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IOT BASED HOME SURVEILLANCE ROBOT USING ARDUINO

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ABSTRACT:

This robot's job is to explore the area and give audio and video information from the The primary goal of this article is to create a robot that can do domestic surveillance. Robots now play a significant part in our daily lives, eliminating the need for human labour and error. Depending on the situation, robots can be operated manually or automatically.

to gather information in a certain environment and communicate it to the user. In this idea, the robot can be controlled via a smartphone or laptop thanks to the Internet of Things (IoT), and a wireless camera on the robot can also be used to feed live video during the day and at night.

The robot may be operated manually or automatically thanks to the Node MCU microcontroller. Additionally, this robot makes use of a number of sensors to gather data and transmit it to the Node MCU microcontroller, which regulates the robot's activity. along with the live-streamed video output that was obtained. As a result, surveillance can be carried out. Our project will evolve to the point where surveillance is possible even in defense-related domains.

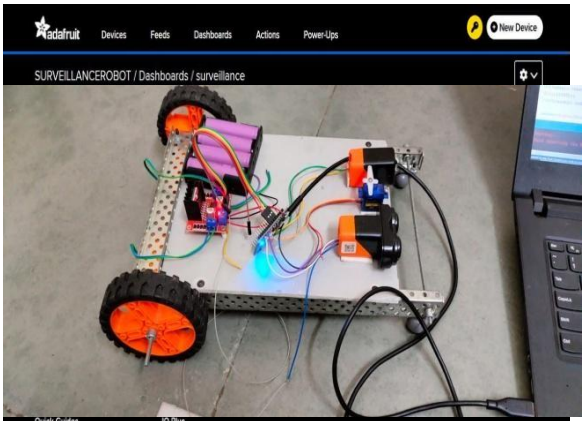
INTRODUCTION:

The field of robotics and automation, which covers a wide range of fields, has undergone a dynamic and significant transformation as a result of technology. The act of closely monitoring a person, group, etc., especially one who is in custody or is the subject of suspicion, is known as surveillance. Therefore, surveillance is primarily needed in places like border regions, public spaces, offices, and industries. It is mostly employed for activity monitoring. Both humans and embedded systems, including robots and other automation equipment, are capable of carrying out the surveillance act in both indoor and outdoor settings. A robot is just an automatic electronic device that can carry out preprogrammed tasks, taking the place of humans in the workplace and readily producing extremely accurate results. The Node MCU microcontroller, which serves as the robot's brain, is what makes the machine up. In addition, this robot features DC motors, wheel chassis, a battery, a Wi-Fi module (ESP8266 12e), and a number of sensors, including an ultrasonic sensor for determining how far away an obstacle is, an IR sensor for detecting pits, and a stop sensor. The robot can be controlled manually or automatically. Through the application of the Internet of Things idea, the user end communicates with the robot. Adafruit IO software, which is used for IOT project development, can help with this.

The Adafruit IO programme is used to send the commands to the robot, and the Node MCU microcontroller, with which it is interfaced, receives them via a Wi-Fi module. As a result,

wireless control of the robot is possible.

In this project, we make use of a wireless transmitting camera that sendsvisual data that the user can access.



EXISTING SYSTEM

1. As they are based on RF Technology, Zigbee, and Bluetooth, the already-existing systems use robots with a constrained communication range.
2. A short-range wireless camera isused in several current projects.
3. A few current robots can only beoperated manually, necessitatinghuman supervision throughout the duration of the monitoring process.

PROPOSED

1. By interfacing Wi-Fi module with Arduino, we can get unlimited range of operation.

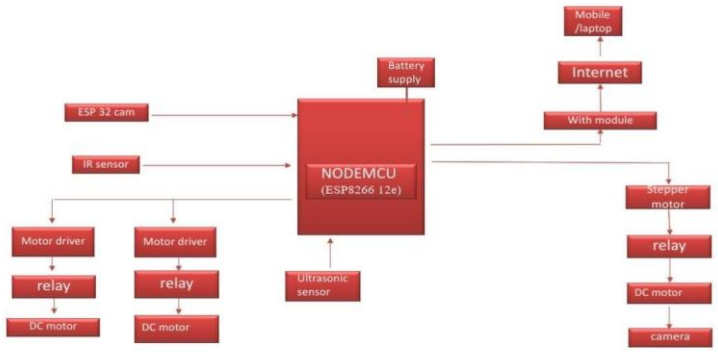
2. Robots can be controlled manually or automatically.
3. The price and complexity can be decreased by using an Arduino microcontroller.
4. Cost and complexity can be minimised by utilising an Arduino microcontroller.

