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IOT BASED SURVEILLANCE ROBOT

Miss. Sayali Bhise[1], Miss. Priyanka Chavan[2], Mr. Ganesh Jadhav[3], Miss. Shital Rajeshirke[4]

[1-4]B.E Student, Dept. of Electronic and Telecommunication, S.C.O.E.M, Limb, Satara, Maharashtra, India

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Abstract – *This project is to design and build a manually control IOT based surveillance robot. The purpose of the robot is to be able to roam around in a given environment while transmitting back real time data (video) to the ground station over the internet or Wi-Fi. This real time data can then the used by the controller (human) to move the robot around. In this proposed system, the robot is compact and self-contained with wireless transmission of data. This system will help to control/spy on the terrorist attack throughout the world by monitoring and control of robot via the internet through Raspberry Pi board. The monitoring and controlling of robotic movements are done through the wireless network by using a web-based application.*

Key Words: Raspberry Pi, Raspbian OS, Python, Things Board, Gas sensor, PIR sensor, Metal detector, Temp & humidity sensor

1. INTRODUCTION

Robot is a machine which design to do particular task. It is based on program that is software and hardware. Nowadays industry becoming modern and they use automated technology to perform risky jobs. This is helpful to minimize life risk of human and animals. For example security purpose we can use automated security system instead of animal/human to minimize life risk of animals.

For home security, we use camera which is mounted on fixed location such as doors, windows, walls and ceiling also. This robot is control by using PC, android mobile or a laptop via website. The camera captures video and sends it back to controller's device via internet.

According to this paper our system helps to controls the terrorist attack anywhere on earth except water by monitoring and controlling of robot via internet through Raspberry Pi board. The monitoring and controlling of robot is done by wireless network by using a web application.

The camera is mounted on the robot to get better visibility of the objects nearby robot. The programming language we used in this project is python which will be interfaced with Raspberry Pi board. The PIR sensor detects movements of person or an animal enters into a surveillance area. This mobile robot can be operated from anywhere in the world by using cloud computing. In the war field area it is difficult to detect the landmines which are life threat to the soldiers. This system also detects the human presence in the field and sense present situation of the environment. By the video surveillance user can keep an eye on the live field. The system operates remotely by using web server and entire data will be stored on cloud and only the authorized person can access the data whenever there is necessity. The system uses standard protocol MQTT (message queue telemetry transfer) protocol and a machine-human interface.

