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Multipurpose Military Spying Robot

Lakshmi C K[1], Mohammed Sadiq B[2]

Student, Department of MCA, BIET, Davangere[1]
Assistant Professor, Department of Master of Computer Application, BIET, Davangere[2]

Abstract - *The robot is basically a machine which can be programmed by a computer to carry out a series of complex operations automatically. With the development in technology, scientists come up with new ideas and inventions. Robots are now becoming an essential part of human life. The robotic technology can be used in various areas like healthcare, restaurants, logistics, homes, space communication, research center and industries. Besides these areas, this technology is also used in defense forces, security systems and much dangerous mission execution.*

1 INTRODUCTION

The robot is basically a machine which can be programmed by a computer to carry out a series of complex operations automatically. With the development in technology, scientists come up with new ideas and inventions. Robots are now becoming an essential part of human life. The robotic technology can be used in various areas like healthcare, restaurants, logistics, homes, space communication, research center and industries. Besides these areas, this technology is also used in defense forces, security systems and much dangerous mission execution.

Multifunctional robot is one of the technologies used in order to give assistance to the solider at border areas to provide surveillance. The robots operate in an automated mode. For this purpose, the have ultrasonic sensors are fitted on the robot for navigation. It can sense the obstacles in the path it moves. The robot also senses harmful gases, metals etc., during manual mode the robot is operated via a webpage. The direction keys in the webpage are used for the control the path of the robot. All the above operations are on the whole controlled by EsP 3286 which is powered by a solar panel.

In war field areas, robot is usually miniature in size so that they are capable enough to enter into tunnels, mines and small holes in building and also have ability to survive in difficult climatic conditions for a longer period of time.

Python is a computer programming language often used to build websites and software, automate tasks, and conduct data analysis. Python is a general-purpose language, meaning it can be used to create a variety of different programs and isn't specialized for any specific problems. This versatility, along with its beginner-friendliness, has made it one of the most- used programming languages today.

Python is commonly used for developing websites and software, task automation, data analysis, and data visualization. since it's relatively easy to learn, Python has been adopted by many non-programmers such as accountants and scientists, for a variety of everyday tasks, like organizing finances.

Performing a task over and over again, you could work more efficiently by automating it with Python. Writing code used to build these automated processes is called scripting. In the coding world, automation can be used to check for errors across multiple files, convert files, execute simple math, and remove duplicates in data.

Python can even be used by relative beginners to automate simple tasks on the computer such as renaming files, finding and downloading online content or sending emails or texts at desired intervals.

EsP 32863 Model B was released in February 20l6 with a

64-bit quad core processor, onboard Wi-Fi, Bluetooth and UsB boot capabilities. On Pi Day 20l8 model 3B+ appeared with a faster l.4 GHz processor and a three times faster network based on gigabit Ethernet (300 Mbit / s) or 2.4 / s GHz dual-band Wi-Fi (l00 Mbit / s). Other options are: Power over Ethernet (PoE), UsB boot and network boot (an sD card is no longer required). This allows the use of the Pi in hard-to-reach places (possibly without electricity).

2 LITERATURE SURVEY

[1] Tajim Md. Nimat Ullah Akhund, Watry Biswas Jyoti, Md. Abu Bakkar Siddik proposed "IoT based low cost Robotic agent design for disabled and Covid 19 virus affected people" in 2020 Fourth World Conference on Smart Trends in Systems, Security and Sustainability (WorldS4), 2020

This paper represents a wireless gesture control robot for people who are physically disabled and virus affected. It can follow the hand or other organ's gesture and works with the data wirelessly.Key points: Covid 19, Robot, Wireless Technology, Gesture Controlled System.

