberry Pi Ltd, which began as a wholly-owned subsidiary of the Foundation .The Raspberry Pi project originally leaned toward the promotion of teaching basic computer science in schools.

The original model became more popular than anticipated, selling outside its target market for diverse uses such as robotics, home automation, industrial automation, and by computer and electronic hobbyists, because of its low cost, modularity, open design, and its adoption of the HDMI and USB standards.

The Raspberry Pi Foundation was created as a private company limited by guarantee in 2008, and was registered as a charity in 2009 by people at the University of Cambridge Computer Laboratory who had noticed a decline in the number and skills of young people applying for computer science courses.

III. INDUSTRY BACKGROUND OF LAPTOPS AND COMPUTERS

Early Computing Industry (1940s-1970s)

1. Vacuum Tubes: The first computers used vacuum tubes, which were bulky and unreliable.
2. Transistors: The introduction of transistors in the 1950s led to smaller, faster, and more reliable computers.
3. Mainframes: Mainframe computers dominated the industry in the 1960s and 1970s, used by governments and large corporations.

Personal Computing Era (1970s-1980s)

1. Microprocessors: The introduction of microprocessors in the 1970s enabled the development of personal computers.
2. Apple I and II: Apple's early computers, introduced in 1976 and 1977, popularized personal computing.
3. IBM PC: IBM's entry into the personal computer market in 1981 helped establish the industry standard.

IV. LITERATURE REVIEW

In A smart spec for the blind persons can developed text detection thereby create a voice output. This smart spec can assist the visually impaired persons to read any printed text in vocal form. A specs inbuilt camera is usages to capture the text image from the printed text and therefore the captured image is analyzed using Tesseract-Optical Character recognition (OCR). The detected text is then converted into speech employing a compact open-source software speech synthesizer, e-Speak.

Finally output, the synthesized speech is generated via the headphone by TTS method. In this system Raspberry Pi is the chief goal for the implementation, as it provides an interface between camera, sensors, and image processing results, while also developing functions to manipulate outer units (Keyboard, USB etc.,). In the design involves human face, object and textual recognition which make vision for visually challenged. The smart kit contains an eye fixed glass given camera, an earphone, a microphone and therefore the system where the processing is administered.

The camera present at the nose head of eye glass take the printed image of the user as snapshots and transfers to the system where it get processed and produces the specified audio description as output. In This paper denote a camera based assistive text reading to assist visually impaired person in reading the text present on the captured image.

When a person enters into the frame by the mode control the faces can also detected. The proposed idea involves text extraction from scanned image using Tesseract Optical Character Recognition (OCR) and converting the text to speech by e-Speak tool, a process which makes visually impaired persons to read the text.[6] this is often a prototype for blind people to acknowledge the products in world by extracting the text on image and converting it into speech. This method is designed by using Raspberry pi and portability is accomplished through a battery backup.

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Aim of Project

The aim of this project is to design and build a compact, portable, and cost-effective laptop using a Raspberry Pi single-board computer. The project seeks to demonstrate how accessible computing devices can be developed using open-source hardware and software, making personal computing more affordable and customizable for students, hobbyists, and tech enthusiasts.

Objectives

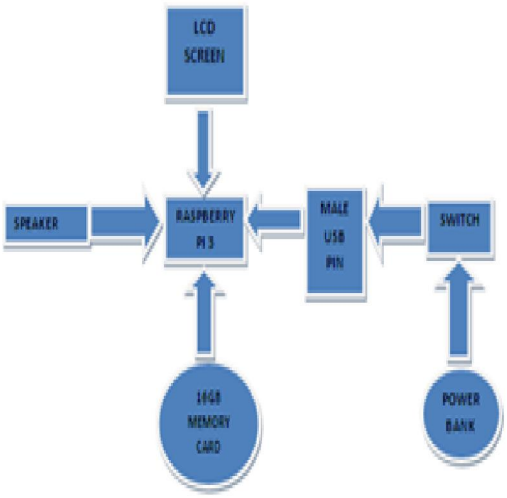
- Utilize a Raspberry Pi as the core computing unit.
- Integrate a small display, keyboard, and battery into a compact enclosure.
- Ensure portability and basic computing functionality (e.g., web browsing, coding, document editing).
- Use open-source software like Raspberry Pi OS or Linux distributions.
- Promote DIY (Do-It-Yourself) electronics and computing knowledge.

