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Raspberry pi Home Appliances Controlling by IOT Technology

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Abstract:

Internet of Things (IoT) is a vision towards Future Internet where "things" are provided with enough intelligence to communicate with each other without the human intervention. In the near future, the number of IoT-enabled nodes is expected to grow substantially. The industrial market is one of the most complex segments of the Internet of Things ecosystem. There are many reasons for this, including vastly different use cases and equipment types, and a lower starting point for connectivity. The objective of this report is to provide a more in-depth look at the specific drivers, enablers and inhibitors for each of the equipment categories which make up the Industrial segment, in addition to highlighting specific use cases which are starting to emerge. This paper presents a low cost and flexible le home control and monitoring system using an embedded micro-web server, with IP connectivity for accessing and controlling devices and appliances remotely. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor and control the home environment with more than just the switching functionality. To demonstrate the feasibility and effectiveness of this system.

Keywords: Raspberry Pi, Wi-Fi.

I. INTRODUCTION

Smart Home can be also known as Automated Home or intelligent home which indicates the automation of daily tasks with electrical appliances used in homes. This could be the control of lights, fans, viewing of the house interiors for surveillance purposes or giving the alarm alteration or indication in case of gas leakage. Home security has changed a lot from the last century and will be changing in coming years . Security is an important aspect or feature in the smart home applications.

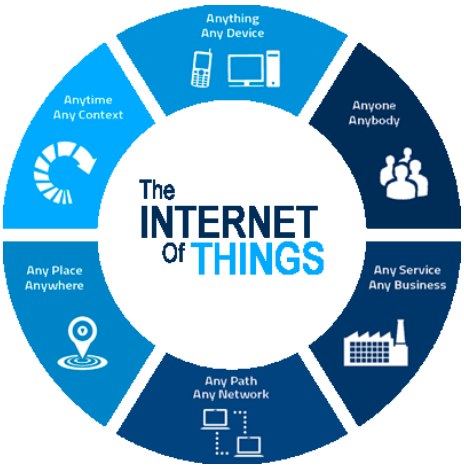

Fig 1: exploration of IoT

Here things are the sensors, the sensor data accessed, monitored and controlled through internet from anywhere, anyplace, any time and any device is called internet of things. IoT finds applications in all automation industries. Mostly considered research area is home automation.

The new and emerging concept of smart homes offers a comfortable, convenient, and safe

environment for occupants. Conventional security systems keep homeowners, and their property, safe from intruders by giving the indication in terms of alarm. However, a smart home security system offers many more benefits. This paper mainly focuses on the security of a home when the user is away from the place. Two systems are proposed, one is based on WI-FI technology and other uses web camera to detect the intruder., installed in house premises, which is operated by software installed on the PC and it uses Internet for communication

