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Wi-Fi Controlled Wheeled Robot

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ABSTRACT: They're looking to suggest a surveillance robot that utilizes the camera to secure any layout. The robotic vehicle moves at various times and the robot is equipped with a camera to broadcast the live video of the robot in motion. A robot is a machine basically programmable by a computer capable of automatically executing a complex set of actions. A robot can be guided by an external monitoring device, or the monitoring can be integrated inside. Robots can be built to evoke a human form, but most robots are high-performance machines, engineered with an emphasis on functional rather than expressive asthmatics. The main purpose of this robot is to provide a streaming the live video and audio information from the given area and it can be sent that obtained information to the user. One of the main aspects of this project is that the robot can be controlled using a mobile or portable computer. The robot that uses different sensors to gather all the data and sends them to the Arduino microcontroller robot that controls the robot's behavior. The main purpose of this robot is to provide a streaming the live video and audio information from the given area and it can be sent that obtained information to the user. One of the major thing in this project is, the robot can be controlled with the help of mobile or laptop. The robot which uses various sensors to collect all the data and sends it to the robotarduino microcontroller which it controls the behavior of robot.

KEYWORDS: Arduino, Surveillance, ESP32 board, IoT.

I.INTRODUCTION

Freestanding security robots are new visionary in modernization in advanced security and surveillance technology. Surveillance is a closed-circuit television system used to maintain close observation of a person or group. The surveillance is highly needed in the fields such as border areas, public places, offices and in the field of industries. It can be mainly used to watching activities. Now-a-days there is an immergence of smart security systems with quick sensors, embedded systems, autonomous control mechanism and mobile application. The 1st surveillance robot was invented by Evertt, H. & Gage, D. W, 1999 in MDARS("Mobile Detection Assessment & Response System"). An advanced patrolling robot can acts as a security patroller in a security system. Recently, security robots are being marketed commercially. Wide number of research and implementation of security robots are available now-a-days. Thus technology can be used in reducing the affordability of security robots. The robot consists: Arduino Uno microcontroller which acts as a heart piece of robot, DC motors, wheel chassis, battery, Wi-fi module(ESP32) and other types of sensors can be used such as ultrasonic sensor for detecting obstacles, IR sensors for detecting pits. As the incidents of theft grew more frequent, the applications of security systems are more popular than ever to applications of security systems are more popular than ever to prevent the damages caused by theft whether at home or elsewhere. The traditional security system gives some protection to the situation but still has some dead zone that cannot be monitored. Therefore, they proposes mobile security monitoring system to improve the security of traditional one. The comparison diagram between the proposed and traditional security system

1.1.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. Thus in order to implement the idea of increasing the range we can go connecting the user section with the internet which is the main concept of Internet of Things. For connecting the user system with the internet, the CAYENNE software is used. CAYENNE software is nothing but an object relational mapping (ORM) which is used to design prototypes and develop IOT applications. Thus through this CAYENNE software, we can send commands and can easily control the robotic vehicle.

At the robot end, they are using an Arduino micro controller 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 12V supply, supplied by means of an external battery source. The motors are interfaced with the Arduino through relay driver. Four relay drivers are employed for two motors and they are used for amplification purpose. The micro controller 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 in fared radiations, so that the surrounding temperature changes can be detected.

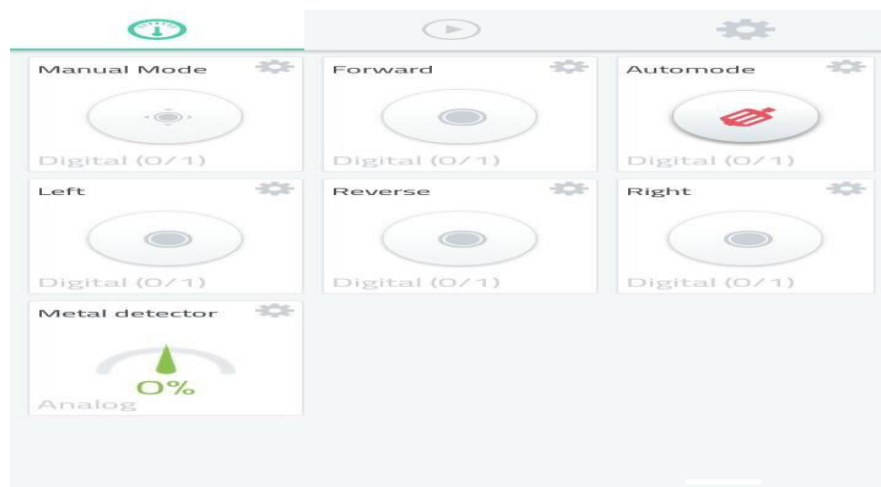
LITERATURE SURVEY

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II. SOFTWARE USED

2.1. Blynk software:

To control the robot from remote place we are using blynk app, its available in the play store, we need to download it and configure the dash board using widgets, while configuring one must properly give Digital and virtual pin details as they are referred in the code for executing routines in accordance to events activated by the user.



