

Designing of Multifunctional Surveillance and Security system

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Abstract - This paper describes to design and build a manually controlled surveillance system. The main purpose of this system is to be able to roam around in a given environment self contained with wireless transmission of data. We are making is to provide visual while transmitting back real time data (video) to the ground station. This real time data can be used by the controller (human) to move the robot around. The robot must be compact and information on of hard to access places, for example a building under a hostage situation. The camera is attached to a stepper motor which makes it feasible to capture the scene or object of interest. The captured video can be enhanced and made intelligible using further image processing on the remote PC thereby eliminating the need for extra hardware on the system. This system can response rapidly as intruder detect, and GSM module will alert home owner on making calls and messages on entering into the home. This security system for alerting a home owner wherever he will be with a phone call and captures the image of that intruder who enters into the home.

Key Words: Surveillance, Raspberry pi, Arduino, GSM module, PIR Sensor.

1.INTRODUCTION

Surveillance is the way toward observing a circumstance, a zone or a man. This by and large happens in a military situation where surveillance of fringes and foe domain is fundamental to a nation's wellbeing. Human observation is accomplished by sending work force close touchy ranges with a specific end goal to continually screen for changes. In any case, people do have their impediments, and sending in unavailable spots is not generally conceivable.

1.1 Benefits of Video Surveillance

This is the process of monitoring a situation, an area or a person. This generally occurs in a military scenario where surveillance of borderlines and enemy territory is essential to a country's safety[2]. Human surveillance is achieved by deploying personnel near sensitive areas in order to constantly monitor for changes. But humans do have their limitations, and deployment in inaccessible places

is not always possible. Thus, in recent times, surveillance technology has become an area of great research interest. The field of surveillance robots is quite popular. A lot of work has been done in control system of wireless surveillance robots. A common theme is also the use of a camera on the robot in order to receive live video feedback.

1.2 Benefits of Security System

This project is rather unique in the sense that it is a low-cost solution that offers the ability to remotely control a robot with an unlimited range (by using the internet), while also offering video feedback[1]. There is also no constraint on any extra processing since everything is done remotely. Our aim to build a fully-featured surveillance robot using an easily available Skype call, which can be remotely controlled over the internet and also provides the security by sensing the objects with in the fixed range given by us. It automatically takes the images and stores in its internal memory and as well as at the same time it also sends those images to the mail of the person which we are included.

2. SYSTEM DESIGN

The block diagram of the proposed system as shown in Fig. 1 consists of sensing unit such as PIR Moisture Sensor to sense the objects and DTMF module to convert frequency and able to roam which are connected to Arduino and Raspberry pi along Raspberry pi Camera.

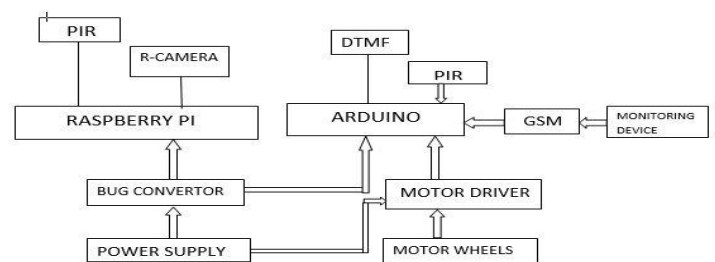


Fig 1: Proposed system design

2.1. Components Description

2.1.1. Raspberry Pi

The Raspberry Pi is a Mastercard estimated PC that attachments into your TV and a console. It is a proficient little PC which can be utilized as a part of gadgets activities, and for a significant number of the things that your desktop PC likes, spreadsheets, word handling, perusing the web, and playing amusements. It likewise plays top quality video. We need to see it being utilized by grown-ups and kids everywhere throughout the world to learn programming and advanced making[4].The Raspberry Pi equipment has developed through a few forms that component varieties in memory limit and fringe gadget bolster. The Ethernet connector is inside associated with an extra USB port. The Broadcom BCM2835 SoC utilized as a part of the original Raspberry Pi is to some degree equal to the chip utilized as a part of original. The Raspberry Pi 2 utilizes a Broadcom BCM2836 SoC with a 900 MHz 32-bit quad-center ARM Cortex-A7 processor (as do numerous current cell phones), with 256 KB shared L2 reserve. The Raspberry Pi 3 utilizes a Broadcom BCM2837 SoC with a 1.2 GHz 64-bit quad-center ARM Cortex-A53 processor, with 512 KB shared L2 reserve.



