

“A Multipurpose Robot for Military” -Tribute to the Defence Ministry

V. Prasanna Balaji & H. Goutham

EIE, SRI SAIRAM ENGG. COLLEGE

E-mail : balaji92@gmail.com, hilfenous@gmail.com

Abstract – In the world that has an enormous potential for conflict, militaries around the world are taking Patton’s words very seriously. Right from the ancient times, the foot soldiers has fought and won the battle for the victor. However, over the past decade or so, the infantry’s role has changed - the emergence of smart munitions and precision aerial bombardment has resulted in the infantryman entering tough urban combat situations to mop up any remaining resistance. Tomorrow’s heroic soldier isn’t going to jump into the battle with just a ballot-proof Kevlar vest, a backpack sized field radio and a commando knife clutched between his teeth[7]. Our system is the first of several such programs that are looking at revamping the infantry soldier’s gear. Our system basically has two modes. One mode is the automatic mode and the other mode is user control mode. The automatic mode uses face recognition technique to combat intruders. In certain unavoidable circumstances the control comes to user who can control the operations of the robot from remote location using a computer. One of the main advantages of our system is that the mode switching can be done very fast with out any delay. It also helps to provide medical aid for needy. Our system can also be used to detect and defuse the bombs. Thus our aim is to provide a robotic system that can combat in wars and other military purposes [8].

I. INTRODUCTION

One can create life no one has the rights to destroy it. The saying goes like this. Right from the early stage millions of humans have fought for their country and have lost life. Here in our project we are going to take up this issue to build a robotic system which can combat in wars and fight with the intruders [3]. The first thing in our project is to identify the intruders which are being carried out by using facial recognition technique.

Our robot not only fights it detects bombs and diffuse them. It has also got the capability of terrain climbing. Our robot also has the capability of detection and diffusion of the fire. This project is sure to create revolution in the infantry.

II. EXISTING SYSTEM

There is much advancement in the field of engineering, robotics in particular. Many robotic systems have been developed for various purposes. There are certain systems which are used for automatic motion of vehicles in road and wheel chairs which can help disabled. There are also robotic systems which can be used for defense purposes [2]. In addition to these advancements there are also robotic systems which can combat in war times. This robot is named "Security Warrior" and consists of five systems including vision, motion; robot arms, power estimation and remote supervise. The vision system is used to carry out human detection and tracking [1]. The motion system is built by using embedded systems and used to achieve motion planning in real time. One of the main things to be noted is that all that have been discussed above is only under R & D (US DEFENCE) and are intended to be implemented by 2015[9].

III. PROPOSED SYSTEM:

Here in our existing system there are only remote monitoring for robots are available. Here in our system we are going to control the robot from remote location in addition to remote monitoring (i.e. User Mode). Our system also has an automatic mode in which it can take its own decision for combating. In addition to this we are also including some of the features like bomb detection, bomb diffusion, fire detection, intruder detection. Thus our system is more reliable to combat the enemy than the existing system. We are going to control the robot from

remote location by using a computer. Our robot is also capable of detecting and diffusing the bombs more quickly [6]. It can either be done through automatic mode or by user mode. Our system also contains fire detection module and intruder detection module which is being carried out by using facial recognition techniques [5].

IV. HARDWARE REQUIREMENTS:

4.1 Microcontroller:

- Microcontroller is an microprocessor with memory unit.
- There are many microcontrollers available in the market which helps in providing highly-flexible and cost-effective solution to many embedded control applications.

4.2 Earth Mine Detection:

- As the robot designed by us is capable of moving around different places by detecting different obstacles the presence of a earth mine can be easily detected by using earth mine detection sensors and other methods [2].
- We place the sensor in the robot which moves to different places and at once if it detects with earth mine or a bomb it gives signal to the handler by using mobile phone.

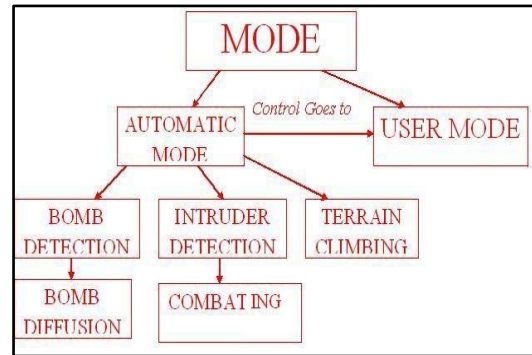
4.3 PIR Sensor:

- The Robot will have the PIR sensor, which will help to detect the alive human beings [2].
- The human body radiates infrared waves with wavelengths of 8 to 12 micrometers.
- Whenever any human being comes in the vicinity of the system the IR system gives the Signal.

