Home Automation Using Social Networks

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Abstract: In earlier days hardware devices are operated by manual operations and remote controllers. This system provides the user with remote control of various lights and appliances within their home and industries. Present day people are trying to control the hardware devices from their desire location. For controlling hardware devices embedded system is required. But we can control hardware devices from our desire location, so that we require IOT. For that we implement "controlling of hardware by using social networks with Raspberry Pi**".** Hardware devices are the controlling of any electrical and electronic device in our homes and offices, whether we are there or away. There are hundreds of products available that allow us to control over the devices automatically with using "raspberry pi" either by remote control or by any social networks. Here we preferred TELEGRAM app. This system is designed to be low cost and expandable allowing a variety of devices to be controlled. Hardware devices and benefits will be focus on and how this can be achieved through the use of the Raspberry Pi. The system can be used in several places like banks, hospital, labs and other sophisticated automated system, which dramatically reduce the hazards of unauthorized entry. The main reason to develop this system is to save time and man power along with maintaining security and convenience.

Index Terms **- Raspberry pi 3, Bluetooth, ZIG -BEE, GSM, GPRS.**

I. INTRODUCTION

An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. Ninety-eight percent of all microprocessors are manufactured as components of embedded systems.

Examples of properties of typical embedded computers when compared with general-purpose counterparts are low power consumption, small size, rugged operating ranges, and low per-unit cost. This comes at the price of limited processing resources, which make them significantly more difficult to program and to interact with. However, by building intelligence mechanisms on top of the hardware, taking advantage of possible existing sensors and the existence of a network of embedded units, one can both optimally manage available resources at the unit and network levels as well as provide augmented functions, well beyond those available. For example, intelligent techniques can be designed to manage power consumption of embedded systems.

Modern embedded systems are often based on microcontrollers (i.e. CPU's with integrated memory or peripheral interfaces), but ordinary microprocessors (using external chips for memory and peripheral interface circuits) are also common, especially in more-complex systems. In either case, the processor(s) used may be types ranging from general purpose to those specialized in certain class of computations or even custom designed for the application at hand. A common standard class of dedicated processors is the digital signal processor (DSP).

Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale.

Embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, and large complex systems like hybrid vehicles, MRI, and avionics. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

II. DESIGN AND WORKING OF THE SYSTEM

This section briefly explains about the Hardware implementation of the system. It discusses the Design and working of the design with the help of block diagram and circuit diagram and explanation of circuit diagram in detail .It also explains the various modules used in this project.

2.1 System Design

The implementation of the project design can be divided in to two parts.

i) Hardware implementation

ii) Firmware implementation

Hardware implementation deals in drawing the schematic on the plane paper according to the application, testing the schematic design over the bread board using the various Ic's to find the design meets the objective, Carrying out the PCB layout of the schematic tested on the board, finally preparing the board and testing the designed hardware.

The firmware parts deals in programming the raspberry pi 3 so that it can control the operating of the Ic's used in the implementation .In the present work, we have used the Raspbian operating system for the software development to write and compile the source code which has been written in the python language the preload programmer has been used write this compile code into Raspberry Pi. The firm ware implementation is explained in the next chapter.

The system design and principle are explained in this section using the block diagram discusses about the required components of the design and working condition of the project and shown in Fig. 1.