Fig 2: Raspberry-pi module

2.1.2. Arduino Uno:

A microcontroller is a little PC on a solitary coordinated circuit containing a processor center, memory and programmable info/yield peripherals. The one we utilized is the Arduino Uno in light of ATmega328P Arduino is a solitary board microcontroller intended to make the way toward utilizing gadgets in multidisciplinary prepare that can be more open. The equipment comprises of single open source equipment board planned around a 8-bit Atmel AVR(Automatic Voltage Regulator) microcontroller. An Arduino board comprises of an Atmel 8-bit AVR microcontroller with integral parts to encourage programming and consolidation into different circuits. An essential part of the arduino is the standard way that connectors are uncovered, permitting the CPU board to be associated with an assortment of compatible extra modules known as shields. The product comprises of a standard

programming dialect compiler and a boot loader that executes on the microcontroller.

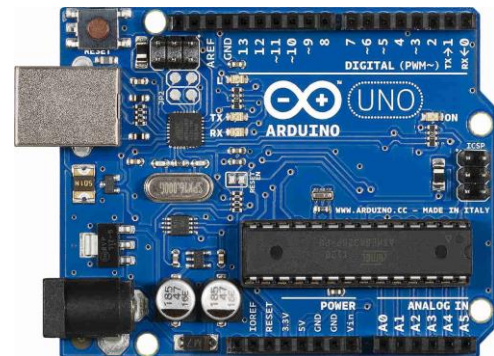


Fig 3: Arduino Uno module

2.1.3. Raspberry Pi Camera:

The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs. It's easy to use for beginners, but has plenty to offer advanced users if you're looking to expand your knowledge. There are lots of examples online of people using it for time-lapse, slow-motion and other video cleverness. You can also use the libraries we bundle with the camera to create effects.



Fig 4: Raspberry-pi Camera

2.1.4. GSM Module:

A GSM module or a GPRS module is a chip or circuit that will be utilized to set up correspondence between a cell phone or a processing machine and system. The modem (modulator-demodulator) is a basic part here. These modules comprises of a GSM module or GPRS modem fueled by a power supply circuit and correspondence interfaces (like RS-232, USB 2.0, and others) for PC. A GSM modem can be a devoted modem gadget with a serial, USB or Bluetooth association, or it can be a cell phone that gives GSM modem abilities. There are different cell sizes in a GSM framework, for example, full scale, small scale, Pico and umbrella cells. Every cell shifts according to the execution space. There are five distinctive cell sizes in a GSM arrange full scale, miniaturized scale, Pico

and umbrella cells. The scope range of every cell differs as indicated by the usage condition.



Fig 5: GSM module

2.1.5. DTMF Module:

DTMF (Dual Tone Multi Frequency) is the flag to the telephone organization that you produce when you press a standard phone's touch keys. In the United States and maybe somewhere else, it's known as "Touchtone" telephone (once in the past an enlisted trademark of AT&T). DTMF has for the most part supplanted circle detach ("beat") dialing. With DTMF, each key you push on your telephone creates two tones of particular frequencies. So that a voice can't impersonate the tones, one tone is created from a high-recurrence gathering of tones and the other from a low recurrence bunch. Here are the signs you send when you press your Touchtone telephone keys.