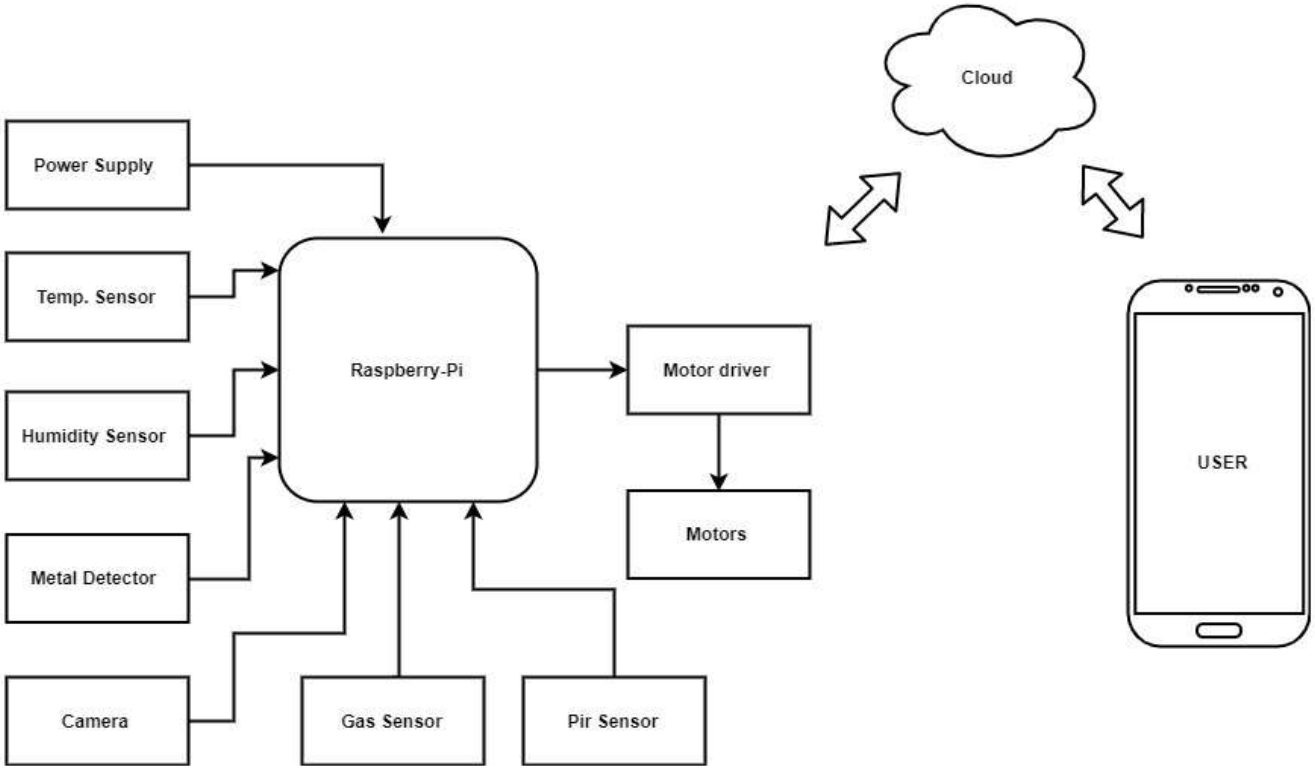
1.1 PROPOSED WORK

Raspberry Pi receives live data collected from different sensors embedded with it and then transfer to Things board dashboard using Wi-Fi. These different sensors are Temperature sensor ,humidity sensor, Metal Detector sensor, Gas Sensor, PIR sensor and camera for live video streaming. The monitoring and controlling of robot is done by wireless network by using a web application Things board. The camera is mounted on the robot to get better visibility of the objects nearby robot. Camera video transmission via internet is done using Duplicity framework. The programming language we used in this project is python which will be interfaced with Raspberry Pi board. The PIR sensor detects movement of a person or an animal enters into a surveillance area. This mobile robot can be operated from anywhere in the world by using online IOT based platform Things board. In the War field area it is difficult to detect the landmines which are life threat to the soldiers, by this system we can detect the landmines by using metal detector sensors and provide a specified path to the soldiers. This system also detects the human presence in the field and senses present situation of the environment.

2. DISCRIPTION OF BLOCK DIAGRAM

The block diagram of IOT Based Surveillance Robot is shown below. The main components of the system Raspberry Pi,, Gas sensor, PIR sensor, Metal detector ,Temp & humidity sensor, Power supply, Camera, Motor, Motor driver, Cloud.

2.1. BLOCK DIAGRAM



The above figure shows that main block diagram of our project. The Raspberry Pi is used as a small-card sized computer capable of performing various functionalities. Gas sensor is useful for leakage detecting (in home and industry).PIR sensor detects human being moving around with in approximately 10m from the sensor PIR. Metal detector aims to disclose an underground metal surface for particular navigation area. It detect only Iron. Humidity and temperature sensor is used to detect differences in temperature present in environment.

2.2 COMPONENT OF SYSTEM

2.2.1 Raspberry Pi

Raspberry pi is a small-card sized computer capable of performing various functionalities such as in surveillance systems, military application, industrial application, home application, etc. The specification of the raspberry pi 3 Model is ARM8-quad core processor 1200 MHz Broadcom BCM2837, HDMI support, 1GB Ram with the support of 4 USB devices, and also micro SD card slot. The memory can further increased to a capacity of about 1GB .The 40 General Input output pins can be used to connect different types connector with expansion boards also can be added. The fully backward compatibility is given to the first 26 identical pins on Model B board.

Features:

1. **SOC**: Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit
2. **CPU**: 1.4GHz 64-bit quad-core ARM Cortex-A53 CPU
3. **RAM**: 1GB LPDDR2 SDRAM
4. **Thermal management**: Yes
5. **Video**: Yes – Video Core IV 3D. Full-size HDMI
6. **Audio**: Yes
7. **USB** 2.0: 4 ports
8. **GPIO**: 40-pin
9. **Power**: 5V/2.5A DC power input
10. **Operating system support**: Linux and Unix

2.1.2 GAS SENSOR (MQ-2)

Gas sensor (MQ2) module is useful for leakage detecting (in home and industry).It can detect H2, LPG, CH4, CO, Alcohol, Smoke, and And Propane Based on its fast response time. Measurements can be taken as soon as possible. Also the sensitivity can be adjusted by the potentiometer.