V. METHODOLOGY OF THE PROJECT

The development of the Pocket Laptop using Raspberry Pi was carried out through the following systematic steps:

Component Selection

- **Raspberry Pi** (preferably Raspberry Pi 4 or 3 Model B) chosen as the main processor due to its compact size and performance.
- **Display**: A 4–7 inch HDMI-compatible LCD touchscreen selected for portability and ease of use.
- **Input**: Mini wireless or USB keyboard with a touchpad or integrated mouse.
- **Power Supply**: Rechargeable lithium-ion battery pack or power bank (5V, 2.5–3A output).
- **Storage**: microSD card (16GB or more) loaded with Raspberry Pi OS.
- **Additional Components**: Custom 3D-printed or laser-cut case, cooling fan (if needed), GPIO cables, USB hub (if required).



Circuit Diagram of Project

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Raspberry Piboard:

Raspberry Pi board is a miniaturized fascinated computer having ample processing speed and size not bigger than credit card [6]. Incredible things can be done by using it. Firstly, to work with raspberry pi, we need a list of things to get desired operation and functioning.

The Model B+ is the most popular updated version of the Pi, with an enhanced functionality. But it uses bit more power to feed the processor . The Model B has received a stealthy update after it was released by adding some more RAM. But the Raspberry Pi Foundation has released third version of the Model B called the B+. Difference exists in the arrangement of components on the pi board. SD card is sized to Micro SD along with the removal of the video.

LCD SCREEN WITH LCD ADAPTER

It is a flat-panel display. LCDs are available to display arbitrary images. LCDs are used in a wide range of applications, including LCD televisions, computer monitors etc.LCD stands for "Liquid-crystal display.

LCD SCREEN ADAPTER

1. Screen Size: 5 inches (measured diagonally)
2. Resolution: Typically 480x854 pixels (FWVGA) or 720x1280 pixels (HD)
3. Aspect Ratio: 16:9
4. Display Type: LCD (Liquid Crystal Display)
5. Touchscreen: Capacitive or resistive touchscreen

BLUETOOTH KEYBOARD:

It is a keyboard that connects and communicates with its device via Bluetooth protocol. It is also known as wireless keyboard. These devices are used with such portable devices as smart phones and tablets.

General Specifications

1. Connection Type: Bluetooth wireless technology
2. Compatibility: Compatible with most Bluetooth-enabled devices, including smartphones, tablets, and computers
3. Operating Range: Typically up to 10 meters (33 feet)
4. Power Source: Battery-powered (usually AAA or AA batteries)
5. Battery Life: Typically several months to a year or more, depending on usage

BATTERY MODULE:

It is used to put energy into secondary batteries . The charging protocol depends upon size and type of battery charged. They are best for Arduino, DIY kits, power banks.

Power Bank Requirements:

To power a Raspberry Pi using a mini laptop, you'll need a power bank that meets the following requirements:
Capacity: A minimum capacity of 10,000mAh to ensure sufficient power for the Raspberry Pi and mini laptop.
Output Voltage: A regulated output voltage of 5V to match the Raspberry Pi's power requirements.
Output Current: A sufficient output current to power the Raspberry Pi and mini laptop, typically around 2-3A.
Ports: Multiple USB ports to connect the Raspberry Pi, mini laptop, and other devices.

