DESIGN AND FABRICATION OF ENEMY DETECTION ROBOT

[1]Jakeer Hussain Shaik, [2]Khadar Basha SK T, [3]Sai Krishna V, [4]Srinivas Rao P, [5]Jagadesh M

[1]Assoc. Professor,[2,3,4&5] Scholar,
[1-5]Department of Mechanical Engineering,
[1-5]KKR & KSR Institute of Technology and Sciences, Guntur, India.

Abstract : In this project, we'll meet some of the military's latest robot soldiers, find out what sorts of jobs they can do and get a glimpse of what the future holds for military robots. The term "ROBOT" is often a misnomer in the present day to refer to these machines, since while a robot performs "autonomous or preprogramed tasks". Most "robots" in current use are in fact remote controlled by a human operator and have no automation or intelligence, due to the limitations of current artificial intelligence.In this project, we'll meet some of the military's latest robot soldiers, find out what sorts of jobs they can do and get a glimpse of what the future holds for military robots. The term "ROBOT" is often a misnomer in the present day to refer to these machines, since while a robot performs "autonomous or preprogramed tasks". Most "robots" in current use are in fact remote controlled by a human operator and have no automation or intelligence, due to the limitations of current artificial intelligence.

INTRODUCTION

Once can fashion the life then no one is rights to wipe out it. Security is the basic could do with for all country. Chuck are the mother of inventions. Whenever human being finds the need of something, it will lead to a brilliant invention. After the 26/11 attack in INDIA, all country started focusing on how to control the attack of terrorism and how to improve the security to a nation. As a result some nations started using of robots in the guard field. Since tracking of enemies at different areas are very much difficult for soldiers. There is a possibility of loss of soldier at the war situation. So our idea is to replace the soldier with the robot soldier. Hence, today is the era of revolution in the field of robotics. The word robot was first used in 1927 play titled R.U.R. Rossum'sUniversal Robots, by Karel Capek. Robotics a Czech word meaning "worker". With the gradual enlargement of technology that gives the various ideas for improvement I Robot. The robot is a contraption or device that is basically place or mounted on a movable platform. Many of the complex robots that we see now have originated from the simple robot. In today's life military robot is vary consequence for soldier. Our life is dazzling and all human wants to enjoy it. These our yearning is become true only solders. The military robot is the autonomous robot that consist wireless camera that human able to monitor via computer as a spy. Today wireless system have been widely used by many company because wireless can save cost of wiring, easy to install, occupy lesser space, easy for maintenance and more reliable. In this line, Kishore Kumar.S et al. [1] designed a next generation intelligent ultra-small dust like wireless sensor motes which has multiple on-board sensors and a controller, which has the ability to detect an enemy intrusion across borders and battlefields. . By using this application, human life can be saved to greater extent, since these motes does the enemy intrusion and tracking job. This application possessed to be of low cost comparative to the earlier technologies. Njilojemu et al. [2] designed a next generation intelligent ultra-small dust like wireless sensor motes which has multiple on board sensors, camera and a processor, which has the ability to detect an enemy intrusion across borders and battlefields. The proposed system of smart dusts for border surveillance applications was designed, developed and tested in the laboratory. Vidya Singh .G et al. [3] integrate a medium-size, ROBOT type Unmanned Ground Vehicle (UGV), for border security, here UGV is built with a human detection sensor for detecting the person. Once the person is detected the system will check for the authentication via RF. The movement of robot is monitored through the live video obtained in the control station through a wireless camera Priyanka D. Balapure et al. [4] designed and built manually controlled surveillance robot with the help of low power Zigbee wireless sensor network to track out the intruders. Video receivers receives the video signals from camera and video shown on the pc with the help of TV tuner. Miss. JagtapAshwini U et al. [5] designed and developed robot for military purpose application to protect our army. This robotic vehicle with different sub modules can widely be used as surveillance robot for security purpose and emergency rescue operations. Sreekumar et al. [6] described the implementation of the secure unmanned Vehicle Navigation system controlled by wireless sensor network. The work done resulted in a Vehicle navigation system controlled by wireless sensor network to make the network more secure and useful. The system can be used in various applications such as monitoring and maintenance and fire detection. If the vehicle is equipped with GPS, the exact location can be determined. P.Kamal et al. [7] developed an intelligent unmanned army robot (IUAR) for both civilian and military use to mainly perform in dangerous activities. The use of unmanned systems brings many benefits, but they should be seen as complementary to rather than replacements for existing manned systems.