Features:

1) Operating voltage is +5v.
2) It can be used to measure or detect LPG, Alcohol, Propane, Hydrogen, Co &even methane.
3) High sensitivity & fast response.
4) Wide detecting scope.

2.1.3 PIR SENSOR

PIR sensor detects human being moving around with in approximately 10m from the sensor PIR are fundamentally made of a pyro electric sensor, which can detect levels of infrareds radiation.

Features:

1) Rated voltage:230V AC 50hz
2) Load wattage:max.100w
3) Detection area:max.10 meters radius
4) Detection angle: 100° around.

2.1.4 MOTOR DRIVER IC (L293D)

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. Input logic 00 and 11 will rotate it in clockwise and anticlockwise directions, respectively.

2.1.5 MOTOR

Motors that operates on 12 v DC power supply are used. These are rotary electric machine that converts direct current electric energy into mechanical energy. The motors used are of 30 rpm speed of operation.

Features:

1) Working voltage: 3-12V.
2) No load speed: 200rpm.
3) No load current: 125mA.

2.1.6 METAL DETECTOR

Metal detector aims to disclose an underground metal surface for particular navigation area. It detect only Iron. Metal detectors are useful for finding metal inclusions hidden within objects buried underground.

2.1.7 TEMP. & HUMIDITY SENSOR

Digital humidity and temperature sensor is used to detect differences in temperature present in environment. The data collected by the DHT11 sensor will be sent to the cloud for other purposes.

2.1.8 POWER SUPPLY

Raspberry pi needs a power supply of and 2 amp micro USB type. Raspberry pi require power source to turn it on 5V adapter. Power supply is enough to power up .In cable, no extra cables or power supplies are needed.

2.1.9 Pi Camera

The Raspberry Pi camera board contains a 5 MPixel sensor, and connects via a ribbon cable to the CSI connector on the Raspberry Pi. In Raspbian support can be enabled by the installing or upgrading to the latest version of the OS and then running Raspi-config and selecting the camera option.

3. SOFTWARE REQUIRMENT

3.1 PUTTY

Putty is an SSH and telnet client, developed originally by Simon Tat ham for the Windows platform. Putty is open source software that is available with source code and is developed and supported by a group of volunteers. IP address of Raspberry Pi have to enter and raspberry pi is ready for programming.