Fig 6: DTMF module

2.1.6. PIR Sensor:

PIR sensors permit you to detect movement, quite often used to recognize whether a human has moved in or out of the sensors go. They are little, cheap, low-control, simple to utilize and don't destroy. Thus, they are regularly found in apparatuses and devices utilized as a part of homes or organizations. They are frequently alluded to as PIR, "Latent Infrared", "Pyroelectric", or "IR movement" sensors.

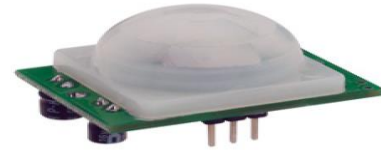


Fig 7: PIR sensor

3. WORKING OF PROJECT

In this venture, webcam is interfaced to Raspberry Pi by means of WiFi module. Raspberry Pi is the heart of the framework. The Raspberry Pi Model B+ joins various upgrades and new features. Improved power consumption, expanded availability and more noteworthy IO are among the changes to this intense, little and lightweight ARM based PC. The Raspberry Pi can't straight forwardly drive the hand-off

In this project the main objective is to Control the robot through skype in wherever everywhere throughout the world and distinguishes the gatecrasher who were going into the home through Automatic telephone call to getting up the client/proprietor and catches the picture of that specific interloper and spare it on its memory and furthermore sends the caught picture to the distributed storage[3].

The objective is to use robot for surveillance system over Wi-Fi network. The surveillance system provide conference option and its output was controlled by phone or pc through internet connection. This model also includes night vision in surveillance system and to move and turn to particular direction using Skype application. The data loss occurred by network failure is limited by using the memory over the robot itself.

This framework is helpful for individuals in unsafe zones, where life risk and plausibility of losing the property is more. Another inspiration is to diminish costs in organizations, labs, processing plants, and so forth. Individuals may utilize straightforward and modest security framework in their homes. The framework is made more valuable by acquainting computerized reasoning with it. By Intruder Detector the robot recognizes the nearness of the impediment and alarms the client with a telephone call and consequently catches the photo of that specific interloper and stores in a current memory of that gadget[6].

This robot run by some commands that are send via mobile phone through skype call . We are here using DTMF function of mobile phone. Here we have used the mobile phone to show working of project. One is user mobile phone that we will call 'remote phone' and second one that are connected with Robot's circuit using aux wire. This mobile phone we will call 'Receiver Phone. First we make a call by using remote phone to receiver phone and then attend the call by manually or automatic answer mode. Now here is how this DTMF controlled robot is controlled by cell phone.

4. HARWARE OF PROJECT

Fig.8 shows hardware part of project. Here we will be considering connections in our project. Here Raspberry pi is the controller of the project[5]. Webcam is interfaced to the raspberry pi. Here we have two comparator circuits which are connected to the PIR sensors. Relay is connected to the motor for ON/OFF of the DTMF module is used for converting frequencies and skype technique is used for automatic lift of calls and Raspberry pi camera is for capturing images when it senses the object and sends to cloud.

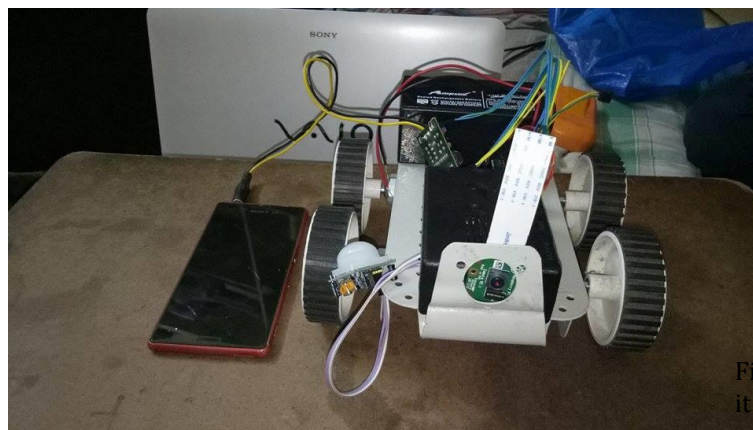


Fig 8: Final Hardware Part of Project

5. RESULT

Fig.9 shows the controlling of surveillance robot using DTMF module on converting the frequency of numbers and making to roam around the environment