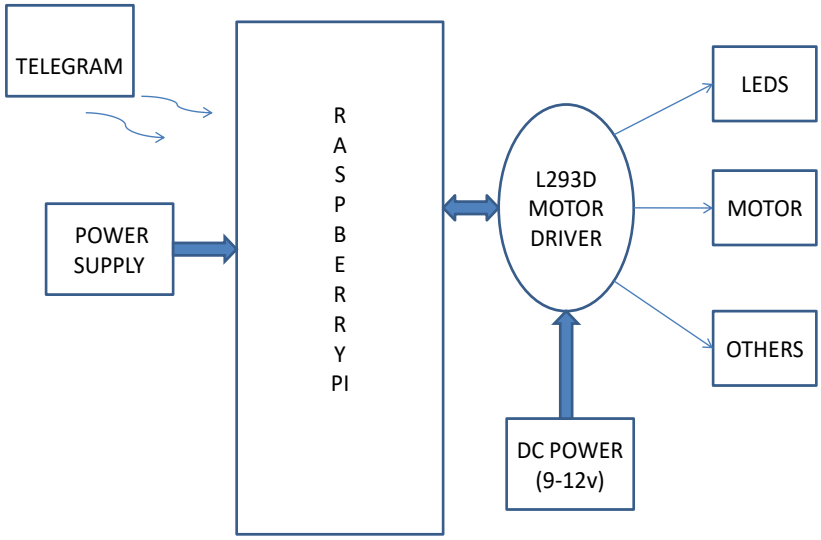

Fig. 1: Basic Block Diagram

III. EXISTING SYSTEM

In previous versions having many wired connections, motors are used to control the hardware of Raspberry Pi. For example controlling hardware of raspberry pi by using wiring pi. In this system we want to connect electric gear motor and allowed to a raspberry pi to be mounted to a small robot and moved it around. Another existing systems are controlling the hardware by using Bluetooth, ZIG -BEE, GSM, GPRS .but it is applicable only some particular range and also less security and reliable

IV. PROPOSED SYSTEM

To overcome the previous complexity we are using controlling of hardware by using Telegram with raspberry pi .Raspberry pi is a tiny sized computer which runs on python so it is hard to keep track of its hardware performance in real time like temperature, hard disk usage etc. But it can be done by using telegram and your raspberry pi will message you details related to its performance. Then you can control raspberry pi with the help of telegram.

4.1 Advantages

- Low cost and expandable allowing a variety of devices to be controlled
- Saves money and energy All in one user friendly system
- This system contain Raspberry pi as a controller so the system contain all the advantages of it.
- This is noise free system.
- High Security

4.2 Applications

- Banks
- Offices
- Homes
- Industries

V. HARDWARE COMPONENTS

Raspberry Pi is a credit-card sized computer manufactured and designed in the United Kingdom by the Raspberry Pi foundation with the intention of teaching basic computer science to school students and every other person interested in computer hardware, programming and DIY-Do-it Yourself projects.

The Raspberry Pi is manufactured in three board configurations through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Egoman. These companies sell the Raspberry Pi online. Egoman produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers.

The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz processor, Video Core IV GPU and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built-in hard disk or solid-state drive, but it uses an SD card for booting and persistent storage, with the Model B+ using a Micro SD.

The Foundation provides Debian and Arch Linux ARM distributions for download. Tools are available for Python as the main programming language, with support for BBC BASIC (via the RISC OS image or the Brandy Basic clone for Linux), C, Java and Perl.

5.1 Specifications

- Broadcom BCM2837 64bit ARMv7 Quad Core Processor powered Single Board Computer running at 1.2GHz
- 1GB RAM
- BCM43143 Wi-Fi on board
- Bluetooth Low Energy (BLE) on board 40pin extended GPIO
- 4 x USB 2 ports
- 4 pole Stereo output and Composite video port
- Full size HDMI
- CSI camera port for connecting the Raspberry Pi camera
- DSI display port for connecting the Raspberry Pi touch screen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source (now supports up to 2.4 Amps)
- Expected to have the same form factor has the Pi 2 Model B, however the LEDs will change position

5.2 Hardware layout

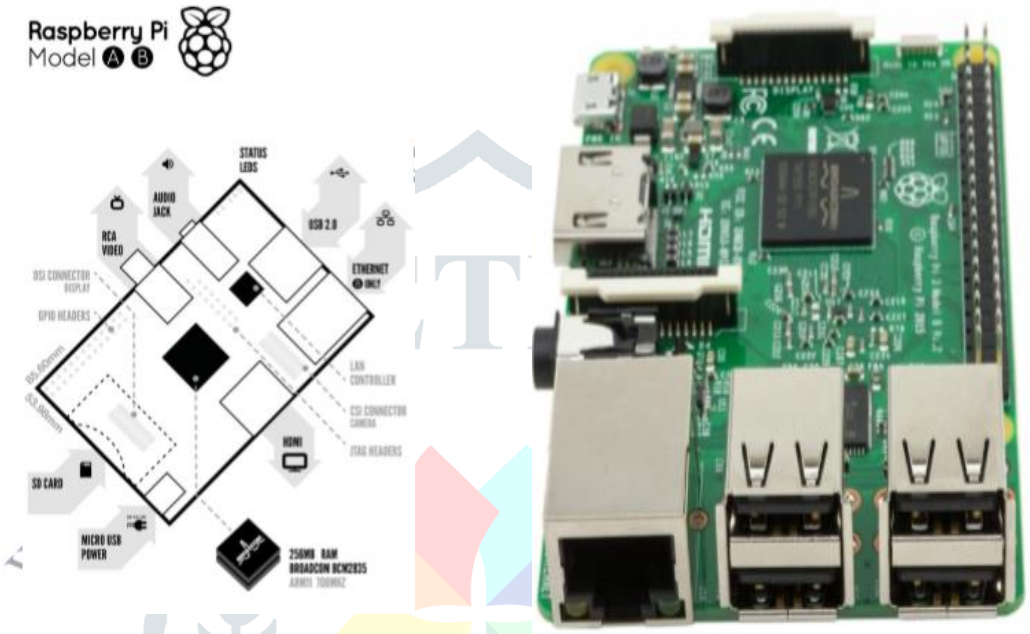

Fig. 2: Block Diagram of Raspberry Pi

The above diagram indicates basic block diagram of Raspberry Pi board and indicates each port shown in above Fig. 2.

