Military Companion Robot

Harsh Singhal[1], Ashutosh Mishra[2], Astha Swaroop[3] ,Amit Rathore[4]

[1234]Student, Dept. Of EC, IMS Engineering College, Ghaziabad, UP, India

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Abstract - *Military Companion robot is developed for mainly military use to perform activities in dangerous situations. This robot act as a companion to our soldiers, with its sensor-based robotic system which helps them to perform better in unexpected or hazardous conditions. It has military as well as civilian applications too like surveillance, riot control, bomb detector, hostage situation, border patrolling etc. By varying size of this robot, we can cope the situation accordingly like supply capability, hospitality, life support, communication center etc…This robot is capable of performing multiple functions in war field since it comprises a gun, bomb detector, flash and camera in it. It can silently enter into the enemy area and spy on them. It can collect information about the enemy with the help of camera, bugger, and GPS on it. It will play a vital role in the future military generation.*

Key Words: Surveillance, firing system, metal detection, ATmega328p, Fire Detection.

1.INTRODUCTION

From the early stage, many army men die for their countries. If one cannot create life it means one does not possess the right to destroy it. As a result, many countries has started using robots in the war field, There is a possibility to lose our soldier in the war situation. So our idea is to deploy this robot before soldiers that mean robot will be our first line of defense. We are concentrating on securing the base of army from intruders and sometimes it can also act as an intruder. Soldiers say one of the biggest advantages to having this "Is the ability for this vehicle to stop out enemy snipers in the area. The remote control station and the robot play very important role in the future military operations. The idea of introducing robot in the army is proposed by DRDO to save the life of men and women. In the existing system, our soldiers have to stand in the border for the long time in rotational timings not only this problem, they have to bare the climatic conditions which are the great problem to face. Whenever the enemy enters the border our soldier has to fight with them. The possibility of defeating them depends on one may survive or they may. Anyway, a human loss will happen. Military Companion Robot can be used for different kind of applications like border surveillance, hostage situation, law enforcement, riot control, security services, intruder, life safer, communication centre and can provide various type of capabilities, to army men during a hazardous situation.

1.1 Objectives

Our Project mainly aims for the protection of soldiers at war or border security. The sub-objectives are given below-

- Interfacing with computation should be as natural as interfacing with people.

1. Modality-opportunistic

2. Mixed-initiative

3. Multi-lingual

- Military "robots" today lack autonomy

1. Currently, many soldiers operate one robot

2. Want few soldiers working with a team of agile robots, to achieve forces multiplication even in harsh environment

3. Put fewer soldiers in harm's way

- Better robots for monitoring- enables soldiers with persistent and pervasive intelligence, surveillance and reconnaissance (ISR), including from hard to reach

- Better robotics for logistics can replace soldiers in the supply chain with capable autonomous robots.

2. PROJECT METHODOLOGY

2.1 Major Inputs and Outputs

- Input Signals from LM35(temperature sensor), Metal Detector and accelerometer.

- Video Feedback.