3.2 PROTEUS

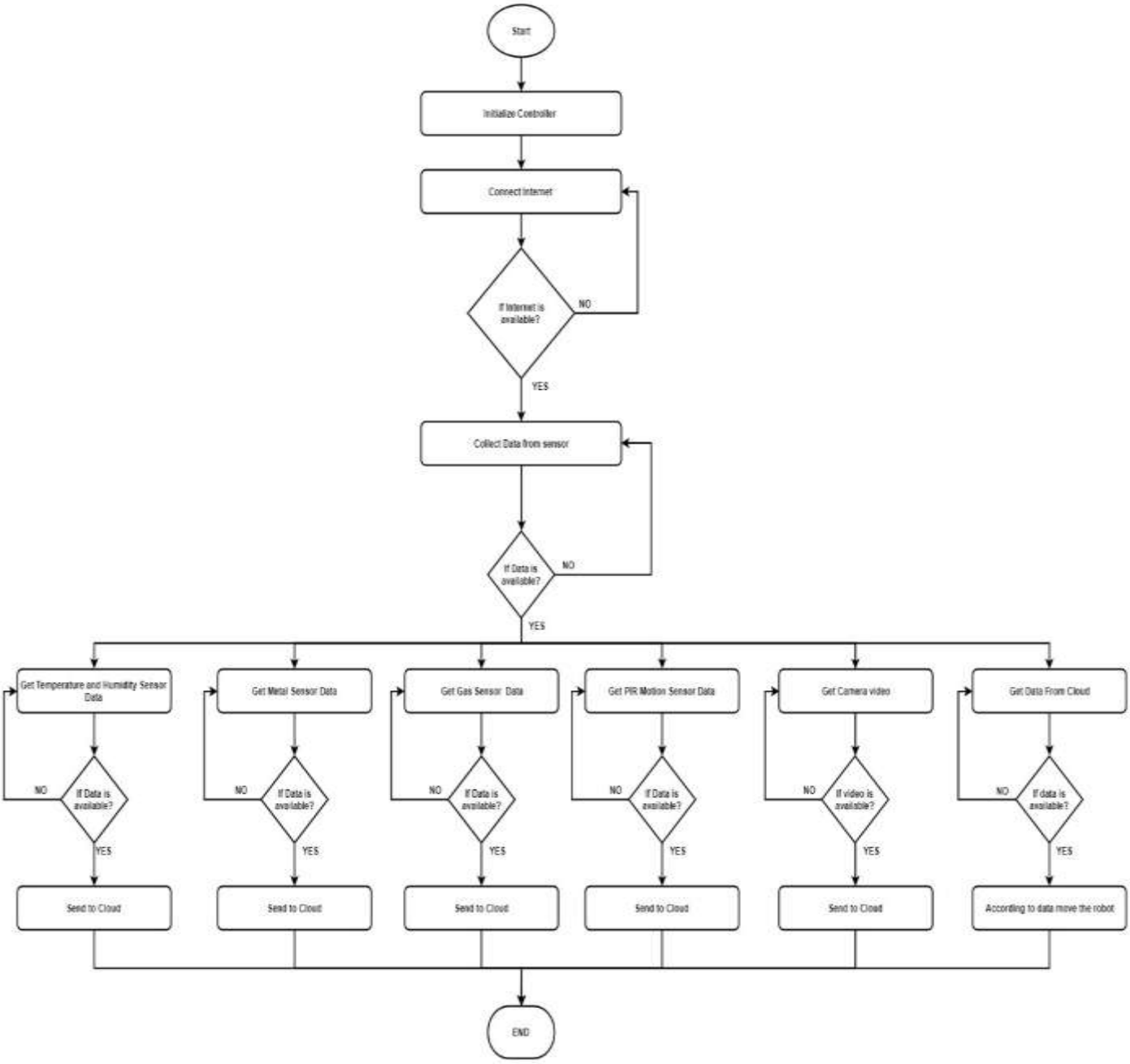
The proteus design suits is a proprietary software tools suit use primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic print for manufacturing circuit board.

3.3 VNC SOTWARE

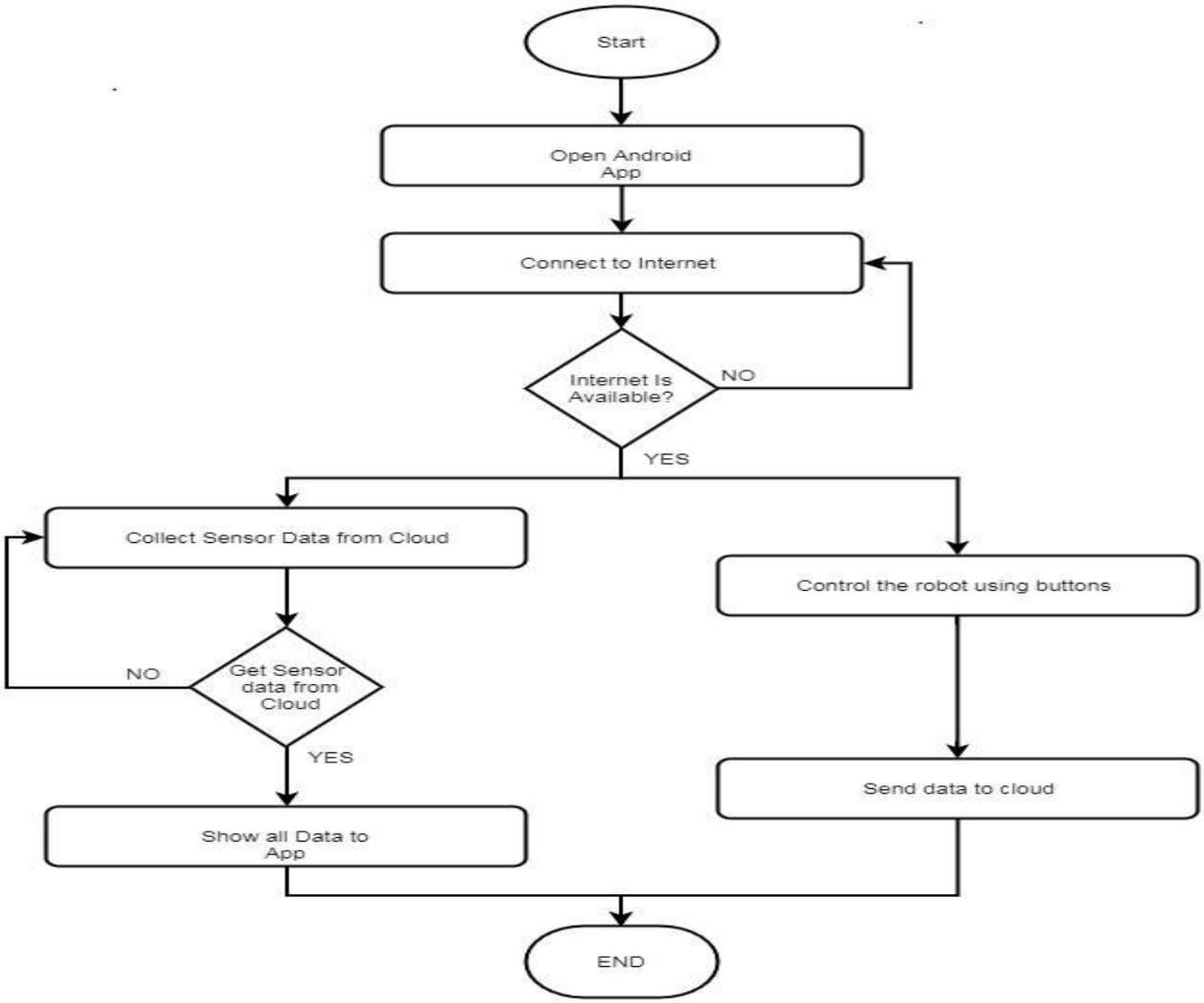
In computing, virtual network computing (VNC) is a graphical desktop-sharing system that uses the remote frame buffer protocol (RFB) to remotely control another computer. It transmits the keyboard and mouse events from one computer to another, relaying the graphical-screen updates back in other direction, over a network.

