

IOT BASED HOME GUARD BOT

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Abstract : There are various surveillance systems available such as camera, CCTV, etc. In these types of a surveillance system, the person has to do continuous monitoring of their home or industry. The proposed system is to build a real-time live streaming and monitoring system using Raspberry Pi with installed Wi-Fi connectivity. Also By using video cameras, information is returned by ROBOT to the authorized person. So by analyzing the real-time images the computation effort, cost and resource requirements needed are significantly decreased.

IndexTerms : Raspberry pi board, Surveillance, IOT, Twillo software, Android app, Pi camera.

I. INTRODUCTION

In Industry robot is being used for various applications like pick and place, automation, painting and in hazardous places for material handling, etc. With the rapid growth of the Internet, more and more intelligent devices have been embedded into it for service, security including telescopes, surveillance cameras, and mobile robots. Most of the Mobile BOTs are applicable in various fields such as home security, industrial surveillance, hospitals, shopping malls and in many other fields. The main reason and benefits of this progress is that the cost of producing and designing the BOTs is reduced to a great extent. Very effectively and not so expensive production produces. The robos also reduce the human difficulties and load in many ways. So that reason home surveillance robot is mostly used. Mostly for indoor security system uses some monitoring device as a video camera mounted on the wall at multiple places. It increases the cost of indoor security system, the costly and complications are increases by using multiple and various type of cameras to surveillance also they are not flexible to implement. The camera installed in the robot can move easily on various spots to monitor with different angles. As compare fixed camera at single area these cameras are more flexible.

In our system, we can monitor our home or industry using IOT. Internet of things is a world, where real, virtual and digital environment combines to create a smart environment which makes life easy. The proposed system uses a Raspberry Pi and Pi camera to detect damage in the surveillance area and to watch live streaming using YouTube live Streamer, which can be viewed by only authorized personnel. The bot will continuously move in the home & when it will detect gas leakage it will send a SMS alert to an authorized person, so one can take action accordingly.

II. LITERATURE REVIEW:

[1] "Implementation of Surveillance robot with the feature of semi-automatic recharging capability" by T.Amulya, M.Vedachary Their main intention was on battery charging capability. The robot can move back to the docking station when the battery is too low. The reason behind the made robot is surveillance, it consist of camera and rechargeable battery for performing operation. For this activity, wireless communicates is used to communicate with the user using Wi-Fi network. In the system battery is powered up robot will move across area avoid obstacle using infrared sensor and when the battery is low then no any power is present to handling the robot hence, robot will stop and need to be recharge. robot can be controlled by user with help of web-based control so user route robot to the docking station for charge the battery. After fully recharging the battery the robot will unlock from the docking station and continuous its surveillance.

[2]A Surveillance Robot for Home Security with Docking System" by P.Vanitha Sri, S.Sharmila focus on robot will be automatically navigates in different modes. Along with this, only the authorize person entering the home is done by using authentication of the person by nabbing the image of the person. PIR sensor and CMOS camera are used to implement this system. The communication process will be established by using ZigBee. PIR sensor will be activated when a person will come front of the door and the camera will capture the image. The PIR sensor is used when a person comes near the door then the image is nabbed. The robot can be operated in two modes, One is normal mode and another is security mode. The normal mode in the person is inside the home and navigates the robot. The navigation includes right, left, up, down, clockwise and anticlockwise movements. The robot can be move using

various keys control by user to navigation that is attached to the robot. When the user or the person goes out of home, at that time no one present in home the security mode is used. In this mode, the robot moves automatically without user interface or control towards the door and captures the image. These captured image will be automatically saves in the database for further uses. After come back authorized person at home, can be check database to watch who came at home at that time where no one at home.

[3] “A Surveillance Robot with Climbing Capabilities for Home Security.” by Dipali Chavan, S.A. Annadate focus on that the robot can climb the staircase of variable step size which is proportional to the dimension of the robot which greatly helps the robot to move in home environments while performing surveillance tasks. The proposed system uses a staircase climbing robot with a camera to monitor the indoor environment. The camera in the robot can move on various locations to take photos with different angles. These cameras are more flexible than a fixed camera at a single location. The robot is capable to cover large area for monitoring that reason it attached robotic arms hence can be rotate camera in 180 degree, called as wheelbase robot. Managing the arm position propely, robot can climb the stair of height proportional to its dimension of the robot. All these process control by wireless RF modem for wireless data communication. For surveillance different sensors are used like smoke sensor PLG sensor, PIR sensor.

