

SMARTCITY APPLICATIONS USING RASPBERRY PI

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Abstract: Today we are living in a technological world that it is necessary to use more advanced technologies to control devices remotely from different locations. Earlier electronic devices were controlled through Wi-Fi Bluetooth, Zigbee in the restricted areas but in the advanced technologies like Raspberry pi and cloud technology extended it up to next level where we can control the devices even from remote area. Raspberry pi is a technology which made the strong influence to control any electronic devices even from the remote areas. This technology is designed to be low cost and expandable allowing a variety of devices to be controlled. Home automation and benefits will be focus on and how this can be achieved through the use of the raspberry pi. The provision for the user to automate homes and smart parking and send the information available in the current government is the main target of this system. There was a need to automate home and other features so that users can take advantage of the technological advancement in such a way that a person can send a control signal to the home-centric devices when he/she forget to turn off devices such as light, fan and air-conditioner etc. instead of returning home. And easily they can park the vehicle without knowing where the place available in the city. Everything around us is becoming smart such as smart phones, smart televisions, smart refrigerators, so why not smart displays boards for advertisements and notices. Display boards are primary thing in any institute, organization, public utility places like bus stops, railway stations, parks, shopping malls to display information regarding platforms, various advertisements about the products, or important notices.

I. INTRODUCTION

Home automation is the control of any or all electrical devices in our home or office. There are many different types of home automation system available. These systems are typically designed and purchased for different purposes. In fact, one of the major problems in the area is that these different systems are neither interoperable nor interconnected. There are number of issues involve when designing a home automation system. It should also provide a user friendly interface on the host side, so that the devices can be easily setup, monitored and controlled. In smart home systems, the internet is also use to ensure remote control. For years, the internet has been widely use for the processes such as surfing on the pages, searching information, chatting, downloading and installation. By the rapid developments of

new technologies, monitoring, controlling services have been started to be served along with internet as an instrument providing interaction with machinery and devices. The system can be use 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.

There are many methods by which we can implement home automation system. Some of the method are listed below:

- Home Appliance Control Using Remote Control
- Home Appliance Control Using DTMF
- Home Appliance Control Using Free Hand Gesture
- Home Appliance Control Using Internet And Radio Connection
- Wireless Browser Based Device Control Using Raspberry Pi

This project uses hardware devices to control home appliances and parking the vehicle easily so here we integrating cloud and IOT using Raspberry pi. Each device is addressed by unique Id from which the control signals are issued. Hence there is no ambiguity when there exists multiple devices in a same network. Internet connectivity is established among all the devices for remote connectivity and continuous monitoring. Raspberry pi acts as a base station to establish connectivity between remote devices and cloud. Base station monitors the signals sent, retrieved to and from remote devices.

Home Automation Using Internet of Things:

- With advancement of Automation technology, life is getting simpler and easier in all aspects.
- In today's world Automatic systems are being preferred over manual system.
- With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology.
- Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities.

Smart Parking Using LDR:

- First, our algorithm adopts a mechanism to search car parks at the least cost.

- Second, we adopt a mechanism for forwarding the vehicles to another car park if the current car park is full.
- We propose a network of car parks such that each park is a node in a network.
- Each node obtains the information from the neighboring node, thus ensuring smooth movement of vehicles at low cost and increasing the probability of finding a free parking space.
- Our system achieves better performance compared with other parking systems.
- We evaluated the performance of our system through simulation and implementation.
- Proposed Approach also include additional modules along with smart parking like smart home and smart advertise where in smart home application we can keep monitor room temperature and lighting system where there is no object in the home all home device are in idle state automatically if any object enter home devices com to active state automatically.
- Smart advertisement board for reducing lot of paper work and unnecessary wastage to keep the city clean.

1.1.1 RASPBERRYPI

This project uses RaspberryPi framework to control the device remotely. RaspberryPi is a credit-card-sized single-board computer developed in the UK by the RaspberryPi Foundation with the intention of promoting the teaching of basic computer science in schools. The RaspberryPi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz, Video-Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It does not include a built-in hard disk or solid-state drive, but uses an SD card for booting and long-term storage.

The RaspberryPi 2 Model B is the second generation RaspberryPi. It replaced the original RaspberryPi 1 Model B+ in February 2015. Compared to the Raspberry Pi 1 it has:

- A 900MHz quad-core ARM Cortex-A73 CPU
- 1GB RAM

Like the (Pi 1) Model B+, it also has:

- 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)
- MicroSD card slot
- Video Core I3 3D graphics core

Because it has an ARMv7 processor, it can run the full range of ARM GNU/Linux distributions including Snappy Ubuntu Core, as well

as Microsoft Windows 10. The RaspberryPi 2 has an identical form factor to the previous (Pi 1) Model B+ and has complete compatibility with Raspberry Pi 1. We recommend the Raspberry Pi 2 Model B for use in schools: it offers more flexibility for learners than the earlier (Pi 1) Model A+, which is more useful for embedded projects and projects which require very low power.



