IoT SURVEILLANCE CAR

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Abstract - This project presents you a modern approach of surveillance at remote areas and at the places where there's military activities using surveillance bot that can be helpful in defence and military applications. This bot is a Bluetooth control device which has a IoT camera using ESP CAM 32.

**Key Words:** Bluetooth technology, microcontroller, Arduino, ESP32

1.INTRODUCTION

There are various changes in the field of technology and which ranges in all the areas. A robot is an electronic device which has the potential to perform various tasks without taking help of a person. There are many activities which humans cannot perform so here's come the bot which performs with a greater accuracy. This bot has various sensors which collects data and transfer it to Arduino microcontroller which controls the behavior of the bot. And there's an ESP 32 camera which show us the work. By this way, the action of surveillance can be performed. It works via Bluetooth, command is sent to the receiver by App logic Command and it is then proceeded further to the Arduino Uno, it checks whether command is received or not and if the command is received then it does the further work which is that it controls the movement of the bot which goes forward, backward, left and right.

2. METHODOLOGY

In this part we will discuss about hardware specification and software specification.

1.Arduino: Arduino UNO ATmega328p is being used which is 8bit AVR family Microcontroller. It has 14 analog pins (0-13). out of which pin 6 provides PWM output. It has 6 digital pins (A0-A5). Serial Pin 0(Rx) 1(Tx) are used to transmit and receive TTL data. It has a ceramic resonator of 16 Mhz frequency. Arduino UNO runs on 5V regulated supply voltage. Using onboard voltage regulator it can generate voltage of 3.3V. It draws maximum current of 5mA. The DC current on 3.3V pin is 50mA whereas the DC current on Input output pin is 40mA. It has a flash memory of 32kb out of which 0.5 is used as boot loader. It has 2kb SRAM and 1kb EEPROM.

Arduino UNO is used to communicate with computers and other Microcontroller boards. Arduino UNO Software includes Serial Monitor which allows simple textual data to be sent to and from the Arduino Board. A software library allows the serial communication on any of Digital Pins. ATmega328p supports 12c(TWI) and SPI communication. Arduino software includes Wire bus to simplify use of 12C Bus
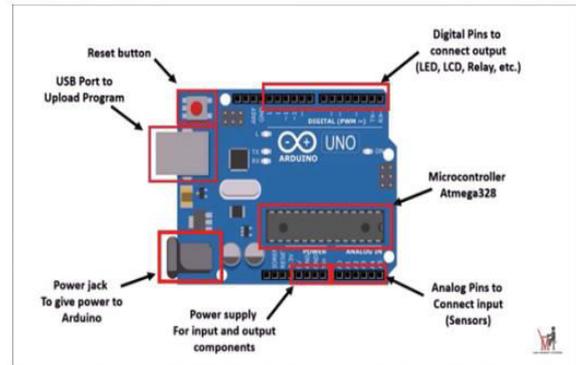
2.Bluetooth Module: HC-05 Bluetooth module is a basic low cost module used for wireless interfacing of Arduino, Raspberry pi and other Microcontrollers. It has operational voltage of 4V to 6V. For communication this module uses USART and TTL protocol. It has a range of less than 100m. It uses frequency hopping spread spectrum (FHSS). This follows IEEE 802.15.1 standardized protocol and has supports following Baud Rate 9600, 19200, 38400, 57609, 115200, 230400, 460800.
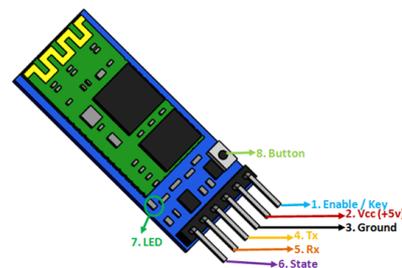

3.ESP32 Cam Module: ESP32 Cam module is a low cost development board with camera. It runs on low power CPU of 32bits. It has 520Kb of internal SRAM. It also has external SRAM of 4MP. It has clock frequency of 160MHz which can compute up to 6000MIPS. OV2640 and OV7670 cam can be attached to this module; It is equipped with AP/STA/STA+AP technology. It has the embedded support of LWIP and Free RTOS. It has multiple sleep modes. This module also supports Wi-fi Image and TF card. It provides support of UART / 12C / SPI / ADC / PWM / DAC for communication.
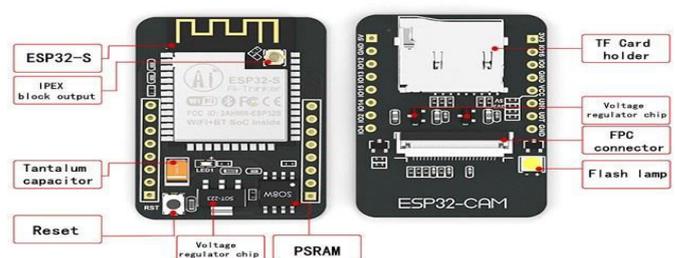
4.Battery: We have used two Batteries in this project one of 9V to power LEDs And Other of 12V to power Arduino and remaining components.