4. FLOW-CHART

4.1 FOR ROBOT



4.2 FOR USER



5. ADVANTAGES

1. Wi-Fi based wireless broadband services could be used for public surveillance systems.

2. Wireless surveillance cameras can be useful in situations where it is difficult to lay cables – Museums, Heritage Buildings, Industrial plants, etc.

3. Wireless surveillance system is cost effective (when compared to wired networks involving Fiber Cables, Trenching, etc.) to install and maintain.

4. Wireless Networks can be deployed quickly and wireless surveillance can be used for providing temporary Wi-Fi to fairs/ exhibitions, etc.

5. Wireless Point-to-Point back-haul networks could extend the network to more than 5 KM over the wireless medium, if required.

6. FUTUER-SCOPE

We can use this system for military applications installing suitable sensors. Just by changing the robotic unit design we can use it in hospitals for patient monitoring. Using some chemical sensors we can detect harmful gas leakage in the chamber the time delay which occurs in the execution of commands can be reduced and thus we can have more real time access to the robot. With reduced time delay we can have faster operation and quick response to any illegal activities in the monitored area. Also it can be used as a spy robot. The robot is very economical.

7. CONCLUSION

In this project, we implement surveillance robot for military application with the help of this robot we know real time condition of border area without using human sources. The surveillance robot gives us live video streaming according to that we give the command.

8. REFERENCES

1] R. Karthikeyan, S. Karthik, Prasanna Vishal, S. Vignesh || snitch design and development of a mobile robot for surveillance and reconnaissance||

IEEE Sponsored 2nd International Conference on Innovations in Information Embedded and Communication Systems ICIIECS'2015.

[2] Kun Wang, Zhiqiang Wang and Houxiang Zhang, —Development of modular wall-climbing robot inspired by natural caterpillar|| IEEE 2nd

International Conference on Computing, Control and Industrial Engineering (CCIE), 2011.

[3] Tushar Maheshwari, Upendra Kumar, Chaitanya Nagpur, Chandrakant Ojha and V. K. Mitta. Capturing the spied image-video data using a flexi

Controlled spy-robot|| third international conference on image information processing, 2015.

[4] Rui Chen, Rong Liu, Jifan Chen and Jin Zhang.

[5] Dr. M. Meenakshi: —vision based autonomous robotic system|| Signal and Image Processing (ICSIP), 2014 Fifth International Conference on 8-

10 Jan. 2014 Date Added to IEEE Explore**:** 31 March 2014