

Embedded Video Processing In Home Automation Using Iot

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ABSTRACT:

This paper explains about “Embedded Video Processing in Home Automation Using IoT”. In this project we can detect the fire using OpenCV and also if any fire occurs the system controls the fire by sprinkling water using motor. This system provides password based home security, controlling of home appliance using webpage and also provides continuous online streaming through web page.

Keywords: Micro processor (ARM-11), Pi Camera, Relay, DC Motor, Buzzer, Water sprinkler

1. INTRODUCTION:

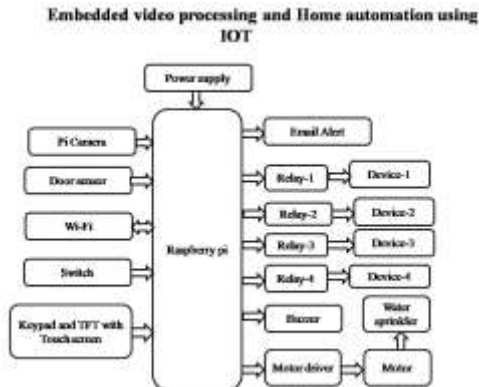
Automation is the most regularly spelled term in the discipline of electronics. The starvation for automation delivered many revolutions in the present technologies. This challenge makes use of an onboard computer, which is many times termed as Raspberry Pi processor. It acts as coronary heart of the project. This onboard pc can correctly speak with the output and input modules which are being used. The Raspberry Pi is a credit-card-sized single-board pc developed in the UK by using the Raspberry Pi Foundation. The Raspberry Pi has a Broadcom BCM2837 gadget on a chip (SoC), which consists of an ARM CORTEX As 1.2 GHz processor, Video Core IV GPU and 1GB RAM. It does no longer encompass a built-in hard disk or solid-state drive, however makes use of an SD card for booting and long-term storage.

2. LITERATURE SURVEY:

[1] Presents a strategy of the designing of a home automation system using DTMF. DTMF stands for Dual Tone Multi Frequency. The system permits user to send commands from their cell phones to control various home appliances such as bulb, fan etc. instructions are sent by means of mobile phone numeric code dialing capability. The system is equipped with DTMF decoder and relay module for controlling any appliance. The application code is fed onto the controller. The fundamental advantage of the circuit is its great range. We can track the status and control our home appliances from anywhere.

[2] Project aims at the design and development of a Short Message Service (SMS)-based intruder detection system, this system consists of controller, receiver and sensor circuit. This system unlike the typical magnetic swap alarms equipped on doorways and home windows has integrated action sensors so that a brief message service, SMS is dispatched to the residence owner on any attempt of a break. This challenge is built the use of a programmed microcontroller interfaced with SIM module, motion detectors and switches. The Passive Infrared (PIR) sensor which is the motion detector used in this venture is placed at the roof of the prototype and a swap close to the door, so that when an intruder pass through the PIR or press the door swap a message is displayed on the phone numbers embedded in the C language software used to program microcontroller.

3. IMPLEMENTATION:



Keypad is used for authentication purpose. Password has to be entered after or earlier than opening or closing the door. Whenever fallacious password is entered or password is no longer entered in time buzzer beeps. Whether correct or wrong password is entered, digital camera takes snap of the personality and sends the picture to the predefined mail id. Switch is used to turn ON the security system as soon as we leave the house. Door lock sensor keeps track whether the door is opened or closed. If protection system is enabled when the door is open, Raspberry pi asks to enter the password.

Whenever any fire accident has been detected using Image Processing, Raspberry Pi processor mechanically switch on the buzzer and offers beep alarm sound. Raspberry Pi processor turns ON the water sprinkler when fireplace is detected. The water sprinkler direction is changed with the help of motor. We can additionally operate the devices through webpage. Relays are used to turn ON/ OFF the devices. We can additionally enable or disable the home protection mode through webpage.

Raspberry Pi is the controlling section in our project. We program it using Python Language and the OS used here is Linux.

4. RELATED WORK:

The brief introduction of different modules in this challenge is discussed below:

Raspberry Pi (ARM-11) PROCESSOR:



The Raspberry Pi 3 Model B is the latest single-board computer from the Raspberry Pi Foundation. In this version, they've upgraded to a 1.2 GHz 64-bit quad-core ARM processor and added 802.11n Wireless LAN, Bluetooth 4.1 and Bluetooth Low Energy.

Like the previous version (the Pi 2) it has 1 GB of RAM, 4 USB ports, and full HDMI support. The Raspberry Pi 3 also has the same form factor as the Pi 2 (and Pi 1 Model B+).

The Raspberry Pi runs Raspbian and/or NOOBS (both Linux-based operating systems) which boot from the removable SD card. A host of third-party operating systems are also supported, including Ubuntu Mate, Windows 10 IoT Core, and OSMC.