5.3 Description of the Components on the Pi

The Raspberry Pi has a Broadcom BCM2835 System on Chip module. It has ARM1176JZF-S processor The Broadcom SOC used in the Raspberry Pi is equivalent to a chip used in an old Smartphone (Android or iPhone).

While operating at 700 MHz by default, the Raspberry Pi provides a real world performance roughly equivalent to the 0.041 GFLOPS. On the CPU level the performance is similar to a 300 MHz Pentium II of 1997-1999, but the GPU, however, provides 1 Gpixel/s, 1.5 Gtexel/s or 24 GFLOPS of general purpose compute and the graphics capabilities of the Raspberry Pi are roughly equivalent to the level of performance of the Xbox of 2001.

The Raspberry Pi chip operating at 700 MHz by default, will not become hot enough to need a heat sink or special cooling. Built specifically for the new Pi 3, the Broadcom BCM2837 system-on-chip (SoC) includes four high-performance ARM Cortex-A53 processing cores running at 1.2GHz with 32kB Level 1and 512kB Level 2 cache memory, a VideoCore IV graphics processor, and is linked to a 1GB LPDDR2 memory module on the rear of the board.

VI. SOFTWARE DEVELOPMENT

6.1RASPBIAN OPERATING SYSTEM

Raspbian is the main and basic software for RPi devices, officially supported by the Raspberry Pi Foundation. In fact, it is an operating system, based on Debian and optimized for Raspberry Pi hardware. It comes with lots of pre-installed pieces of software appropriate for most of ARM users and developers.

Raspbian is a Debian-based computer operating system for Raspberry Pi. There are several versions of Raspbian including Raspbian Stretch and Raspbian Jessie. Since 2015 it has been officially provided by the Raspberry Pi Foundation as the primary operating system for the family of Raspberry Pi single-board computers. Raspbian was created by Mike Thompson and Peter Green as an independent project. The initial build was completed in June 2012. The operating system is still under active development. Raspbian is highly optimized for the Raspberry Pi line's low-performance ARMCPUs.

Raspbian uses PIXEL, **P**i **I**mproved **X**windows **E**nvironment, **L**ightweight as its main desktop environment as of the latest update. It is composed of a modified LXDE desktop environment and the Openbox stacking window manager with a new theme and few other changes.Thedistribution is shipped with a copy of computer algebra program Mathematica and a version of Minecraft called Minecraft Pi as well as a lightweight version of Chromium as of the latest version.