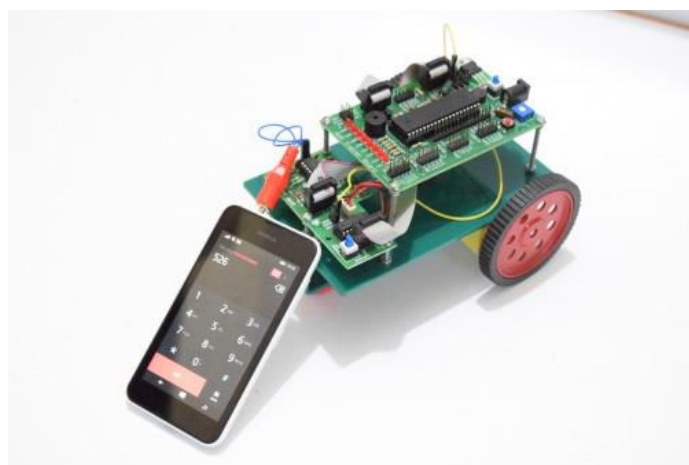


Fig 9: DTMF controlled robot

Fig.10 shows the roaming of the robot around the environment that which we like around here in this image it was kept in the room at different place and controlling it from other place.



Fig 10: Monitoring the moving robot controlling from different station

Fig.11 shows that when an intruder enters into that range it automatically senses and captures the images and send copy to the Dropbox account and owner gets an call and message to alert the owner.

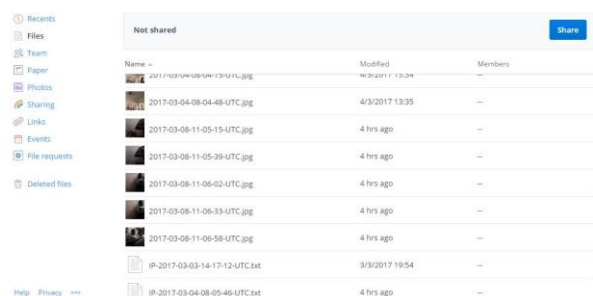


Fig 11: Capturing the image of an intruder and also send a copy to the Dropbox

6. CONCLUSION

In this proposed system have presented the new innovative Surveillance system. This system comprises the live streaming of robot using DTMF and Skype technique of automatic call lift system, this two systems make the Robot fully automatic. We can capture the live images on wi-fi on getting the sense while entering of the intruder. The entire system is monitored and controlled by the power full credit card sized microcomputer called Raspberry Pi. Pi board is powered by Raspbian /Linux operating system.

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REFERENCES

- [1] C.D. Nugent, D.D. Finlay, P. Fiorini, Y. Tsumaki, and E. Prassler, "Home Automation as a Means of Independent Living," IEEE Trans. On Automation Science and Engineering, vol. 5, no. 1, pp. 1-9, 2008 M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.
- [2] Sridhar Lakshmanan, Vin Joe Varghese, Narasimhamurthi Natarajan. "Miniature surveillance robot" (<http://www.google.com/patents/US7436143>)K. Elissa, "Title of paper if known," unpublished.
- [3] Nikhil Agrawal Engineering Manager, Siemens,Noida nikhil.pa@gmail.com, SmitaSinghal ASET, Amity University, Noida singhal.smita@gmail.com, Smart Drip Irrigation System using Raspberry pi and Arduino, International Conference on Computing, Communication and Automation (ICCCA2015) ISBN:978-1-4799-8890-7/15/\$31.00 ©2015 IEEE.
- [4].A.P.Engelbrecht, Fundamentals of Computational Swarm Intelligence, John Wiley & Sons,2006.
- [5].E.Bonabeau, M.Dorigo and G.Theraulaz,Swarm Intelligence: From Natural to Artificial Systems, Oxford University Press, Inc., New York, NY, 1999.