III. SYSTEM OVERVIEW:

We are designing a system in which monitoring of our home can be done. For which raspberry board is used which will able to control all the operations. The bot will move in every part of our home. The pi camera will be mounted on the bot and will capture all the areas of the home. The gas sensor will be connected to the raspberry board, which will sense any gas leakage. If any gas leakage is sensed by the gas sensor, the authorized person will get the SMS. And then will go live on YouTube and can monitor home by live streaming. Using software one android app is developed by which one can control the position of the bot and can take action accordingly.

IV. BLOCK DIAGRAM AND DESCRIPTION:

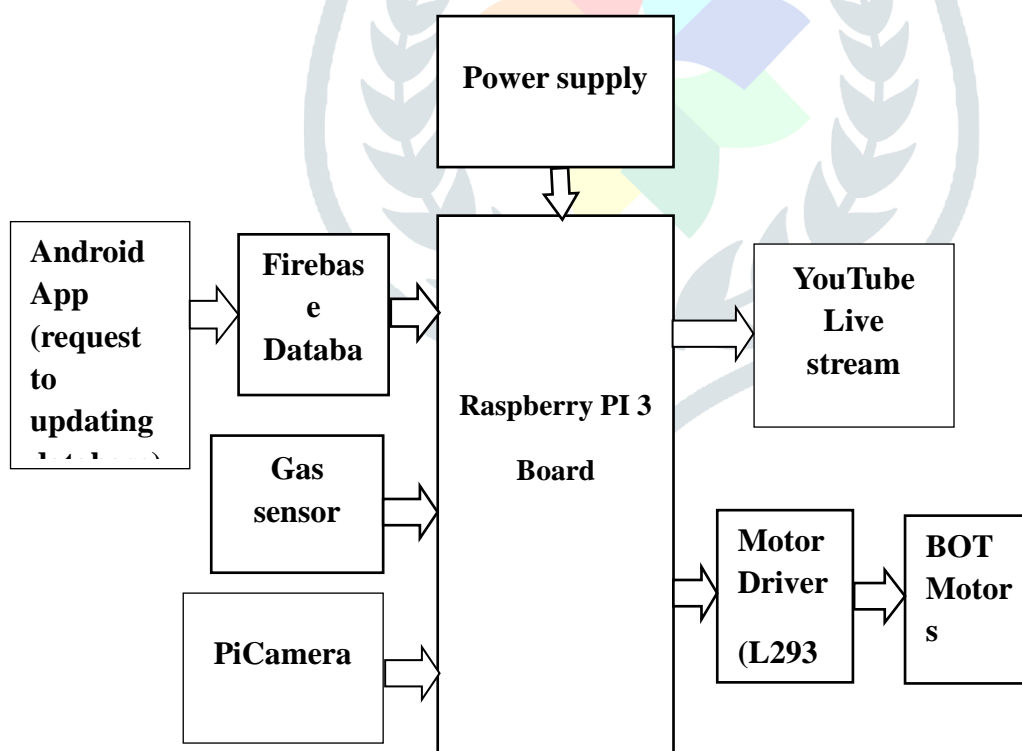


Fig. 1 block diagram

The main part of the system is the Raspberry Pi board, which will control all the working of the system. Bot motors are used to move the bot To drive the motors, motor driver IC is used. The Pi camera is connected to a raspberry pi board which will be mounted on the front side of the bot. The Pi camera is used for monitoring and capturing all the parts of the home. Gas leakage sensor is used to sense the gas leakage. YouTube live streaming is done to watch the live streaming of our home. The Pi camera will capture the video and one can access that video lives on YouTube. Android app is used to control the position of the bot. By watching live streaming we can control

the direction of the bot. According to the database, the robot will change its direction. The bot will continuously move to our home. When gas sensor will sense any gas leakage it will give a signal to the raspberry board. The then authorized person will receive SMS. After viewing that SMS authorized person will go live on YouTube and can watch live streaming of our home and by using the android app we can control the position of the bot.