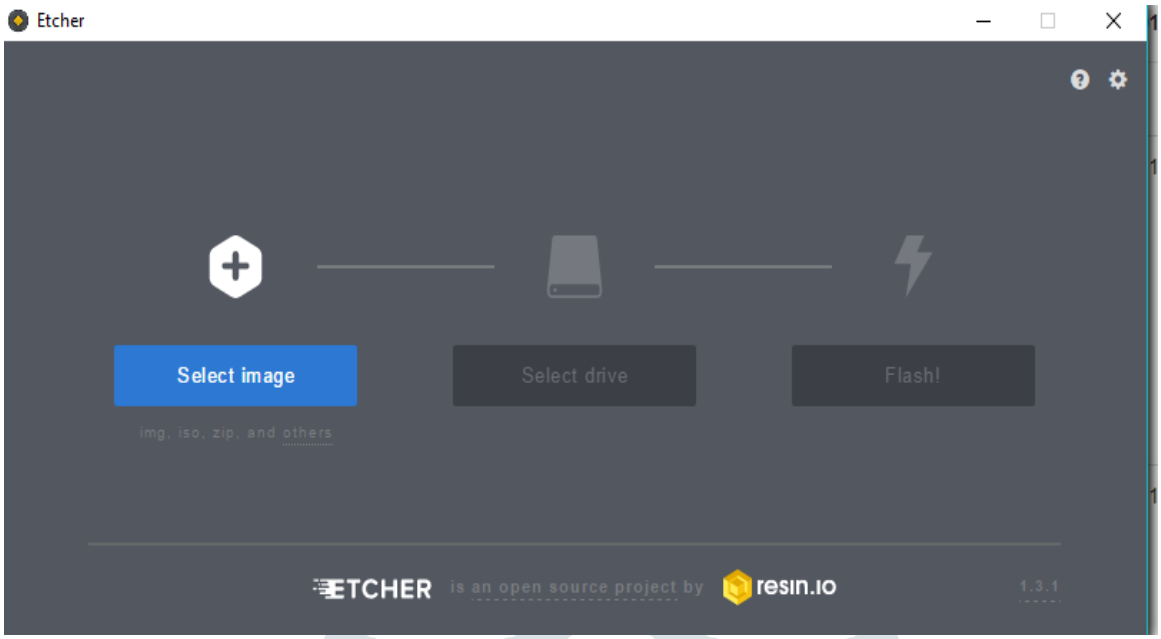

Fig. 3: Raspbian Software Installing Process Step 1

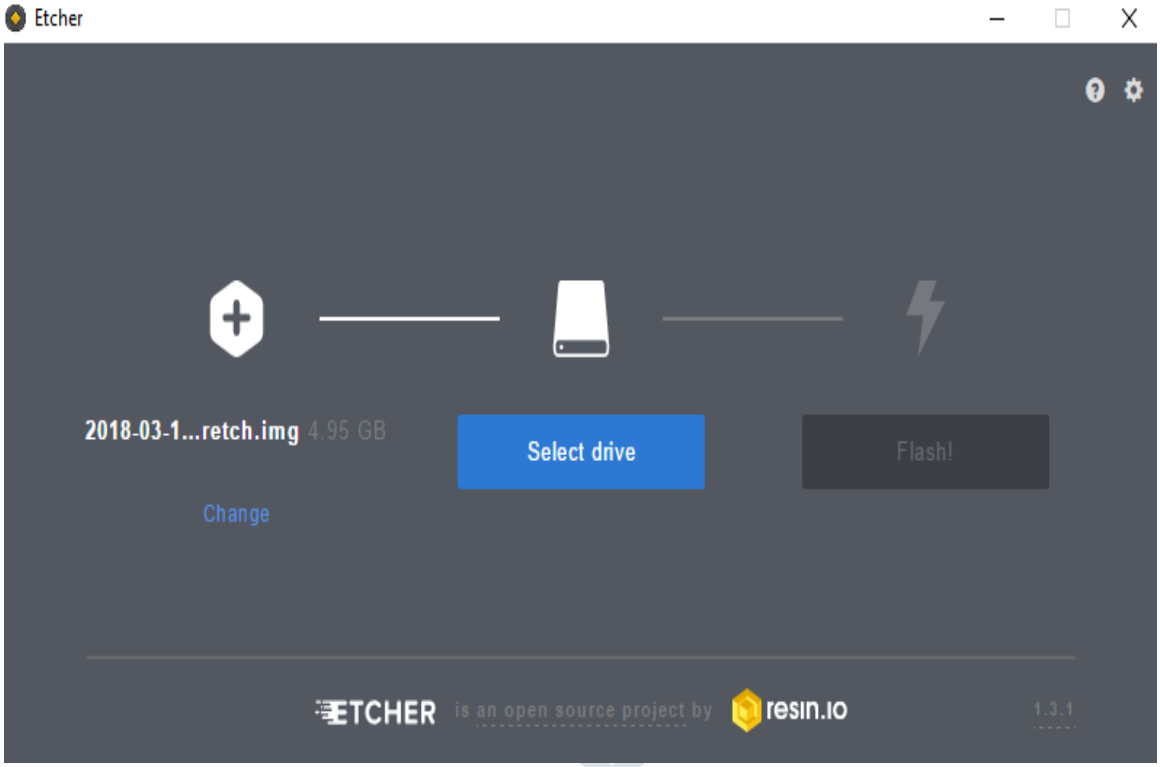

Fig. 4:RaspbianSoftwarte Installing Process Step 2

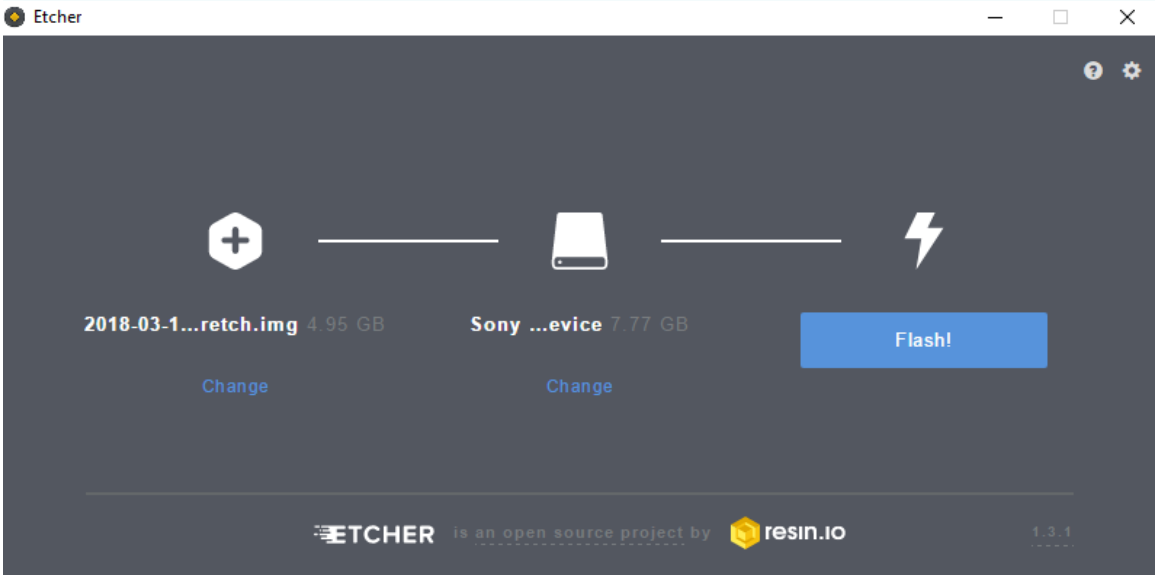

Fig. 5:Raspbian software installing process step 3

6.2 Python Programming Language

Python is an interpreted, object-oriented programming language similar to PERL, that has gained popularity because of its clear syntax and readability. Python is said to be relatively easy to learn and portable, meaning its statements can be interpreted in a number of operating systems, including UNIX-based systems, Mac OS, MS-DOS, OS/2, and various versions of Microsoft Windows 98. Python was created by Guido van Rossum, a former resident of the Netherlands, whose favorite comedy group at the time was Monty Python's Flying Circus. The source code is freely available and open for modification and reuse. Python has a significant number of users.

A notable feature of Python is its indenting of source statements to make the code easier to read. Python offers dynamic data type, ready-made class, and interfaces to many system calls and libraries. It can be extended, using the C or C++ language. Python can be used as the script in Microsoft's Active Server Page (ASP) technology. The scoreboard system for the Melbourne (Australia) Cricket Ground is written in Python. Z Object Publishing Environment, a popular Web application server, is also written in the Python language.

Python is a general purpose programming language created in the late 1980s, and named after Monty Python, that's used by thousands of people to do things from testing microchips at Intel, to powering Instagram, to building video games with the PyGame library. Sometimes only Python code is used for a program, but most of the