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# War Surveillance Combat Robot Using RF Technology

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**ABSTRACT**: This paper presents an implementation of a wireless robot which can be used in border areas of our country to counter the attacks and save lives. The robot consists of a RF unit for communication purpose. It also comprises of recent technologies like Global Positioning system (GPS), passive infrared sensor (PIR sensor) module, temperature sensor, camera, metal detector and Gun mounted on it. This system is controlled wirelessly by the user sitting in the base station. The main purpose of this robot is to save the lives of soldiers in the border areas.

**KEYWORDS:**Camera, GPS, Gun, Temperature sensor, PIR.

## I.INTRODUCTION

In past few years India has experienced many terrorist activities in which India has suffered tragic loss of our soldiers. So time has come to think on this great loss and work on it to avoid the further loss. According to David Axe in his article “One in 50 troops in Afghanistan is a Robot”. The United States military wants to cut down human soldiers and add more military robots. The main objective is that a robot can actually do a job that may be a difficult and dangerous to a soldier. So this designed system is a contribution to it. The system consists of Gun and camera which can be rotated in 360 directions as per the command given by the user which makes it strong to visualize intruder or enemy in all directions. This system make use of a PIR sensor to detect intruders in dark and a GPS to give the actual position of the system.

Section II describes the related work done in the military robotics field. The system description is discussed in section III. Hardware and software modules have been presented in section IV&V respectively. Section VI shows the results on the laptop screen.

## II.EVOLUTION

Many researchers have been working on this field. My designed system consist of the ideas and technologies done or going in these field which is described in this paper. The work done by the researchers is described below.
A radio frequency robot which can be used in real war fields is presented in [1]. They have taken use of recent equipment like riffles and night vision camera to make their system more strong.
The authors have used DTMF technology for communication purpose in their system in paper [2]. They have also make use of sensors like PIR, temperature. The main aim of their paper was intruder detection.
The authors have shown how a Arduino military robot can be used in real war fields in paper [3]. They have used Zig bee for communication purpose. They have also used PIR sensor and GPS unit.
The authors have introduced GPS in their system to give the exact position of their system in paper [4]. They have used RF units for communication purpose and also used PIR, GPS and camera.

## III.SYSTEM DESCRIPTION

The system is described in detail with the help of the figures 1&2.Figure 1 shows how the user is going to control the system from the base station and the Figure 2 shows how the robot will respond to the commands given by the user in detail.

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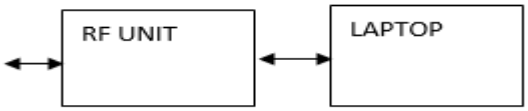


Figure (1): Transmitter (USER SIDE)

*A. Transmitter:* The communication is made via RF units. One RF unit is on the user side through which commands are sent. These commands are received by the robot which also consists of RF unit and then it is given to the controller. Further the controller will process the commands and trigger the appropriate connected equipment on the robot (ex: camera, gun).The processing of commands will be programmed by the user in the controller.

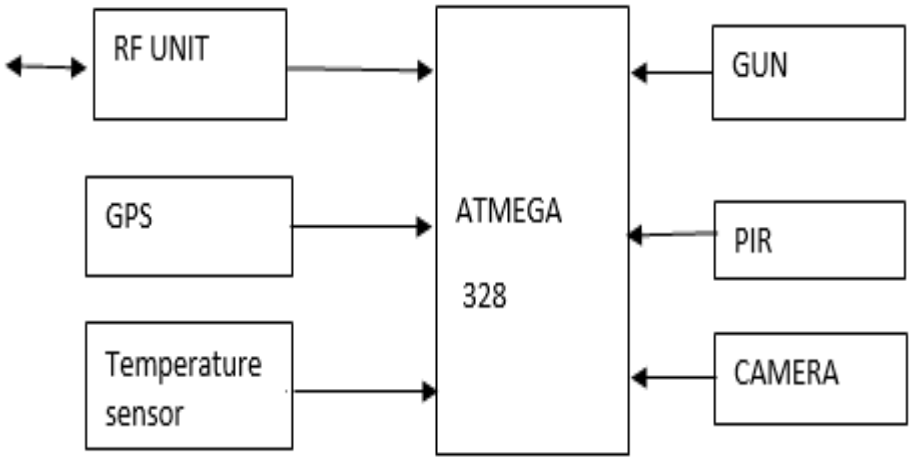


Figure (2): Receiver (ON ROBOT)

*B.Reciever:*Suppose the PIR and camera detects any intruder, the signal will be sent to the controller. Then the controller will send the information to the user via RF units. Hence the user is alarmed and reacts accordingly.
The GPS unit mounted on the robot sends the longitude and latitude position of the robot to the user via RF units.
Gun is also mounted on the system. If the camera mounted on the system visualizes any enemy, the gun fires as command given by the user sitting in the base station. Both the gun and camera rotates in 360 directions. Arrangement is also done to connect extra gun or other equipment like sensors etc. Here also communication is taking place via RF units.