MATERIALS AND METHODS:

Instead of using wireless camera we are using smart phone for live streaming of surroundings for spying this can be done with help of BLUETOOTH application which is installed in mobile phone and due to internet services we can easily spy at any time. For wireless communication with Robot unit we are using Bluetooth module and easily control our robot with the help of android Application using USART Technology. Hence Android application is used as a remote control for robot which control movements of motors due to which wheel and is controlled laser shooter.

Hardware components:

1.12V BATTERY:

In the current market, lead-acid is the only available battery technology for electric vehicle conversion. Voltage. Batteries are available in both 6V and 12Vunits. Most standard, wet-cell, golf cart batteries are 6V units. Most sealed batteries are 12V units. The capacity of a battery is rated in amp-hours. This rating must be specified with a given discharge rate. The discharge rate of a battery is the minimum length of time during which the battery must be discharged in order to meet the specified amp hour rating. The watt-hour rating is a true indication of the energy Capacity of a battery, like the amp hour rating, this rating must be specified with a discharge rate. The watt-hour rating of a battery is the amp-hour rating multiplied by the specified voltage of the battery.

2. BLUETOOTH HC-05:

BLUETOOTH HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

Fig 1. .Bluetooth

3. GEARED MOTORS:

"Gear motor" refers to a combination of a motor plus a reduction gear train. These are often conveniently packaged together in one unit. The gear reduction (gear train) reduces the speed of the motor, with a corresponding increase in torque. Working principle of a DC motor. A motor is an electrical machine which converts electrical energy into mechanical energy. The principle of working of a DC motor is that "whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force".

Fig.2 . Geared motor

4. L293D MOTORS:

The Motor Driver is a module for motors that allows you to control the working speed and direction of two motors simultaneously. This Motor Driver is designed and developed based on L293D IC.L293D is a 16 Pin Motor Driver IC. This is designed to provide bidirectional drive currents at voltages from 5 V to 36 V.un Founder L293D is a monolithic integrated, high voltage, high current, 4-channel driver. Basically this means using this chip you can use DC motors and power supplies of up to 16 Volts, that's some pretty big motors and the chip can supply a maximum current of 600mA per channel, the L293D chip is also what's known as a type of H-Bridge. The H-Bridge is typically an electrical circuit that enables a voltage to be applied across a load in either direction to an output, e.g. motor.
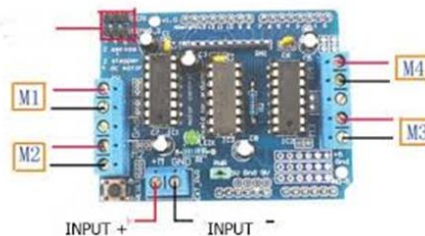

Fig3..L293D motor

5. BUZZER:

A buzzer or beeper an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.
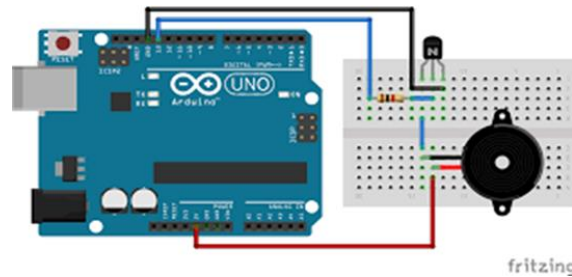

Fig.4. .Buzzer

6. LEDs:

An LED is a small light (it stands for "light emitting diode") that works with relatively little power. The Arduino board has one built-in on digital pin 13. To blink the LED takes only a few lines of code. The first thing we do is define a variable that will hold the number of the pin that the LED is connected to. We don't have to do this (we could just use the pin number throughout the code) but it makes it easier to change to a different pin. We use an integer variable (called an int).