The Raspberry Pi 3 is a credit-card sized computer capable of doing just about anything a desktop PC does. From web

surfing and word processing, to playing Mine craft or acting as a media player, the Raspberry Pi's capabilities are extensive. With plenty of graphics processing power, the Raspberry Pi 3 is capable of streaming BluRay-quality video. If you're looking to incorporate the Pi into your next embedded design, the 0.1" spaced 40-pin GPIO header gives you access to 27 GPIO, UART, I2C, SPI as well as both 3.3V and 5V power sources.

Raspberry pi processor is programmed using embedded 'Linux'. Linux is the best known and most used open source operating system. As an operating system Linux is a software that sits underneath on a computer having other software's, receiving requests from those programs and relaying these requests to the computer's hardware.

RELAY:

A relay is an electrically operated switch. Many relays use an electromagnet to function a switching mechanism however different running concepts are additionally used. Relays find applications where it is vital to control a circuit via a low-power signal, or the place numerous circuits should be managed via one signal. The first relays had been used in lengthy distance telegraph circuits, repeating the signal coming in from one circuit and re-transmitting it to another. Relays discovered huge use in telephone exchanges and early computer systems to operate logical operations.



BUZZER:



The vibrating disk in a magnetic buzzer is attracted to the pole by the magnetic field. When an oscillating signal is moved through the coil, it produces a fluctuating magnetic field which vibrates the disk at a frequency equal to that of the drive signal.

PI CAMERA:

The Raspberry Pi Camera Module v2 is a high quality 8 megapixel Sony IMX219 image sensor custom designed add-on board for Raspberry Pi, featuring a fixed focus lens. It's capable of 3280 x 2464 pixel static images, and also supports 1080p30, 720p60 and 640x480p60/90 video. It attaches to Pi by way of one of the small sockets on the board upper surface and uses the dedicated CSI, designed especially for interfacing to cameras.



DC MOTOR:

A DC motor which uses electrical energy to produce mechanical energy, very commonly via the interaction of magnetic fields and current-carrying conductors.

The DC motor has two basic parts: the rotating part that is called the armature and the stationary part that includes coils of wire called the field coils. The second part called the stator.

The current carrying conductor is placed in a magnetic field perpendicularly, and then the conductor experiences a force in the direction of field and the current carrying conductor in perpendicularly. Fleming's left hand rule says that if we extend the index finger, centered finger and first finger i.e., thumb of our left hand perpendicular to each other, in such a way that the middle finger is along the direction of current in the conductor, and index finger is along the direction of magnetic field i.e. north to south pole, then thumb indicates the direction of created mechanical force.



4. RESULTS:



The above figure explains that when the fire has been detected Raspberry Pi processor turns on the water motor.



The above figure explains about the controlling of home appliance.



Finally the keypad is meant for intruder detection purpose.

5. CONCLUSION:

The present model presents an Integrating function of all the hardware elements which has been used and developed in it with Arm-11 Raspberry pi processor. The Presence of each and each module has been reasoned out and placed very carefully. Hence the contributing to the great working unit for “Embedded video processing in Home automation using IoT”

has been designed perfectly. Secondly, the use of distinctly superior IC’s like Broadcom BCM2387 chipset, 1.2GHz Quad-core ARM cortex-A53 (64Bit) processor, Linux OS technology with the help of growing technology. Thus the challenge has been efficaciously build and tested.

6. FUTURESCOPE:

In future we will implement this system by adding finger print for authentication purpose which is more secure than password based authentication system.

7. ACKNOWLEDGEMENT:

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REFERENCES

[1] Amrit Kumar Panigrahi, Reshav Ranjan, Subhasish Bhoi, Neha Kumari

“DTMF based Home Automation System”

in International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Vol. 6, Issue 3, March 2017

https://www.ijareeie.com/upload/2017/march/62_DTMF.pdf

[2] Nwalozie G. C, Aniedu A. N, Nwokoye C. S, Abazuonu I.E

“Enhancing Home Security Using SMS-based Intruder Detection System”

in International Journal of Computer Science and Mobile Computing

Vol. 4, Issue. 6, June 2015, pg.1177 – 1184

[3] <https://www.raspberrypi.org/>

[4] Ammar Anuar, Khairul Muzzammil Saipullah, Nurul Atiqah Ismail, Yewguan Soo

OpenCV Based Real-Time Video Processing Using Android Smartphone

International Journal of Computer Technology and Electronics Engineering (IJCTEE)

Volume 1, Issue 3



[5] Saptarshi Bhowmik, Sudipa Biswas,
Karan Vishwakarma, Subhankar Chattoraj,
Parami Roy

Home Automation System Using Android
Application

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Research Publications, Volume 6, Issue
12, December 2016

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