[2] Merin Antony, Megha Parameswaram, Nithin Mathew, Sajithkumar V S, Jineeth Joseph, Christy Mary Jacob, "Design and Implementation of Automatic Guided Vehicle for Hospital Application.", Proceeding of the Fifth International Conference on Communication and Electronics Systems(ICCES 2020)

Here, the design and development of an automatic guided vehicle for hospital applications, which can be controlled remotely. This also helps to monitor the health condition by measuring temperature.Key points: Automatic Guided Vehicle (AGV), Hospital, Drugs, Monitoring, Waste, Covid-19.

[3] D Kalaiarasi, Pavithra S, Pratheeba S, Priya Dharshini R L proposed "IoT based Motion control system of a robotic car." International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 03 Mar 2018

The car and mobile phone are linked via wireless communication. By touching or pressing on the screen of an Android phone, a manipulator can send commands to the Arduino microcontroller on the car through Wi-Fi and observe the corresponding executions accomplished by actuators.

Key points: Arduino Node MCU, Motor driver, IR obstacle sensors, IoT.

3. METHODOLOGY

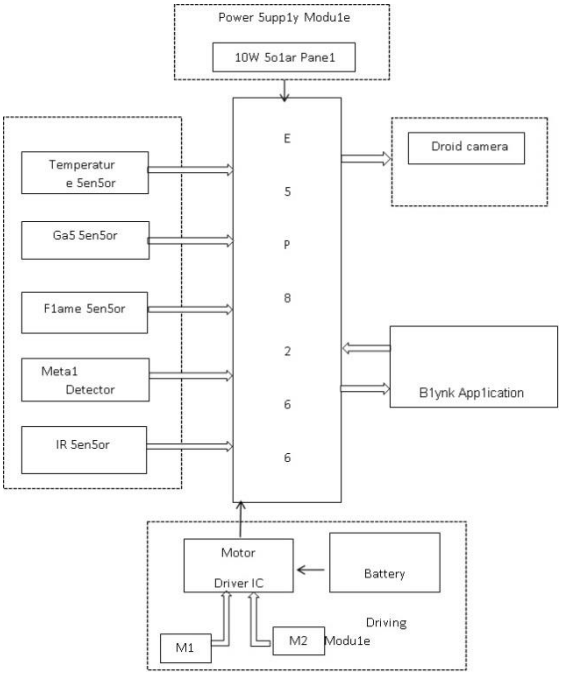

Figure 1 : architecture diagram of the proposed project

Above diagram shows various functional units present in the proposed project, the proposed project (prototype) uses various things like

- Chassis with wheels and motors
- Driver circuit to drive motors
- Tray to hold things
- Sensors to fetch temperature
- Blynk app to control direction of the robot
- ESP32 Module to control and coordinate various elements
- Smart phone loaded with droid cam app
- Web Server to broadcast video transmitted via Droid cam app
- Batteries to power the robot module

Procedure

Step1: Power on the robot module and control unit

Step2: Turn on Wi-Fi

Step3: Make sure ESP32 module got connected with Wi-Fi by checking status LED

Step4: Launch Blynk App

Step5: Activate motion of the Robot by pressing Start button of the Blynk app

Step6: Control the direction using other buttons provided in the Blynk app

Step7: Launch the web browser and type the IP address provided by the droidcam app and view the video being broadcasted via smart phone

Step8: View the temperature of the person at log file

4. TECHNOLOGY OVERVIEW

The IDE is available for free at its official website called www.Arduino.cc/en/software, from here based on the platform software needs to be downloaded and installed, while installing care should be taken to install device drivers so that board and system can communicate via UsB, by default it supports only UNO boards hence we need to install EsP32 board explicitly by following below steps.

Installing EsP32 board

EsP32 board is developed by company called Espressif, we need to download board manager packages from respective GIT hub repository and install them using board manger option available in the Tools menu of Arduino IDE, after successful installation one could see the board listed in the Boards option.

Installing respective libraries

We need to make use of predefined libraries while developing the code so that we need not write the code from the scratch, in Arduino IDE we have option called manage library with which we can install libraries available in the repositories easily. In this project we have used libraries to read information from sensors, connect to Wi-Fi etc.