## IV.HARDWARE DESCRIPTION

The main controller board is designed using eagle software. Following components are decided and then the board is made ready according to it. The required circuits for some equipment like RF, GPS are also designed in Eagle. Then the equipment like GPS, RF unit, camera, gun, PIR and temperature sensor are connected to the board. The gun and camera is rotated in 360 directions with the help of motor. Then the whole controller board is placed on a 4 wheeler vehicle. Then the connection of the tires of the vehicle is connected to the board.
The description of the main equipment connected is given.
RF units-RF units are used for communication purpose. The operating frequency of the RF unit used is 2.4 GHz.
GPS unit-GPS unit of model no 001 is used. Its operating frequency is 1575.42MHz.It gives the longitude and latitude position of the system to the user. The system shows its own geographical location by just typing the longitude and latitude coordinates in google. Figure 3 shows the position taken of the robot while operating it.

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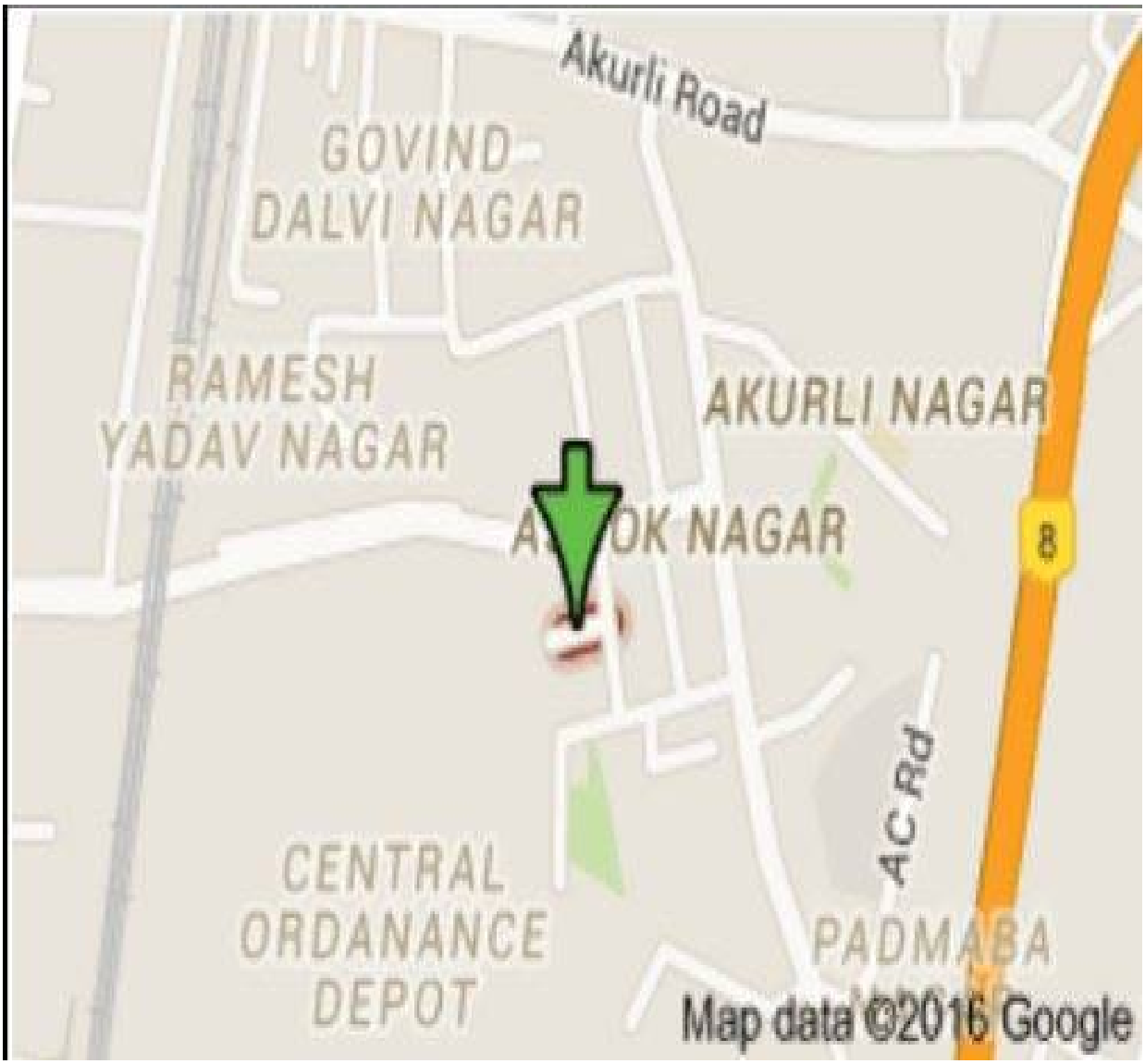