2.2. Arduino software

It is open source software that is used to write codes and upload it to the Arduino board. The Arduino IDE contains a text editor for writing codes, a message area, a text console, a series of menus along with a toolbar with buttons. The programming codes are known as sketches. The sketches are saved with the file extension .ino. It runs on Windows, MAC and LINUX. Thus through this software we can code for the robotic movement and so for the

sensors interfaced with the arduino board.

III.HARDWARE USED

They investigate that the surveillance robot requires a lot of essential hard ware components for proper functioning. Due to advancement in technology, these surveillance robots are used in remote as well as domestic areas. Then a in components used in our project and their specifications and functions are as follows,

1. ARDUINO MICRO CONTROLLER:

Arduino micro controller 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.



Fig1 :Arduino IDE

2. BO MOTORS

These are the DC motors with 100 RPM, these helps to move the ROBOT model in the required directions. They can operate at voltage ranging from 3.3 to 9v;



Fig 2: Bo motors

3. BO Motor Wheels

These are fixed to BO motors, as motor rotates it keeps wheels moving, motor and wheels are attached to wood chassis of the model, wheels and motor together responsible for the movement of the whole system.



Fig 3:BO motor wheels

4.Driver circuit

Driver circuit being used in the project, this circuit helps to control the direction of motors, it receives control signals from esp32 board, esp32 board receives commands or instructions from blynk app. It has pins to receive input from battery and control unit and output pins to which motors are connected.

Features:

1. Vccpin
2. Gndpin
3. A1pin
4. A2pin
5. B1pin
6. B2pin



Fig4:Driver circuit

5.External battery



Fig 5:external battery

It is used to supply energy to BO motors to keep them moving. It is also used as source of energy to turn on sub mercible motor to dispense sanitizer. It has 9v capacity.

6. ESP32 MICROCONTROLLER



FIG 6.1:ESP32 MICROCONTROLLER

ESP32 is one of the microcontroller 802.11b/g/n integrated with 802.11b/g/n Wi-Fi and dual mode Bluetooth its means it supports both Bluetooth 4.0 (BLE) and Bluetooth Classic (BT). It is a low-cost, low-power system so it has more advantages to implement the projects. ESP Ressif Systems and Shanghai-based Chinese company created/invented and developed this ESP32 microcontroller and it is manufactured by TSMC with the help of their

40 nm process. Sometimes it connects the network of its own. It provides power supply is of about 5V through USB. The ESP32 is good option for peer-to-peer connection without the need of an access point supports wi-fi Direct as well.

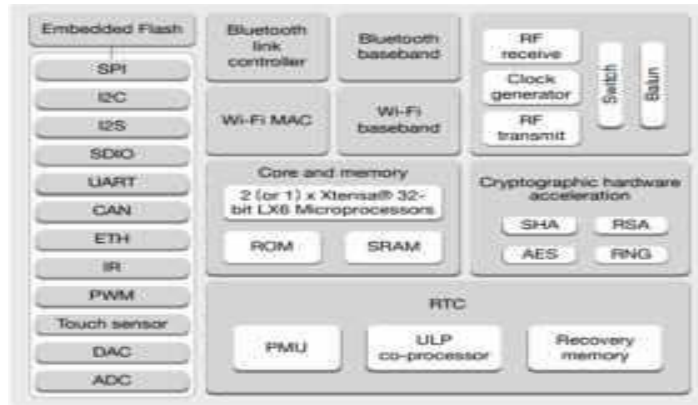


Fig7 :Block diagram of ESP32

7.WI-FI module:

The ESP8266 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-Facility.

4.1 EXISTING SYSTEM

- Already existing systems use robots that have limited range of communication as they are based on RF Technology,Zigbee and Bluetooth.
- Some existing projects use short range wireless camera.
- Some existing robot scan only be controlled with a manual mode which needs human supervision through out the whole surveillance process.