7. JUMPER WIRES:

Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins. Use them to wire up all your circuits! Wires .A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Software requirement:

Arduino:

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

Fig. 5. Arduino Board

Various kinds of Arduino boards are available depending on different microcontrollers used. However, all Arduino boards have one thing in common: they are programed through the Arduino IDE.

The differences are based on the number of inputs and outputs (the number of sensors, LEDs, and buttons you can use on a single board), speed, operating voltage, form factor etc. Some boards are designed to be embedded and have no programming interface (hardware), which you would need to buy separately. Some can run directly from a 3.7V battery, others need at least 5V.

PARTS:

1. Power USB
2. Arduino Reset
3. Ana log pins
4. Main microcontroller
5. ICSP pin
6. Power LED indicator
7. TX and RX LEDs
8. Digital I / O
9. AREF

ARDUINO PROGRAMME:

```
int lm1 = 2;
int lm2 = 3;
int rm1 = 4;
int rm2 = 5;
intgp = 8;
intgn = 9;
intlasp = 6;
intlasn = 7;
void setup()
{
//initlize the mode of the pins
pinMode(lm1,OUTPUT);
pinMode(lm2,OUTPUT);
pinMode(rm1,OUTPUT);
pinMode(rm2,OUTPUT);
pinMode(gp,OUTPUT);
pinMode(gn,OUTPUT);
pinMode(lasp,OUTPUT);
pinMode(lasn,OUTPUT);
//set the serial communication
rate
Serial.begin(9600);
}
void loop()
{
//check whether arduino is
reciving signal or not
while(Serial.available() == 0);
charval = Serial.read() ;//reads the
signal
Serial.print(val);
/*********For        Forward
motion*********/
if (val == 'B')
{
Serial.println("FORWARD");
digitalWrite(lm1,HIGH);
digitalWrite(rm1,HIGH);
digitalWrite(lm2,LOW);
digitalWrite(rm2,LOW);
}
```

```
/*********For        Backward
Motion*********/
else if(val == 'C')//8
{
Serial.println("BACK");
digitalWrite(lm2,HIGH);
digitalWrite(rm2,HIGH);
digitalWrite(lm1,LOW);
digitalWrite(rm1,LOW);
}
/*********Right*********/
else if(val == 'A')//7
{
Serial.println("RIGHT");
digitalWrite(lm1,HIGH);
digitalWrite(rm2,HIGH);
digitalWrite(lm2,LOW);
digitalWrite(rm1,LOW);
}
/*********Left*********/
else if(val == 'D')//6
{
Serial.println("LEFT");
digitalWrite(lm2,HIGH);
digitalWrite(rm1,HIGH);
digitalWrite(lm1,LOW);
digitalWrite(rm2,LOW);
}
/*********Horn*********/
else if(val == 'F')//5
{
Serial.println("STOP");
digitalWrite(lm2,LOW);
digitalWrite(rm1,LOW);
digitalWrite(lm1,LOW);
digitalWrite(rm2,LOW);
}
else if(val == 'G')//4
{
//Serial.println("STOP");
digitalWrite(lasp,HIGH);
digitalWrite(lasn,LOW);
```

```
delay(1000);
digitalWrite(lasp,LOW);
digitalWrite(lasn,LOW);
}
else if(val == 'H')//3
{
//Serial.println("STOP");
digitalWrite(gp,HIGH);
digitalWrite(gn,LOW);
}
else if(val == 'I')//2
{
//Serial.println("STOP");
digitalWrite(gp,LOW);
digitalWrite(gn,LOW);
}
else if(val == 'J')//1
{
//Serial.println("STOP");
digitalWrite(gp,LOW);
digitalWrite(gn,HIGH);
}
}
```
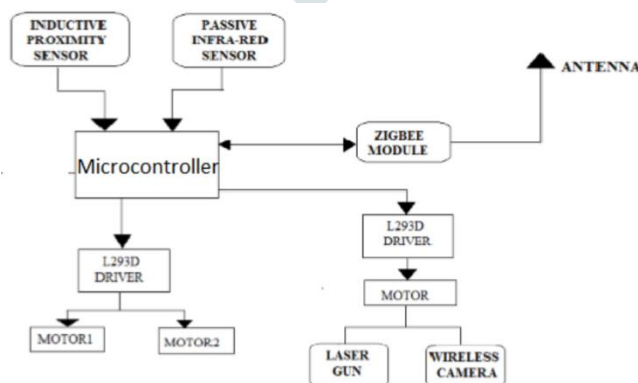
Algorithm and flow charts:

Fig. 7. Software set up

- STEP 1: Automation and Manual Mode
- STEP2: Area Sensing
- STEP3: Live video transmission
- STEP4: Image capturing

- STEP5: Database Management
- STEP6: Commanding Information
- STEP7: Attacking or Leaving

CATIA DESIGN

CATIA is a computer aided three-dimensional interactive application, pronounced is a multi-platform software suite for computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided engineering (CAE), PLM and 3D, developed by the French company Dassault Systems. CATIA started as an in-house development in 1977 by French aircraft manufacturer Anions, at that time customer of the CAD/CAM CAD software to develop Dassault's Mirage fighter jet, then was adopted in the aerospace, automotive, shipbuilding, and other industries.

Commonly referred to as a 3D Product Lifecycle Management software suite, CATIA supports multiple stages of product development (CAX), from conceptualization, design (CAD), manufacturing (CAM), and engineering (CAE). CATIA facilitates collaborative engineering across d1isciplines, including surfacing & shape design, mechanical engineering, equipment and systems engineering.
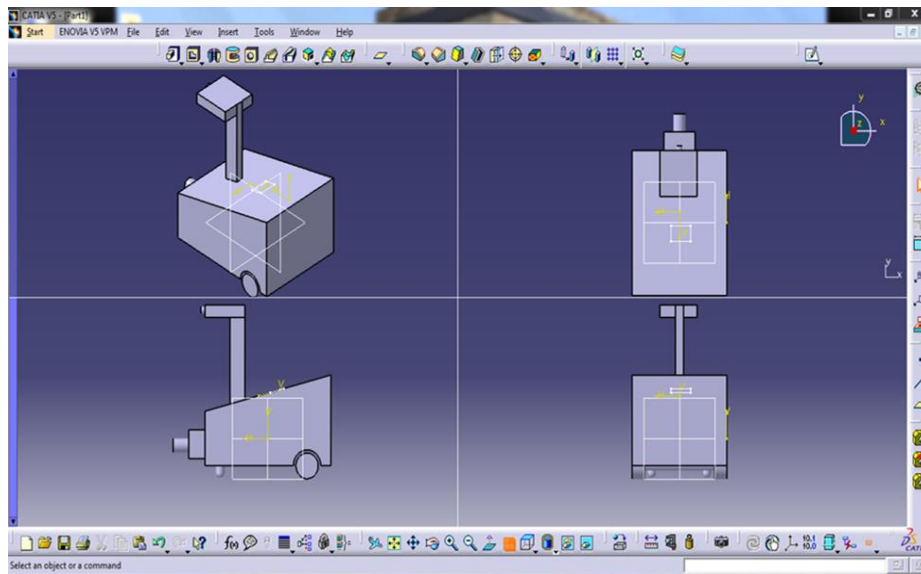