Figure (3): Geographical location of the robot.

Gun-It is used for defense purpose and controlled by the user sitting in the base station.
PIR-PIR is a motion detection sensor. It proves helpful to detect enemies during night.
Camera-It is used to visualize intruder or enemy.
Arrangements are also made to connect extra equipment like Gun, sensors etc.
Temperature sensor-It is user to measure the surrounding temperature. It plays a very important role in border areas because there is sudden rise or drop in temperature in some border areas.

## V. SOFTWARE DESCRIPTION

Arduino is used in programming.Arduino files are burned in the ATMEGA 328 controller and then the programming is done according to the equipment connected**.** Then the robot is controlled by the user using arduino software. Figure 4 represents the flowchart of the robot in which it shows how the actual flow of programming done in controller.

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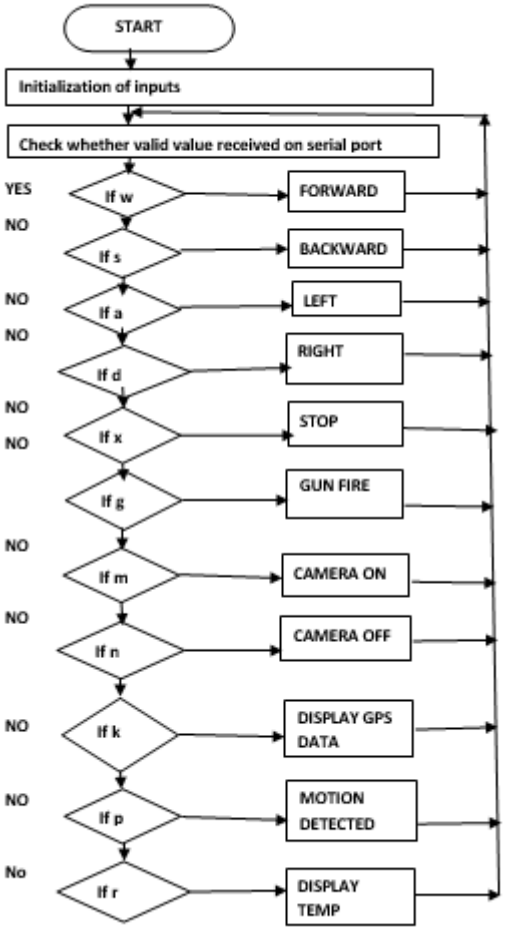


Figure (4): Flowchart of the robot.

Particular alphabet are assigned and programmed in a robot to do a particular task.So whenever the user sitting in the base station presses the particular alphabets on the keyboard the robot will act and also give the necessary information demanded by user.

## VI.RESULTS

Communication between the robot and the laptop is made by RF modules which one RF module is connected on the robot which is also connected to the controller and other RF module is connected to the user's laptop. The Figure 5 represents the actual wireless communication taking place between the robot and the user. It shows the commands of gun, PIR, GPS, temperature sensor, camera given by the user who is sitting in the base station.