4.4 LDR:

- LDR's are employed to sense the Fire; here we use powerful and sensitive "LDR" (Light Dependent Resistor) for the flame detection.
- Normally LDR senses all the lights. But in our case we have to sense only Blue and Yellow flame and reject sunlight and other luminaries [2].
- We have provided necessary circuit to reject ambient and luminaries lightings and senses only desired flame coloring.

V. BLOCK DIAGRAM:



5.1 Automatic Mode:

- Here the user has no control over the robot. The robot takes it own decisions and performs the required operation using AI.
- At unavoidable circumstances the control automatically goes to the user.

5.2 User Mode:

- Here in this mode the user has the full control of the robot.
- The user can control the robot from the remote location and perform the required operation.

5.3 Bomb Detection

- Laser Gun can be used to Detect Roadside Bombs. A image is as shown below



- Trained wasps are used to detect the bombs [4].
- They are contained into a device called as "Wasp Hound" which gives an alarm or triggers a visual signal.

- NQR (Nuclear quadruple resonance) is another technique for detecting the explosives.

5.4 Bomb Diffusion:

- Bomb diffusion can be made in both the automatic and in the user modes.
- In the automatic mode the robot detects the bomb and diffuses it by disabling the circuitry of the bomb [9].
- If the detected material in the bomb is RDX then the robot applies a heat of above 200C.
- The RDX decomposes and melts at that temperature.
- In case of failure in automatic bomb diffusion the control automatically goes to user mode.
- Once the user gets the control he can diffuse the bomb from remote location.

5.5 Intruder Detection:

- Here in this module the intruders are being detected by using facial recognition techniques.
- Here a database of our infantry is stored and this is compared for detecting the intruders.
- There high quality facial recognition technique which can even detect a face covered with mask.

5.6 Combating:

- Once the intruders are detected by using camera the robot starts the combating operation based on the opponent strength.

5.7 Terrain Climbing:

- Our robots produce their electro adhesion forces by applying a small amount of power to pads that induce electrostatic charges onto the wall's surface.
- In contrast to conventional dry or liquid adhesives, electro adhesion is able to repeatedly clamp onto damp, dusty, or dirty surfaces.
- Our Robot can climb on concrete, wood, steel, glass, drywall, and brick surfaces, and are undeterred by bumps, corners, cracks, and other surface variations.

5.8 Fire Detection:

- LDR's are employed to sense the Fire, Here we use powerful and sensitive "LDR" (Light Dependent Resistor) for the flame detection.

- Normally LDR senses all the lights. But in our case we have to sense only Blue and Yellow flame and reject sunlight and other luminaries.
- We have provided necessary circuit to reject ambient and luminaries lightings and senses only desired flame coloring [2].

VI. IMPLEMENTATION

We have started with the implementation of our robot and have finished implementing the humanoid robot which has the capability to walk like human. The robot also has the inbuilt AI so that it can make decisions on his own. The sample microcontroller coding for implementation of robot is as given below.

```

if(Aval > 300)
{
St=0;
PORTB = 0xaa;
PORTC = 0x80;
PORTD = 0x00;
PORTE = 0x00;
DelayMs(4);
Flag=0;
}
else
{
St=1;
}
//Coded By
L.Srinivasavaradhan,G.Chandramouli,A.G.Maniprashanna
if(St==1)
{
if(Flag == 0)
{
PORTB = 0xaa;
PORTC = 0x80;
PORTD = 0x00;
PORTE = 0x00;
DelayMs(4);
}
if(Flag == 1)
{
PORTE = 0x01;
PORTD = Pulse[Pent];
Pent++;
if(Pent > 3) Pent = 0; DelayMs(4);
}
}

```

VII. PROS AND CONS:

- Our robot has remote controlling facility so that it can be controlled from any where in the world.
- Our robot also has an in built bomb diffusion technique which is a new technology.
- Our robot can also climb terrains and combat with the intruders.
- One of the disadvantage of our robot is that the response time is high.

VIII. FUTURE ENHANCEMENT:

- Our future aim is to reduce the response time to a greater extent.
- We are also working on adding some more new applications to our robot.

IX. CONCLUSION

The proposed system is aimed towards the welfare infantry to minimize the casualties to a great extent. This also helps on remote bomb detonation and automatic bomb detection. Our robot also has terrain climbing facility so that it can be used in hilly regions. Hence, 7th SENSE is sure to create a revolution in its own field and ensure complete support from people of different societies.

X. REFERENCES

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