Fig 8. Model design

FABRICATION MODEL OF PROJECT:

Fig 6. Fabrication Model

RESULTS AND DISCUSSIONS:

Android Application:

Below is the screenshot of Android application which is used in this project to control the Robot. This application has 9 keys / commands. We have used 7 commands. Command 7 and 9 are not used and are reserved for future scope. User can even rename these key text as Forward / Reverse using the Set Keys option. User needs to turn on the Bluetooth on his/her mobile and press scan button as shown below. Then connect to the Bluetooth receiver on robot. Once the connection is established then the application will show connected status.
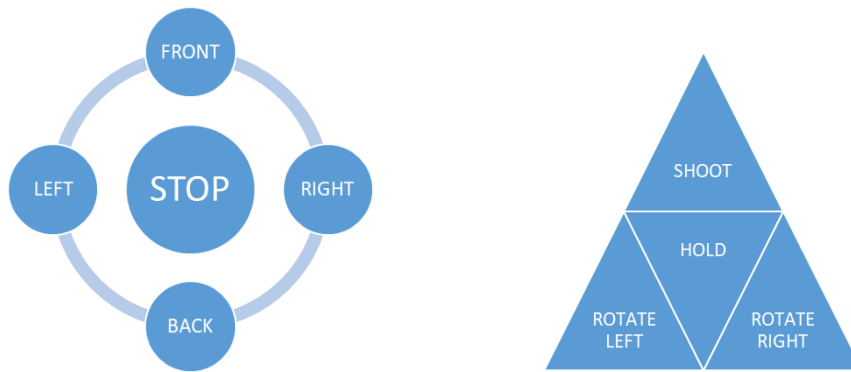
Fig. 9.App to run vehicle

METHOD OF IMPLEMENTATION:

1. The HC-05 Bluetooth modules should be paired with the mobile and the default password to establish the connection would be 1234 or 0000

2. Then you need to click on "Select Device" option to select the paired Bluetooth module

3. When you press the "Up arrow" it sends the data "A" to the Bluetooth module connected with the bot and the microcontroller is programmed in such a way that whenever it receives the command "A" it moves forward

4. Similarly, when you press the "Down arrow" it sends the data "B" to the Bluetooth module connected with the bot and the microcontroller is programmed in such a way that whenever it receives the command "B" it moves reverse

5.And, when you press the "Left or Right arrow" it sends the data "C or D" respectively to the Bluetooth module connected with the bot and the microcontroller is programmed in such a way that whenever it receives the command "C or D" it moves left or right accordingly

6. When the "Stop" button is pressed, it sends the data "E" to the Bluetooth module connected with the bot and the microcontroller is programmed in such a way that whenever it receives the command "E" the robot's movement gets stopped

7. You can then click on the "Disconnect" option to remove the paired Bluetooth module.

OUTPUT SCREENS:

Fig 10. IMAGE 1

CONCLUSIONS

•Design of an enemy detecting robot for border security purpose is implemented. The main goal to integrate a medium size, robot type unmanned ground vehicle (UGV) to help our soldiers to monitor the border areas especially in extreme climatic conditions is achieved.

•The application of wireless sensor network will improve the saving of many precious lives. The project is an efficient method for rescue operations and also for terrorists and thieves detection inside a building.

•As it is a wireless robot it can be easily mobilized and controlled.

•The application of wireless sensor network can realize the real-time monitoring of affected area by the natural calamities.

•The robot can be improved by using high range sensors and high capacity motors. Some more sensors like mobile phone detector, metal detector etc can be implemented to make this robot more effective.

•As the Robot can move, it covers lot of distance that reduces the use of many sensors or many robots.

•When the Robot finds a human it can notify the users by producing continuous beeps. The Robot can detect the human by attaching a visual camera where the image of the intruder can be notified. The robot is attached with the ultrasonic sensor which determines the distance between the human and can detect the IR image of the object.

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