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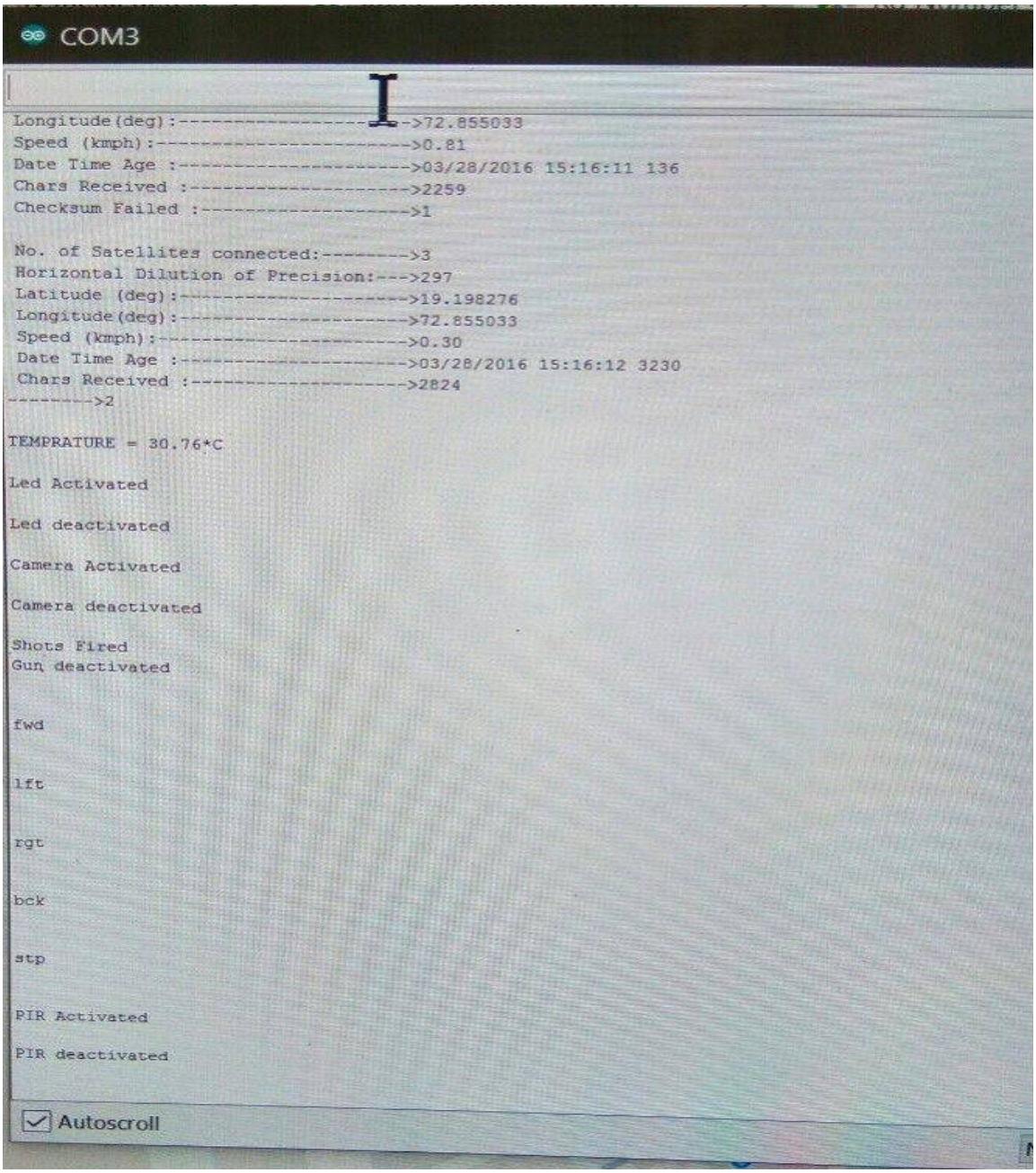


Figure (5): Laptop screen on the user side.

So figure 5 shows you how the robot is acting and receiving the commands given by the user. For example you can see the GPS coordinates which the user has received to know the exact position of the robot. The robot acts as per the commands given by the user.

## VII.CONCLUSION

Today, military makes use of every innovation that has the potential to support military work. In order to strengthen the security of the border areas we require strong robots which will save the lives of soldiers fighting for country. If the robots are equipped with new technologies then surely the robots can do dangerous work that was previously

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undertaken by humans. Hence reducing the risks involved. So our robot is well equipped to play a major role in the border areas.

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## BIOGRAPHY

Hi this is Sachin Suresh Desai writing this paper. I am studying in MPSTME College Mumbai and pursuing Masters in Technology in EXTC. The main aim of making this system was to save the lives of our soldiers fighting for our country. I have also attached my photo below.