SYSTEM DESIGN

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. Therefore, to implement the idea of increasing the range, we can go connecting the user section with the internet, which is the main concept of the Internet of Things. For connecting the user system with the internet, the Adafruit IO software is used, which is nothing more than an object relational mapping (ORM) that is used to design prototypes and develop IOT applications. Thus, through this Adafruit IO software, we can send commands and can easily control the robotic vehicle
An Node MCU microcontroller, an essential component of the robotic vehicle, is used at the robot end. It is mounted on the robot's body or chassis. DC motors with 30 rpm each link the wheels to the chassis underneath. Each motor needs a 12 volt supply, which can be provided by an external battery

source. Relay drivers are used to connectthe motors to the Arduino. For the purpose of amplification, two motors are driven by four relay drivers. To steer therobot in the right directions, the microcontroller is programmed using IDE software. This is the corresponding manual mode operation. Numerous sensors, including infrared and ultrasonic ones, are also employed, and they connect to the microcontroller via the appropriate I/O ports. Ultrasonic sensors work on the reflection principle, which involves sending and receiving signals to identify obstructions. It essentially uses the echolocation method used by bats. Similar to this, infrared sensors are employed to both emit and detect infrared radiations in order to monitor changes in the ambient temperature.

HARDWARE BLOCK DIAGRAM



HARDWARE USED

For optimal operation, this surveillance robot needs a lot of crucial hardware parts. These surveillance robots are usedin residential and remote places due to technological advancements. The following are the primary components used in our project, their specifications, and their functions:

1. NODE MCU

A low-cost System-on-a-Chip (SoC) called the ESP8266 serves as the foundation of the open-source Node MCU (Node Micro Controller Unit).

The Espressif Systems-designed and -produced ESP8266 has all of the essential components of a computer, including CPU, RAM, networking (WiFi), and even a contemporary operating system and SDK. This makes it a fantastic option for all types of Internet of Things (IoT) projects.

2. DC MOTORS

The use of motors requires a 12V DC power supply. These rotary electrical machines transform electrical energy from direct current into mechanical energy. The motors in use operate at a speed of 30 rpm.

3. ULTRASONIC SENSOR

An ultrasonic sensor is a device that uses sound waves of a specific frequency to calculate the distance to an object (obstacle). It has a range of 3 cm to 3 m. It functions in all kinds of lighting. As a result, the robot simply avoids any obstructions in its path.

4. INFRARED SENSOR

By radiating infrared light, an infrared sensor is used to sense and analyse the characteristics of the environment. This sensor can generate infrared radiation, and it can also detect that radiation when it is reflected off of something or the environment. The operating voltage is roughly 3 to 5 volts, and the range is between 2 cm and 30 cm. The robot is equipped with this infrared sensor to look for edges in its route.

5. LED ACID BATTERY

A series connection of two 6V batteries creates a 12V power source for the motors. The arduino and other components that require power supply for effective operation are also supplied power supply from these batteries.

SOFTWARE USED

Adafruit IO software

Adafruit IO is a platform

created to show, react to, and interactwith the data from your project. Additionally, we safeguard and keep your data confidential (data feeds are private by default). Everyone can use theinternet of things! Showcase your statistics online in real-time.

• Connect your project to the internet toread sensor data, control motors, and more!

• Connect your project to other internet- capable devices. • Connect your project to web services like Twitter, RSS feeds, weather services, etc.

• What's best? With Adafruit IO, all ofthe aforementioned tasks are free.

CONCLUSION

The framework for building a robot for surveillance purposes is suggested in this study. By utilising the idea of IOT, the issue of limited range monitoring is resolved. We can manually control the robot with the aid of a laptop or mobile device. Additionally, automatic monitoring is possible. Our suggested robot can fit into spaces that are impossible for humans to access becauseof its small size.

One of the most important technologiesin the realm of electronics is wireless technology. This technology is employed as a key component of our

project's surveillance strategy. This delivers a highly effective and economical robot that substitutes human activity, eliminates the need for human labour, and efficiently performs monitoring tasks.

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