time it is used to do simple jobs while another programming language is used to do more complicated tasks. Its standard library is made up of many functions that come with Python when it is installed .Learning Python is really easy, a breeze if you've learned other object oriented programming languages. ... It's recommended to be the first language people learners.

Fig. 6: Raspbian software installer

VII. RESULTS

```
Python 3.5.3 (default, Sep 27 2018, 17:25:39)
[GCC 6.3.0 20170516] on linux
Type "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: /home/pi/Desktop/bot (1).py ==========
{'is_bot': True, 'first_name': 'Home automation', 'username': 'Sirty_bot', 'id': 775858608}
Up and Running....
Received: /led1 on
Received: /led2 on
Received: /led3 on
Received: /led4 on
Received: /led1 off
Received: /led2 off
Received: /led3 off
Received: /led4 off
Received: /lamp1 on
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Received: /lamp3 on
Received: /lamp4 on
Received: /lamp1 off
Received: /lamp2 off
Received: /lamp3 off
Received: /lamp4 off
Received: /fan1 on
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Received: /fan2 on
Received: /fan2 off
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VIII. CONCLUSION

This system is designed to be low cost compare to normal CPU and expandable allowing a variety of devices to be controlled. Hardware devices and benefits will be focus on and how this can be achieved through the use of the raspberry pi. The system can be used in several places like banks, hospital, labs and other sophisticated automated system, which dramatically reduced the hazards of unauthorized entry. The main reason to develop this system is to save time and man power along with maintaining security and convenience.

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