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Rover Sieth

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Abstract- The main objective behind this paper is to develop a robot to perform the act of surveillance in domestic areas. Nowadays robot plays a vital role in our day to day life activities thus reducing human labor and human error. Robots can be manually controlled or can be automatic based on the requirement. The purpose of this robot is to roam around and provide audio and video information from the given environment and to send that obtained information to the user. In this project, one can control the robot with the help of mobile or laptop through Internet of Things and also can get the live streaming of video both in daytime as well as at night with the help of wireless camera from the robot. The robot can be controlled both in manual as well as in automated mode with the help of Arduino microcontroller. This robot also uses various sensors that collects data and sends it to the Arduino microcontroller which controls the robot .Thus the action of surveillance can be performed. Further advancement in our project can provide surveillance even in defense areas.

Keywords- Arduino, Surveillance, ESP8266 12e, CAYENNE Software.

I. INTRODUCTION

Technology has brought a dynamic and tremendous change in robotics and automation field which ranges in all kinds of areas. Surveillance is the process of close systematic observation or supervision maintained over a person, group, etc. especially one in custody or under suspicion. Thus surveillance is mainly required in the areas such as border areas, public places, offices and in industries. It is mainly used for monitoring activities.

The act of surveillance can be performed both indoor as well as in outdoor areas by humans or with the help of embedded systems such as robots and other automation devices. A robot is nothing but an automatic electronic machine that is capable of performing programmed activities thus replacing human work, providing highly accurate results and easily overcoming the limitations of human beings. Thus replacing humans in the surveillance fields is one of the great advancement in robotics.

The robot consists of Arduino Uno microcontroller which acts as the heart piece of the robot. This robot also consists of DC motors, wheel chassis, battery, Wi-Fi module (ESP8266 12e) and camera.

The robot can be either operated manually. User end communicates with the robot by implementing the concept of Internet Of Things. This can be achieved through software, which is used for IOT developing projects. The commands are sent to the robot by means of software and they are received by Arduino microcontroller via Wi-Fi module since both are interfaced with each other.

Thus the robot can be controlled in a wireless manner. In this project, we use wireless transmitting camera that provides audio and video information that can be received at the user end.

II. LITERATURE SURVEY

The main objective of [1] behind this paper is to develop a robot to perform the act of surveillance in domestic areas. Nowadays robot plays a vital role in our day to day life activities thus reducing human labor and human error. Robots can be manually controlled or can be automatic based on the requirement. The purpose of this robot is to roam around and provide audio and video information from the given environment and to send that obtained information to the user. In this project, one can control the robot with the help of mobile or laptop through Internet of Things (IoT) and also can get the live streaming of video both in daytime as well as at night with the help of wireless camera from the robot

The project [2] is designed to develop a robotic vehicle using Arduino for remote operation for monitoring purpose. The robot can transmit real time information with the help of Arduino board connected to computer or any smart device.

In this project [3] a cost-effective four-wheeled surveillance robot is proposed using an Arduino UNO microcontroller and a smartphone running the Android Operating System. Surveillance robots typically consist of a video camera, a GPS module, and GSM radios. The robot can be controlled remotely from a PC using the internet and a microcontroller-smart phone interface residing on the robot. To capture and archive the real time

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video from the robot, the inbuilt camera input of the phone is utilized. The robot can be controlled based on visual feedback from the same smart phone.

This paper [4] explains about the working, plan and implementation of IoT and wireless Sensor based surveillance robot using Arduino uno controlled by hand gesture. The main motto of the gesture recognition to reduce the human obot to enhance and showcase their skills. The hand motion or gesture was recognized by using gyroscope accelerometer.

There are so many ways and algorithms are there and implemented to recognize the hand gesture. Here we are dividing the robot into two circuits, transmitter and receiver. The Transmitter circuit contains Gyroscope and Accelerometer (MPU6050), Arduino UNO, Transceiver (NRF24L01). The Receiver circuit contains Motor Driver (L298D), Transceiver (NRF24L01), BLET (Bluetooth low energy tags), Arduino UNO. The motto of the project was according to the hand motions the robot must react. Hand motion detected by the gyroscope accelerometer.

The main objective of this paper [5] is to propose an Internet-of- Things-based Internet of Robot, i.e., InterBot 1.0. InterBot 1.0 is efficient in terms of real-time environmental monitoring in terms of temperature, humidity, and gas sensing and is equipped with long-range communication system via 2.4 GHz 6-channel remote and also short range via HC-05 (Bluetoothmodule). InterBot 1.0 is IoT-based via ESP8266, and all the data can be viewed in live graphs via ThingSpeak.com. The Results state the efficiency of Interbot 1.0 in monitoring real-time environments.