Installing Blynk app

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.

Writing the sketch for esp32 defining respective pins

We need to write the code for Esp32 board to function according to the plan, while writing the code we need to define two methods

1. setup()
2. loop()

Function setup() gets called only once and its used for initialization purpose like define pin modes, assigning variables etc.

Function loop() get called repeatedly hence tasks to be done repeatedly such as being in touch with Blynk, reading information from sensors etc. are defined here.

Designing the dashboard in Blynk

Blynk has widgets like buttons, we need to configure them according the requirements, and making dashboard layout is quite easy job as just by drag drop technique one could design it.

Writing the sketch for esp32 defining respective pins

With the basic knowledge of C and C++ one could easily write the code, actual code being written is explained below.

4. IMPLEMENTATION

```
#inc1ude <dummy.h>

#inc1ude <B1ynk5imp1eE5p32.h>
#inc1ude <WiFi.h>
#inc1ude <WiFiMu1ti.h> #inc1ude
<DHT.h>
#define B1YNK_PRINT 5eria1

#define motorpin1 18

#define motorpin2 5

#define motorpin3 22

#define motorpin4 4

#define F1AME 21          // 0 for detection
#define 5MOKE 32 // 0 for 5moke detection
#define META1 33
#define DHTPIN 27

#define DHTTYPE 11

#define IR 34
```

```
DHT dht(DHTPIN, DHTTYPE);

void 1oop() {
B1ynk.run();
Int f1ame=digita1Read(F1AME);
 int 5moke=digita1Read(5MOKE); int ir =
digita1Read(IR);
5eria1.print1n("f1ame,5moke="+5t
ring(f1ame)+","+5tring(5moke));
if( ir==0 )
{
B1ynk.notify("Object ha5 been
detected");
digita1Write(motorpin1,1OW);
digita1Write(motorpin2,1OW);
digita1Write(motorpin3,1OW);
digita1Write(motorpin4,1OW);
}
if( f1ame==0 )
{
B1ynk.notify("F1ame ha5 been detected");
}
if( 5moke==0 )
{ B1ynk.notify("5moke ha5 been detected");
}
f1oat h = dht.readHumidity();
f1oat t = dht.readTemperature(true);
B1ynk.virtua1Write(V0,t);
}
B1YNK_WRITE(V0) //Button Widget i5 writing to pin
V1
{
digita1Write(motorpin1,1OW);
digita1Write(motorpin2,1OW);
digita1Write(motorpin3,1OW);
digita1Write(motorpin4,1OW);
}
B1YNK_WRITE(V1) // Moving forward
{
digita1Write(motorpin1,HIGH);
digita1Write(motorpin2,1OW);
digita1Write(motorpin3,HIGH);
digita1Write(motorpin4,1OW);
}
B1YNK_WRITE(V2) // Moving backward
{
digita1Write(motorpin1,1OW);
digita1Write(motorpin2,HIGH);
digita1Write(motorpin3,1OW);
digita1Write(motorpin4,HIGH);
}
```

5. RESULTS

Figure 4.1 Blynk dash board to control robot

Figure 4.2 Robot model with sensors

6. CONCLUSION

The main purpose of this proposed system is to overcome the limited operational region. The earlier robot has very limited range of operations, because which use Wi-Fi and other local networks. Compared to other proposed systems, it makes the system cost effective as the proposed system employs solar power as its power source and wireless camera for live streaming purpose. This robotic vehicle with a number of modules can be used as surveillance robot for security purpose and also in emergency rescue operations where humans cannot find best results. The user is also alerted about the intruder prior to his premises.

REFERENCES

[1] Tajim Md. NiamatUllahAkhund, Watry Biswas Jyoti, Md. Abu BakkarSiddik,"IoT basedLow-Cost Robotic Agent Design for Disabled and Covid-19 Virus AffectedPeople"2020 Fourth World Conference on Smart Trends in Systems, Security and Sustainability (WorldS4), 2020

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