LCD BATTERIES:

For rechargeable cells, the term anode (or negative electrode) designates the electrode where oxidation is taking place during the discharge cycle; the other electrode is the cathode (or positive electrode). During the charge cycle, the positive electrode becomes the anode and the negative electrode becomes the cathode. For most lithium-ion cells, the lithium-oxide electrode is the positive electrode; for titanate lithium-ion cells (LTO), the lithium-oxide electrode is the negative electrode.

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SD Card Module:

The SD card module provides a means to read and write data to an SD card, enabling storage capability for saving scanned data or other information generated by the system. It interfaces with the Arduino via SPI (Serial Peripheral Interface) communication protocol and typically operates at 5V.

The SD card module typically operates at 5V and can be powered directly from the Arduino's 5V output pin. When connected to the Arduino, the module draws power from the microcontroller's on-board voltage regulator, ensuring a stable supply voltage. However, if the SD card module requires additional current beyond what the Arduino can provide, an external power supply may be necessary. It's essential to provide a stable power supply to the SD card module to ensure reliable data storage and retrieval operations.

VI. ADVANTAGES

Portability

Compact and lightweight design makes it easy to carry anywhere, like a mobile workstation.

Cost-Effective

Uses affordable components, making it much cheaper than traditional laptops.

Low Power Consumption

Operates efficiently on minimal power, ideal for use with portable batteries or solar panels.

Customizability

Fully customizable hardware and software for different use cases or personal preferences.

Educational Value

Helps users learn about computer hardware, Linux, programming, and DIY electronics.

Open-Source Friendly

Runs open-source operating systems and supports a wide range of free software tools.

Offline Functionality

Can function without an internet connection, useful for remote areas or fieldwork.

VII. APPLICATIONS

Educational Tool

Ideal for students to learn coding, electronics, and computing concepts.

Portable Programming Station

Can be used for Python, C/C++, or other language development on the go.

Web Browsing and Note Taking

Good for basic computing tasks like browsing, emails, document editing, and note-taking.

DIY Projects and Prototyping

Useful for developers and hobbyists to test IoT projects or run lightweight servers.

Field Research and Data Collection

Useful in fieldwork for scientists or engineers needing a small, robust computing solution.

Backup or Emergency Computer

Acts as a handy secondary device in case of primary computer failure

VIII. CONCLUSION

The Pocket Laptop using Raspberry Pi successfully demonstrates how a compact, affordable, and functional computing device can be built using readily available components. This project highlights the versatility of the Raspberry Pi as a core computing platform, proving that it can support essential computing tasks such as coding, web browsing, and document editing in a highly portable form factor.

Through careful component selection, efficient power management, and the use of open-source software, this project provides a practical solution for students, hobbyists, and tech enthusiasts seeking a DIY laptop alternative. It not only reduces the cost of access to computing but also encourages hands-on learning and innovation.

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In conclusion, the project achieves its goal of delivering a cost-effective, portable, and customizable laptop, opening the door for further enhancements and applications in education, fieldwork, and personal productivity.

REFERENCES

[1]. Raspberry Pi Foundation. (n.d.). Raspberry Pi Documentation. Retrieved from https://www.raspberrypi.com/documentation/
[2]. Raspberry Pi Foundation. (n.d.). Raspberry Pi OS. Retrieved from https://www.raspberrypi.com/software/
[3]. Adafruit Industries. (n.d.). PiTFT Touchscreen Display. Retrieved from https://learn.adafruit.com/category/raspberry-pi
[4]. Instructables. (n.d.). Build a Pocket-Sized Raspberry Pi Laptop. Retrieved from https://www.instructables.com
[5]. MagPi Magazine. (n.d.). Raspberry Pi Projects and Tutorials. Retrieved from https://magpi.raspberrypi.com
[6]. SparkFun Electronics. (n.d.). Getting Started with Raspberry Pi. Retrieved from https://www.sparkfun.com/pages/raspberry_pi
[7]. Sharma, A. (2021). DIY Raspberry Pi Laptop: A Beginner's Guide. Electronics For You. Retrieved from https://www.electronicsforu.com