The World Is Full Of Surveillance, Which Was monitored by enemy countries. Especially, the border region of any country was controlled and monitored by the own country for their safety purpose, for that many technology was used to monitor the region. Earlier, the surveillance was done by human, which causes many deaths by enemy country. To overcome the problem, the technology was introduced for surveillance with the help of robot. But now, the technology was upgraded, which made us to make a new robot for surveillance, bomb detector with automated gun. In this project, this was controlled using arduino with Wi-Fi module. The camera was fixed and captures the video and monitored through it. The robot can move ups and downs of any place for surveillance with the help of motors.

A robot is an integration of mechanics, electronics and software. Robots are essentially a self-contained tribute to the wonders of technology. Robots if well designed in architecture and programmed with concepts of artificial intelligence can ease the human work. There are many different reasons for using a robot. Use of robots reduces labor and cost by automating recurring tasks.

Human intervention is avoided hence less chances of errors and better accuracy can be expected. And most importantly the areas where human life can have risk, danger; at such places robots can navigate dangerous places and potentially save lives. The most advanced robotic models use fast computer processing, high-definition cameras, artificial intelligence and long-range sensors. They are used for surveillance.

Our project is all about developing a wireless surveillance robotic vehicle which can navigate through obstacles with the help of sensors, embedded system and its programming. It will be able to capture the footage or pictures of area with its camera eye and send them back using wireless transmission technology such as Bluetooth.

KEY WORDS: Android, Robot, Bluetooth, Robotic control, Wi-Fi, Surveillance, Artificial Intelligence, Arduino

III. PROPOSED SYSTEM

By interfacing Wi-Fi module with Arduino, we can get unlimited range of operation shown in fig (1). Robots can be operated in both manual modes.By using Arduino microcontroller, the cost and complexity can be reduced.The communication with the robot occurs in a more secured manner.

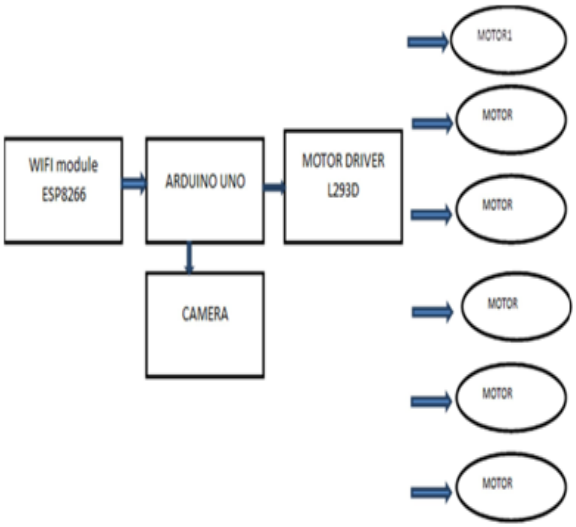

Fig 1. Block diagram of rover sieth.

At the robot end, we are using an Arduino microcontroller placed on the body or the chassis of the robot, which is the integral part of the robotic vehicle. Below the chassis, the wheels are connected with DC motors that are of 30 rpm each. Each motor requires 9v supply, supplied by means of an external battery source. The motors are interfaced with the Arduino through relay driver. relay drivers are employed for two motors and they are used for amplification purpose.

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The microcontroller is coded with IDE software in order to operate the robot in appropriate directions. This is the manual mode operation associated with it. Several sensors such as ultrasonic sensor, infrared sensor are also used which are interfaced with the microcontroller in the respective I/O pins.

Ultrasonic sensor operates by reflection principle, that is by transmission and reception of signals obstacles are detected. In short, it follows the principle of bats termed as echo location. Similarly, Infrared sensors are used to emit and detect infrared radiations, so that the surrounding temperature changes can be detected.