5.L293D motor driver shield: L293D motor driver shield is used for controlling motors. It consists of two dual channel L293d, 74HC595 shift register IC, H Bridge motor drive IC. It can control 4 Motors at a time. It provides bidirectional current of 600mA at voltage of 4.5V to 36V.It is easily connected to Arduino UNO and MEGA
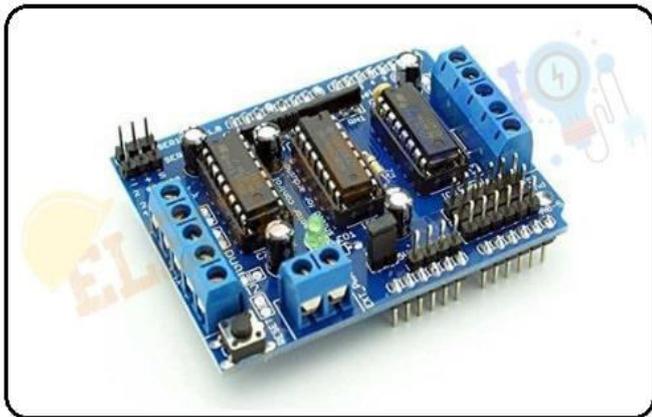
3. OPERATION

Working is divided in two parts:-
1.Working on Motion of Bot using Bluetooth module:-
        After Assembling all the hardware parts of the bot, make necessary connection to upload the code in Arduino Uno. For uploading the code use Arduino IDE software. After uploading the code check the Bluetooth connectivity with Bluetooth RC controller app with HC-05 module. When the app is connected to the HC-05 module check motion of bot, like forward, backward, left and right by pressing corresponding keys in app

When these corresponding keys are pressed in the App. That corresponding data is transferred to the HC-05 module from the phone over Bluetooth connection. When Arduino Uno receives any of this data from HC-05 module (as per commands from Bluetooth app), then it performs switch case operation and according to the transferred data that corresponding instruction to the motor driver pins. For example, when 'Forward' key is pressed in App from phone, it transmits according data to Arduino and then it makes both motors inputs High i.e. ON condition of both motor and it performs Forward motion.

2.Working of IoT ESP 32 cam:-
    To understand the working we have to know the connection of ESP-32 with Arduino Uno for uploading the code to ESP-32 Cam module. ESP-32 cam module is low cost, low power which contains on chip microcontroller with integrated WIFI and also a dual mode Bluetooth.

Connection of ESP-32 Cam with Arduino Uno:-
- Reset pin of Arduino to the GND
- 5V and GND pins of ESP-32 Cam with Arduino 5V and GND respectively

- Revive pin to Rx of Arduino and Transmit pin to Tx of Arduino
- 10pin of ESP-32 with GND pin of ESP-32 Cam itself

After interfacing this connection, install the ESP-32 Cam board in the Arduino IDE software in the laptop. Make sure there is latest version of Arduino IDE software in your laptop. Before uploading the code make the following settings

- Select QIO in flash Mode
- Select 40Mhz in Flash frequency
- Select Huge APP in partition scheme
- Select 115200 as the Baud rate
- Select AVR ISP in programmer
- See the port where Arduino is connected using USB Cable
- Then File menu > Examples > ESP32 > Camera > Camera Webserver
- Open the Camera Webserver program
- Then inside the code, enter your WIFI id and password
- Select your camera model inside the code

Now click on upload button. After code is uploaded successfully remove the wire i.e. 10pin and GND of the ESP 32 cam module. Then in the Arduino IDE software click on serial monitor and select baud rate as 11500 and press the reset pin of ESP-32 Cam module, then you can see the IP address on serial monitor.

Copy this IP address and search it on your browser. Make sure power supply is ON for ESP-32 Cam. When you open this IP address on your browser it will show one window, then click on start button on this window. So the camera is streaming on this window, and after interfacing the ESP-32 CAM MODULE on bot its ready for surveillance.

4. Circuit Diagram
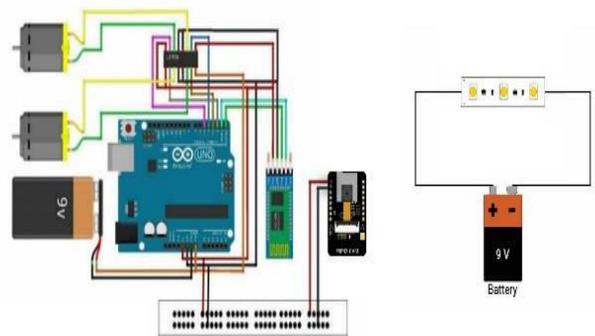
5. Conclusion

        Surveillance bot have the potential to function throughout the day and can become important part of the care service sectors. This bot has the potential to decrease the cost of securities can provide more accuracy in catching burglars and can improve the security system. If we try to make these types of bot then it will be helpful for us in future, and will be the better option to opt for these types of technologies in the upcoming years.

6. FUTURE SCOPE

The future scope and applications:

- The surveillance bot can move to any place, anywhere, anytime.

- It can be used in many military applications such as using this bot to see where the enemies are, what are they doing etc.

- This bot can move to the area where the humans can't go example when there is a disaster area, this bot can go there see what happened there.

- Surveillance bot can reduce the efforts of humans

- These bots are very useful in business sectors and many other organizations as a security.

- As we know, humans do need a break when they do work for longer period, this bot can work without any break and without any disturbance.

- Such robots will play very important role in the future in all the sectors.

REFERENCES

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