Fig 1.1: RaspberryPi model B+

1.1.1 RASPB IAN OS

The RaspberryPi essentially utilizes Linux portion based working frameworks. The ARM11 chip at the heart of the Pi depends on adaptation of the ARM. The present arrivals of a few popular versions of Linux, including Ubuntu, won't keep running on the ARM11. It is impractical to run Windows on the RaspberryPi. Raspbian (prescribed) – Kept up autonomously of the Establishment; in light of the ARM hard-coast (armhf) Debian7 "Wheezy" architecture port initially intended For ARMv7 and later processors (with Jazelle RCT/ThumbEE, VFPv3, and NEON SIMD expansions), accumulated for the more restricted ARMv6 guideline set of the Raspberry Pi. A base size of 4 GB SD card is required. There is a Pi Store for trading programs. Raspbian is a free working framework in view of Debian advanced for the Raspberry Pi equipment. A working framework is the arrangement of basic programs and utilities that make your Raspberry Pi run. Be that as it may, Raspbian gives more than an immaculate OS: it accompanies more than 35,000 bundles, pre-arranged programming packaged in a decent configuration for simple establishment on your The underlying form of more than 35,000 Raspbian bundles, enhanced for best execution on the Raspberry Pi, was finished in June of 2012. Be that as it may, Raspbian is still under dynamic advancement with an accentuation on enhancing the strength and execution of whatever number Debian bundles as could be allowed.

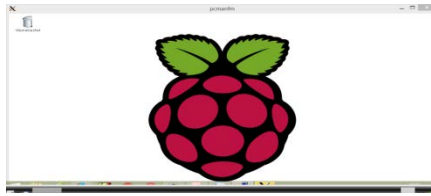


Fig 1.2: Raspbain OS

1.1.2 LDR Sensor

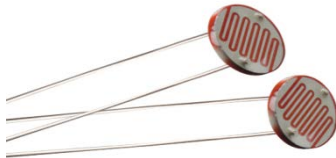


Fig 1.3:LDR

A **Light Dependent Resistor (LDR)** or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells. They are made up of semiconductor materials having high resistance.

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II.SYSTEM DESIGN

Configuration is an inventive procedure a great outline is the way to successful framework. The framework "Outline" is characterized as "The procedure of applying different strategies and standards with the end goal of characterizing a procedure or a framework in adequate point of interest to allow its physical acknowledgment". Different outline elements are taken after to build up the framework. The outline particular portrays the elements of the framework segments or components of the framework and their appearance to end-clients.

2.1 SYSTEM ARCHITECTURE

Framework engineering is the calculated outline that characterizes the structure and conduct of a framework. It characterizes the framework segments or building pieces and gives an arrangement from which items can be obtained and frameworks built up, that will cooperate to execute the general framework. Tr5 tfrtfr

The System architecture is shown below:-

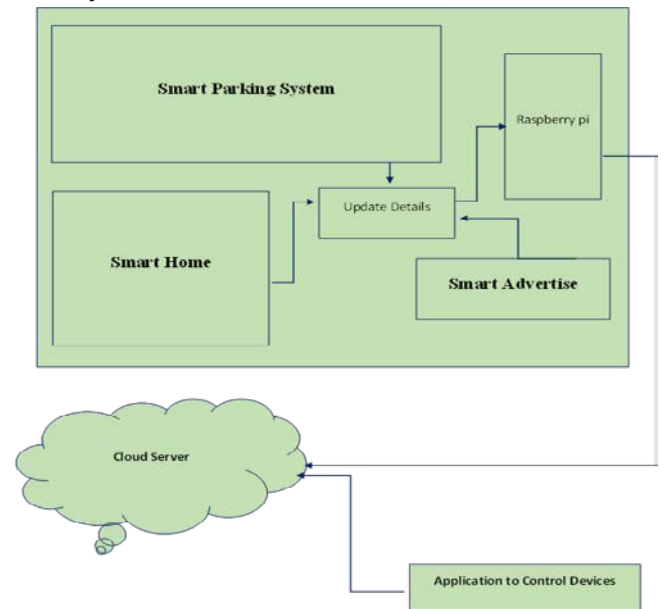


Fig 3.1: system architecture

2.2 DATAFLOW DAIGRAM

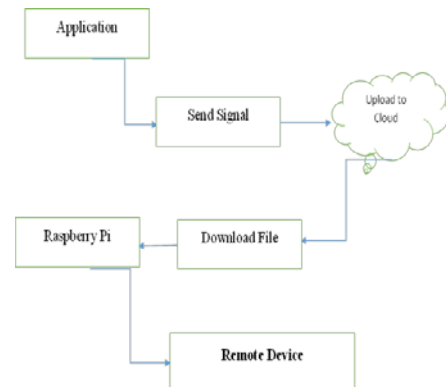


Fig 3.2.1: Data Flow Diagram

III.CONCLUSION

SmartCity systems are required to control the various electronic devices remotely to avoid human errors like forgetting to switch off the home appliances when there is no use and in this case, they are useful in order to utilize the power effectively and also in a secured manner.

This project is successfully designed a system that communicates with a mobile device such as a Smartphone or laptop via RaspberryPi to control a devices, sensors and a smart parking the vehcles using LDR and other can also monitoring the system smartly with using development technologies has many possible applications that could benefit from this work.

IV.FUTURE SCOPE

In future enhanced several areas that need to be improved are the size of the devices, the cost of the devices, the power sources used and the range of communication. There are several ways this could be improved in future work. So we can implement the VPN. A virtual private network (VPN) extends a private network across a public network or internet. It enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network. The use of surface mount components would dramatically decrease the overall size of the components. Surface mount components are also often less expensive as they require less material to produce. This would help reduce the overall cost of the devices as well as the size.

V. REFERENCES

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