- Motion of Robot

- Firing System

- All Terrain Motion
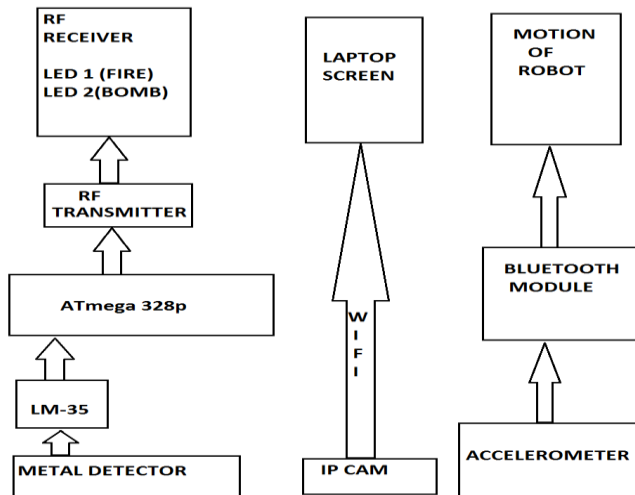

2.2 Block Diagram

Fig.1 Block Diagram

3. HARDWARE DESCRIPTION

3.1 ATmega328P

The high-performance Atmel 8-bit AVR RISC-based microcontroller. It combines 32kb ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23 general purpose Input and output lines and 32 general purpose working registers. There are three flexible timer/counters with compare mode, internal and external interrupts, serial programmable USART and a byte-oriented 2-wire serial interface, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates at 1.8-5.5 volts.
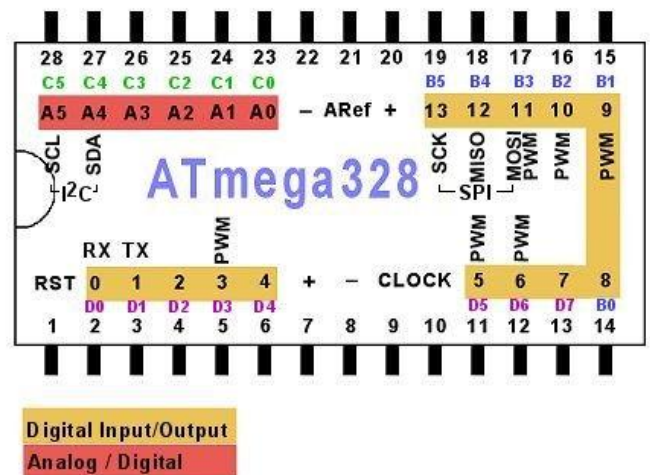

Fig.2 Pinout of ATmega 328p

3.2 DC Motors

In any electric motor, the operation is based on simple electromagnetism. A current carrying conductor generates a magnetic field when it is then placed in an external magnetic field experience a force proportional to the current in the conductor and to the magnitude or strength of the external magnetic field.


Fig.3 DC Motor

3.3 Accelerometer

These are the most common inertial sensors, a dynamic sensor capable of a vast range of sensing. Accelerometers are available that can measure acceleration in one, two, or three orthogonal axes. They are typically used in one of three modes:
• As an inertial measurement of velocity and   position.
• As a sensor of inclination, tilt, or orientation in 2 or 3 dimensions, as referenced from the acceleration of gravity (1 g = 9.8m/s2).
• As a vibration or impact (shock) sensor.
There are considerable advantages to using an analog accelerometer as opposed to an inclinometer such as a liquid tilt sensor – inclinometers tend to output binary information (indicating a state of on or off), thus it is only possible to detect when the tilt has exceeded some threshold angle.
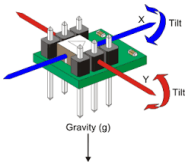
Fig.3 Accelerometer

3.4 LM35 (Temperature Sensor)

It is an integrated circuit that can be used to measure temperature with an electrical output proportional to the temperature (in °C).the scale factor is 10mV/ °C.


Fig.4 LM-35

3.5 IP CAM

IP Camera is a type digital video camera commonly employed for surveillance and which, unlike analog closed circuit television(CCTV) camera, can send and receive data via a computer network and the internet.
In the part of the transmission, it is done by using a phone camera and reception of video is done by the laptop screen.

3.1.5 RF TX-RX

It operates at radio frequency which ranges between 30Khz to 300Ghz. It is used for long range transmission. It can travel even through the obstacles, it is reliable and strong transmission. Our module operates at frequency of 434Mhz and the transmission occurs at the rate of 1Kbps-10Kbps.
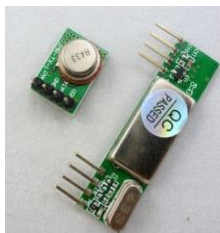
Fig.5 TX-RX

3.6 Bluetooth

It is an open standard for short-range digital radio to interconnect a variety of devices such as cell phone, laptop, printer etc.. It is a low-cost device. It works on radio based wireless network technology. It uses frequency hopping spread spectrum and it offers speed of up to 1Mbps up to 10m.
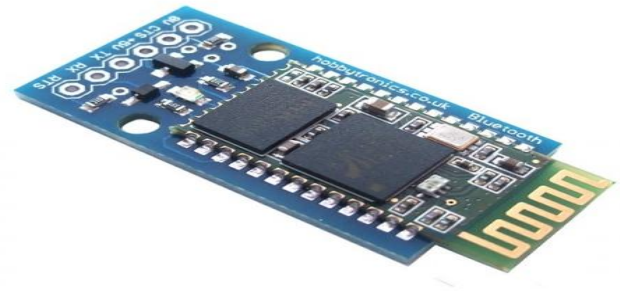
Fig.6 Bluetooth Module

4. CONCLUSIONS

The robot with a wireless camera, metal detection, fire detection and firing system can open great opportunities for our soldiers to enhance their ability to tackle in a dangerous situation. We can also use it in a hostage situation where terrorist put their hostage and entering in that environment is risky. The incorporation of different technologies under one roof has given us the path to achieving goals which have never been realised in such an efficient manner in the past.

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