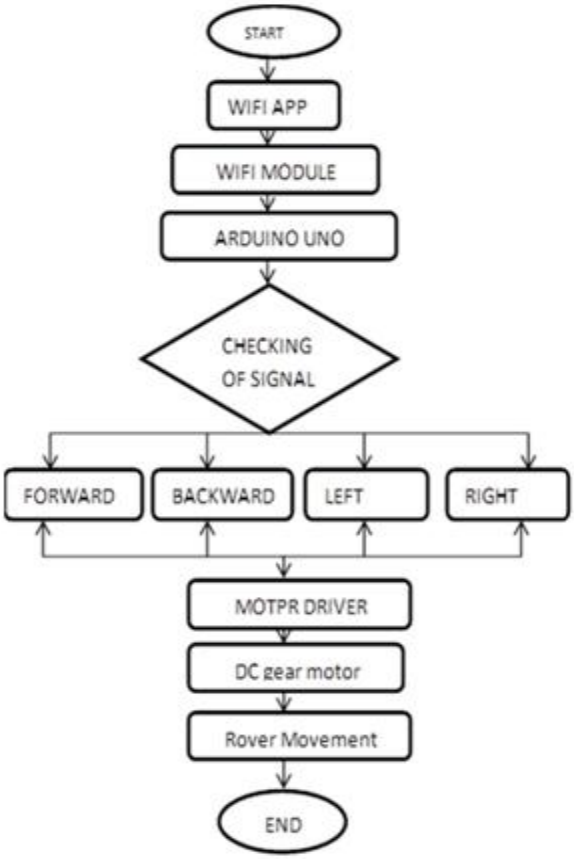

Fig 2. Flow chart of rover sieth.

The system consists of two major sections - one is the user section and other is the robot section. In that the user section can possess laptop or mobile for communicating with the robot end. Thus by using a laptop or a mobile the user section can be a portable one compared to those that uses a typical stationary computer system.

The communication can be performed with RF technology or by using a Zigbee device or by using a Bluetooth technology, but that comes at the cost of limited range.Thus in order to implement the idea of increasing the range we can go connecting the user section with the WI-FI which is the main concept of Internet of Things.

1. Hardware Used:

This surveillance robot requires a lot of essential hardware components for proper functioning. Due to advancement in technology, these surveillance robots are used in remote as well as domestic areas.

The main components used in our project and their specifications and functions are as follows,

1.1 Arduino Microcontroller: Arduino microcontroller is based on UNO AtMega328. It is used to receive commands sent by the user via the internet and processes according to the code and also used to control the motors. Wi-Fi module ESP8266 is also connected with the arduino so that Wi-Fi facility can be provided to the robot.

1.2 DC Motors: Motors that operate on 12V DC power supply are used. These are rotary electrical machine that converts direct current electrical energy into mechanical energy. The motors used are of 30 rpm speed of operation.

1.3 Lead Acid Battery: Two 6V batteries are connected in series to provide a 12V power supply for the motors. From these batteries power supply is also given to the arduino and other parts that require power supply for their effective performance.

1.4 Wi-Fi Module: The ESP8266 12e module which is low cost, self- contained chip consists of TCP/IP protocol stack that is used to provide network access to any microcontroller. It is highly compact in size and is easily a portable one and thus this is interfaced with the arduino to provide the robot with Wi-Fi facility.

1.5 Camera: A camera is an optical instrument that captures a visual image. At a basic level, cameras are sealed boxes (the camera body) with a small hole (the aperture) that\ allows light through to capture an image on a light-sensitive surface (usually photographic film or a digital sensor). Cameras have various mechanisms to control how the light falls onto the light-sensitive surface. Lenses focus the light entering the camera, and the size of the aperture can be widened or narrowed. A shutter mechanism determines the amount of time the photosensitive surface is exposed to light.

2. Software Used Software:

It is an object relational mapping (ORM) framework. It allows a programmer to work with objects abstracted from databases. It is used to design prototypes and IOT based applications as it is a drag and drop project builder thus allowing devices to get easily connected to the internet. Through this software we can easily control the robot with the help of the buttons present in the software. Both manual and automatic mode can be performed with this software

2.1 Arduino Software (IDE): It is open source software that is used to write codes and upload it to the Arduino

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board. The Arduino IDE contains a text editor for writing codes, a message area, a text console, a series of menus along with toolbar with buttons. The programming codes are known as sketch. The sketches are saved with the file extension. It runs on Windows, MAC and LINUX. Thus through this software we can code for the robotic movements and also for the sensors interfaced with the arduino board

IV. CONCLUSION

In this paper, the framework for making a robot for surveillance purpose is proposed. It overcomes the problem of limited range surveillance by using the concept of IOT. We can control the robot with the help of laptop/mobile manually. Automatic monitoring can also be done. Our proposed robot is small in size thus maneuvering into area where human access is impossible.

Wireless technology is one of the most integral technologies in the electronics field. This technology is used to serve our project as a supreme part of surveillance act. This provides highly efficient and a cost effective robot that replaces human work and reduces human labor and performing monitoring works in a well effective manner.

V. ACKNOWLEDGMENT

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