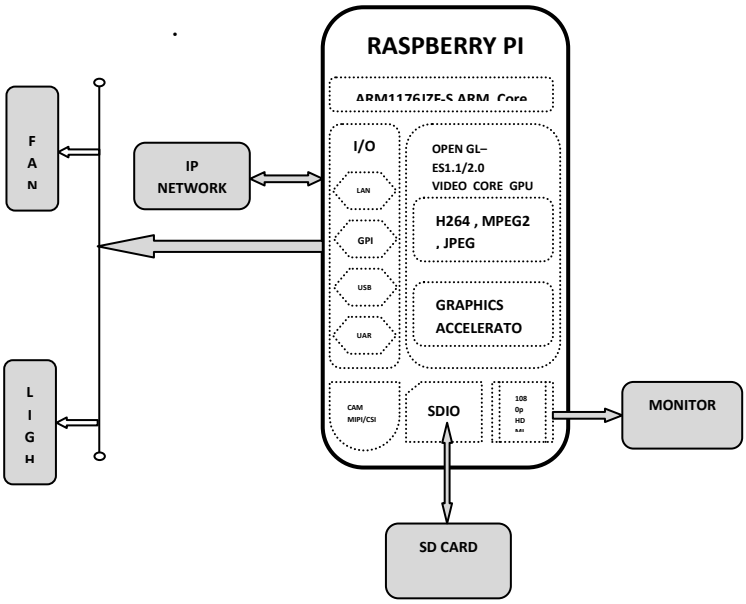

Fig : block diagram smart home

The software communicates to the intended user via Internet network and at the same time it gives sound alert. The proposed system is aimed at the security of Home against Intruders and Fire. In any of the above cases happens while the owners are out of their home then the device sends sms to the emergency number which is provided to the system. The system is made up of three components: sensors, WI-FI Module, raspberry pi, relays to control the device and buzzers to give security alert signal in terms of sound and also 3 algorithms are used in the system:

II. Design and Implementation

In this block diagram the whole system is controlled by Arm11 processor and this processor is implemented on Raspberry Pi Board. So this board is connected with monitor, SD card and IP connected through LAN. Those all components are connected by USB adaptors. The home devices are connected to raspberry pi. One powerful feature of the Raspberry Pi is the row of GPIO (general purpose input/output) pins along the edge of the board. At the simplest levels, they are the switches that can turn on or off (input) or that the Pi can turn on or off (output). Out of the 20 GPIO pins, 3 pins have been used to control three devices in this project which have been represented by 3 LEDs for testing the switching signal. For practical purposes a relay driver circuit and relays can be interfaced with Raspberry Pi and appliances, respectively, for their controlling.

III. SYSTEM HARDWARE

This section emphasizes on the actual hardware implementation of the proposed system, the various modules, components, peripherals and the interconnections between them are discussed here.

The first stage of the implementation is to prepare the Raspberry Pi 3 module for its first boot; this is done by downloading the latest version of the Raspbian operating system from

the official Raspberry Pi website. A microSD card is the formatted using SD Formatter; it's then flashed with the Raspbian OS using Win32 Disk Imager. The first boot is then completed on the Raspberry Pi connecting the required peripherals, such as power supply, keyboard, mouse, Ethernet cable, etc.

The Raspberry Pi for optimal operation requires a quality power supply; the Pi can be driven by using any Micro USB based mobile phone chargers with a good current rating, and this system is powered by a 5V 2A power bank for uninterrupted operation.

Since the Raspberry Pi doesn't natively support wireless internet a USB WiFi dongle is used for connectivity; the Pi also has an Ethernet port which can be used to gain wired internet access.

Using Python programming language preinstalled on Raspbian the source codeof the system is provided and tested appropriately. The USB Camera is interfaced, the GPIO pins are programmed using commands in Linux and Python in this stage. The camera is interfaced to the Pi via the USB port and the door lock module is interfaced via the GPIO pins on the Pi.

Relay:

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches.

Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.

Relays are very simple devices. There are four major parts in every realy. They are

- Electromagnet
- Armature that can be attracted by the electromagnet
- Spring
- Set of electrical contacts

DC motor:

DC motors are configured in many types and sizes, including brush less, servo, and gear motor types. A motor consists of a rotor and a permanent magnetic field stator. The magnetic field is maintained using either permanent magnets or electromagnetic windings..Motors are the devices that provide the actual speed and torque in a drive system. This family includes AC motor types (single and multiphase motors, universal, servo motors, induction, synchronous, and gear motor) and DC motors (brush less, servo motor, and gear motor) as well as linear, stepper and air motors, and motor contactors and starters.

IV. Conclusion

In this highly developing era, where directly or indirectly, everything is dependent on computation and information technology, Raspberry Pi proves to be a smart, economic and efficient platform for implementing the home automation. This paper provides basic application of home automation using Raspberry

Pi which can be easily implemented and used efficiently. The code provided is generic and flexible in a user friendly manner and can be extended for any future applications like switch electrical appliances on and off, and monitor the rooms of your consumption data.

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