V. HARDWARE USED:

For Proper functioning of this bot lot of hardware components are required. This bot can be used in domestic as well as in remote areas. Following are the main components used in our project.

i. Raspberry Pi board:- Raspberry Pi board is the main component of our project. Raspberry Pi 3 model is used our project. It can run multiple program at a time. It is having 40 pin Extended GPIO. Camera module can be directly interface to the raspberry pi board. It is having separate slot for Miro SD card. It is having Quad core 1.2GHz Broadcom with BCM2837 64bit CPU.

ii. Camera module:- Raspberry Pi board is having defined port for Camera module. So,it can be directly inserted into that port. It is 5MP omnivision 5647 camera module. Its picture resolution is 2592 x 1944. For video it supports 108p @ 30fps and 720p @ 60fps.

iii. Gas Sensor :- MQ6 Gas sensor is used to sense the leakage of gas. It is highly sensitive to LPG. Its detection range is 100-10000ppm iso butane propane. It requires 5V supply. It is having less sensitivity to alcohol and smoke.

iv. Motors :- Servo motors are used for the motion and mobility of robot. Motors are interfaced to raspberry Pi through drivers. We can monitor the movements in 360 degrees which can be accomplished with the help of motors. It is having 150RPM for 12V.

v. Motor Driver :- L293D motor driver is used. It is used to take low current control signal and turn it into higher current signal. It can drive the current up to 600mA at voltage from 4.5V to 36V.

V. Software Design:-

i.Installing OS on SD card:- Insert the SD card into SD card slot of the Raspberry pi board. Note the drive letter assigned to the SD card. You can see the drive letter in the left hand column of Windows Explorer.Accept the terms and condition and start the process of installing OS on SD card.

ii.Fire base:- Fire base is a mobile and web app development platform that provides developers with lot of tools and services to help them to develop high-quality apps, grow their user base, and earn more profit. Firebase Services is used for developpe and to test your app. It is also used for storing information and various data.

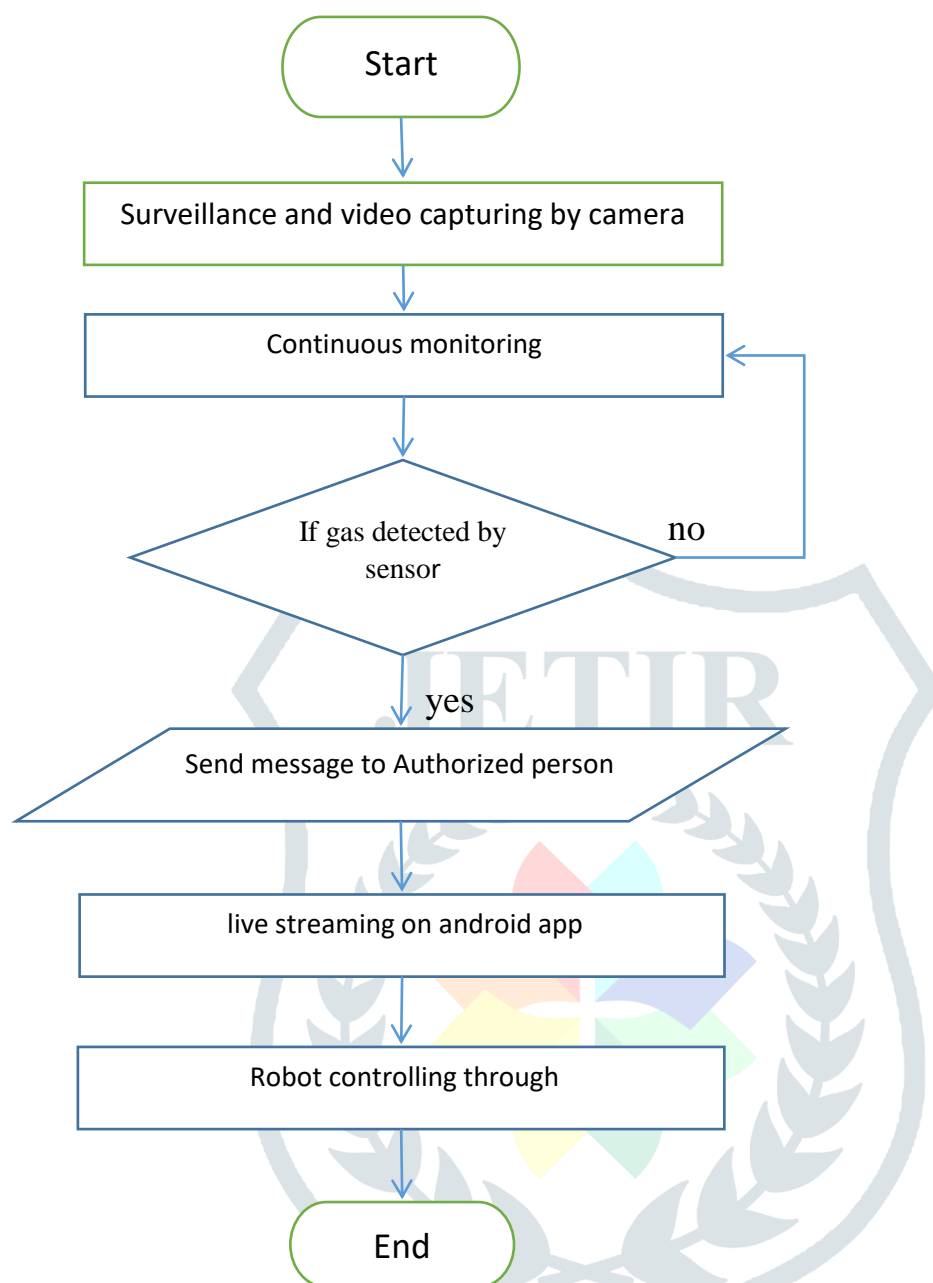
iii.YouTube for live streaming:- When everything is installed on the Raspberry Pi, it is almost ready to launch a live stream to YouTube. Initially it is required to sign up to a YouTube account and enable your account for live streaming.From the YouTube home page, you will need to navigate to the following:

My Channel > Video Manager > Live Streaming.

iii. TWILLO:- Twillo is a Software which is used for sending SMS to the authorized person. It is required to sign up for a Twilio account and purchase a Twilio phone number. If you're brand new to Twillo, you can sign up for a free trial account to get started. Once you've signed up, grab your Account SID and your Auth Token.Tell Twilio which phone number to use to send this message by replacing the from_ number with the Twilio phone number you purchased earlier. Specify authorized phone number as the message recipient by replacing the to_number with authorized person mobile phone number. Both of these parameters must use E.164 formatting (+ and a country code, e.g., +16175551212).It includes the body parameter, which contains the content of the SMS we're going to send.

iv.

VI. Flowchart:-



VII. RESULTS:

The monitoring of home or industry can be carried by live streaming on YouTube and can take action accordingly. By using the Android app, the position of the bot can be controlled which will avoid any damage to the home.

VIII. CONCLUSION:

The proposed system can be used for home surveillance using the bot, which will cover every part of the home and will be able to detect gas leakage. Whenever gas leakage is detected, SMS Gas detected is sent to the registered mobile number. According to the instructions provided by the app on android mobile, authorized person can control the position of the robot. The robot can move in forward, backward, left and right direction. Simultaneously we can go live & can watch live streaming of our home on android app.

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REFERENCE:

- 1] International Journal Of Engineering And Computer Science ISSN: 2319-7242 Volume 4 Is-sue 10 Oct 2015, Page No. 14856-14860 "Implementation of Surveillance robot with the feature of semi automatic recharging capability" T.Amulya, M.Vedachary ,P. Srilaxmi.
- 2] International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4, Issue 11, November 2015 "A Surveillance Robot for Home Security with Docking System" P.Vanitha Sri, S.Sharmila, K.Karthik.
- 3] International Journal of Computer Science and Mobile Computing .A Monthly Journal of Computer Science and Information Technology ISSN 2320{088X IJCSMC, Vol. 2, Issue. 11, November 2013, pg.291 { 296 "A Surveillance Robot with Climbing Capabilities for Home Security" Dipali Chavan, S.A. Annadate.