Limitations of existingsystem

- Does not support long distance
- IR sensors may malfunction when exposed broad daylight
- Extra hardware is required to support Bluetooth

4.2.Feasibility study:

Feasibility study main goal is analyzing the entire feasible test for economical and operational and function feasibility so that the proposed project cost will be not much expensive.

Feasibility study is a decision making of project documentation where it will provide idea to perform the task by using this feasibility report. It also provides the economical and all the technical cost and resources we needed to perform our task.

The feasibility study as follows

- Technical Feasibility
 - Operation Feasibility
- Economic Feasibility and Technical Feasibility

The technology and platform is IoT based, it makes use of iot Architecture to implement

Data storage:

To store information the iot platform such as Blynk is used, all information is stored in the cloud.

Server

Dedicated blynk server is used to establish communication among users and deployed system

Messaging, notification is sent using widget called notification of the blynk app.

They investigate C programming language to communicate with the hardware as it finds handy for this task. The language has following characteristics

- High-level language
- Structured
- Modular approach

- Best suited for communication with hardware.

In C each program includes one more functions' hence it is called procedural programming language. A function can be defined with the following syntax.

The type of value being returned by the function, function name can be any valid identifier. Body of the function includes one or more statements.

All whole numbers irrespective of sign are known as integers, fractional numbers irrespective of sign with 6 digits decimal points are known as floats, fractional numbers irrespective of sign with 16 digits decimal points are known as double.

V. BLOCK DIAGRAM

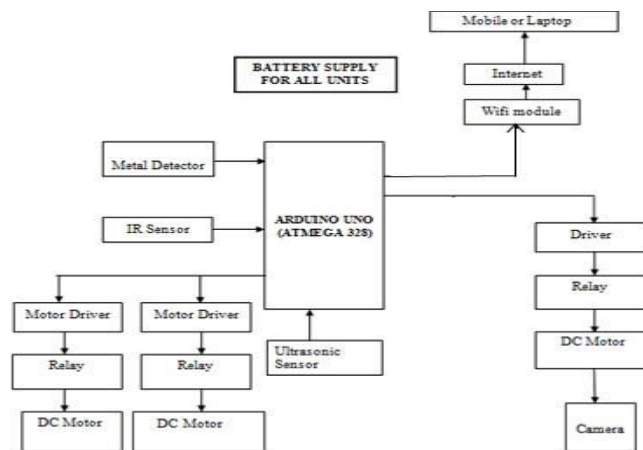


Fig 8:Block diagram

APPLICATIONS:

Following are the main applications of the solar powered multi functional robot:

1. By combining camera features with the robot we can easily monitor indoor as well as outdoor locations during day time and at night.
2. Remote are as can also be explored.
2. Used to record and send video output of the required environment.
- 6.Results



Fig 9:Wi-Fi controlled Robot

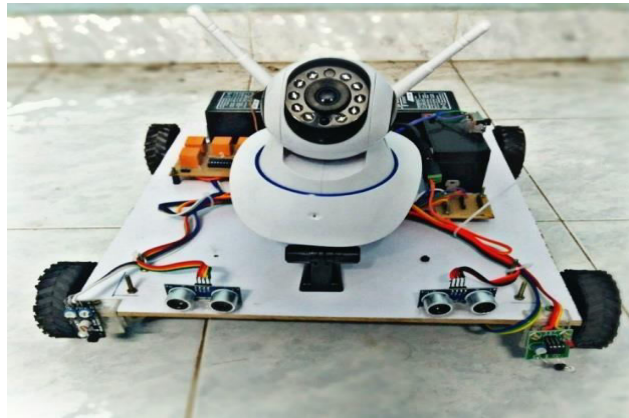


Fig 9: prototype of proposed model

- Robots can be operated in both manual and automatic modes. By using Arduino micro controller ,the cost and complexity can be reduced.The communication with the robot occurs in a more secured manner

VI. CONCLUSION

They made the frame for manufacturing a robot for surveillance purposes is proposed. It overcomes the problem of limited scope monitoring using the concept of IOT. We can operate the robot with a portable/mobile computer manually. Automatic monitoring can also be done. The robot we are proposing is small and there fore moves zone where human access is impossible.

The self-propelled vehicle can charge automatically in low battery conditions.By interfacing the Wi-Fi module with Arduino, we can achieve limitless autonomy.Robots can be operated in both manual and automatic .

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