International Journal of Technical Research and Applications e-ISSN: 2320-8163,
www.ijtra.com Special Issue 39 (KCCEMSR) (March 2016), PP. 68-71

MINI RADAR

[1] Gangaram Bhor, [2] Pratik Bhandari, [3] Rahul Ghodekar, [4] Sushant Deshmukh,
B.E. Extc
Department of Electronics and telecommunication Engineering,
K.C. College of Engineering & Management studies & Research,
Kopri,Thane(E)-400 603, India.
[1] bhorgangaram77740@gmail.com; [2] pratik1234@gmail.com; [3] ghodekar_rahul@yahoo.com [4]
sushantdeshmukh15@gmail.com

Abstract— **This paper deals with Mini Radar. Mini radar is an prototype of military based surveillance radar. It is implemented using arduino Mega board. The main reason for the use of arduino board was its low cost and its open source nature. Mini radar basically is an autonomous feedback system in which if an intruder enters the surveillance zone it is detected by the ultrasonic sensor of the radar, the sensor communicates to the vehicle(robo) via arduino about the position and the angle of the intruder to the defense vehicle. Knowing the position and angle of the intrusion. The defensive vehicle marches in the direction of intruder and explodes reaching in the vicinity of intruder.**

Index terms- **Sensors, motors. Ardiono Board, Supply.**

I. INTRODUCTION

RADAR is an object detection system which uses radio waves to determine the range, altitude, direction, or speed of objects. Radar systems come in a variety of sizes and have different performance specifications. Some radar systems are used for air-traffic control at airports and others are used for long range surveillance and early-warning systems. A radar system is the heart of a missile guidance system. Small portable radar systems that can be maintained and operated by one person are available as well as systems that occupy several large rooms.

Radar was secretly developed by several nations before and during the World War II. The term RADAR itself, not the actual development, was coined in 1940 by United States Navy as an acronym for Radio Detection and Ranging.

The modern uses of radar are highly diverse, including air traffic control, radar, astronomy, air-defense systems, antimissile systems, antimissile systems; marine radars to locate landmarks and other ships; aircraft anti-collision systems; ocean surveillance systems, outer space surveillance and rendezvous systems; meteorological precipitation monitoring; altimetry and flight control precipitation monitoring; altimetry and flight control systems; guided missile target locating systems; and ground-penetrating radar for geological observations. High tech radar systems are associated with digital signal processing and are capable of extracting useful information from very high noise levels.

II. REVIEW OF LITERATURE SURVEY

An overview of key operational and technical factors governing future radar evolution is given.in [1]

Future concept for FM detection, to identify main lines along which research and development effort should be oriented .Our paper describes a prototype of military radar .Information plays an important role in military operations and radar is thus required to detect, locate and identify numerous targets accurately in all weather conditions and other wide areas. In recent times misusing of unmanned aerial vehicles is becoming the hot and topical problem [2].

Mini UAV detection by radar. Means of air attack (MOAA) were, are and will be in the future, inseparable part of modern armed conflicts. That goes always when warring parties have MOAA in disposal. Highly developed armies are using the whole spectrum of MOAA and their quantity employment intensity and proportion among them depend on many factors such as disposition and situation of enemy, type of operation, phase of conflict, local condition of operation. Hence philosophy of defense against them should be formed. The main solution for this problem would be surface object detection in urban environmental condition using infrared and visible part of electromagnetic spectrum.1q pham2014 [3] M.Polasek in their paper compiled an algorithm for detection and selection of objects of interest in urban built-up background of civil automobiles which closely resemble similar military equipment. Those objects are captured by 1R camera and visible camera in different outdoor conditions for instance during daytime in all seasons. The object detection in infrared spectrum is based on assumptions of object of interest are given definite color .The basic task of the object detection in image data is a selection of an optimal threshold value to be converted from intensity image to binary image.

III. PROBLEM DEFINITION & PROPOSED SOLUTION

This project deals with problems of surface object detection in urban environmental conditions using infrared and visible part of the electromagnetic spectrum. General proposed papers aim to compile an algorithm for detection and selection of objects of interest in urban built-up background, of civil automobiles which closely resemble similar military equipment. Those objects are captured by infrared camera and visible camera in different outdoor conditions- for instance

during daytime in all seasons. The object detection in infrared spectrum is based on assumption that the objects of interest have sufficient contrast against the background, while the object detection in visible spectrum is based on assumption that the objects of interest are given a definite color. (In detail [3]).

The basic task of the object detection in image data is a selection of an optimal threshold value to be converted from intensity image to binary image. As a result of the variable environmental conditions and variable colors of the objects, the optimal threshold value can be changed. In case of this type image processing is used, we divide algorithms into infrared images processing, images processing acquired in visible range. Each category is given several different algorithms for targets detection.

However image processing proves to be time consuming for fast detection of objects as well as become difficult in adverse weather condition. Our project describes the configuration, operation principles and the performance of battlefield surveillance radar. It is a radar, which operates in moving target detection (MTD) modes. The radar can be used for the reconnaissance and surveillance missions with good performance even in adverse weather condition or smoky battlefield environment. It is especially suitable for the operation on the unmanned surveillance air vehicle.

IV. System Design

Block Diagram:

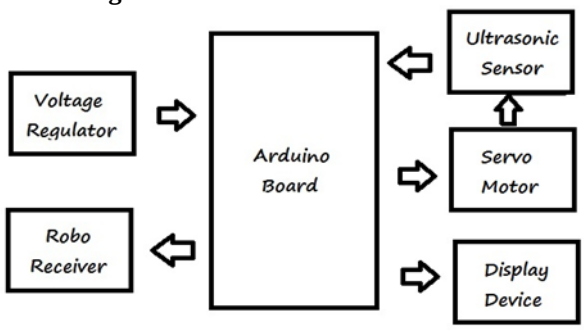
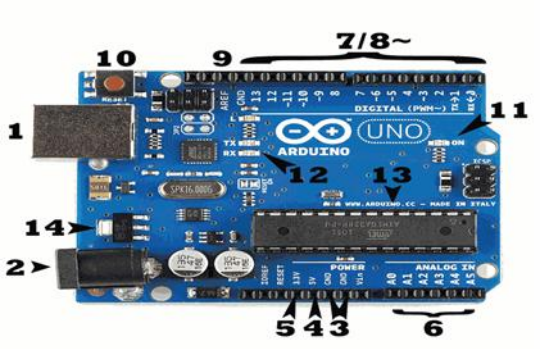


Figure 1.1 Block Diagram

Hardware Specification & Working:



Arduino Board

Every Arduino board needs a way to be connected to a power source. The Arduino UNO can be powered from a USB cable coming from your computer or a wall power supply that is terminated in a barrel jack..

The USB connection is also how you will load code onto your Arduino board. More on how to program with Arduino can be found .The Arduino has several different kinds of pins, each of which is labeled on the board and used for different functions

Pushing the Reset Button it will temporarily connect the reset pin to ground and restart any code that is loaded on the Arduino.

The black thing with all the metal legs is an IC, or Integrated Circuit . It is a brains of our Arduino. The main IC on the Arduino is slightly different from board type to board type ,but is usually from the ATmega line of IC's from the ATMEL company.

The voltage regulator does exactly what it says – it controls the amount of voltage that is let into the Arduino board.

Ultrasonic Sensor :

Ultrasonic sensors are widely used in robo project for distance measurement as well as for Obstacle detector. The Ultrasonic module has two transducers ,one for Transmit and the other for receive ,both are fixed on a single pcb with control circuit ,so that it can be easily used in our robo projects .Ultrasonic Distance sensor provides precise ,non-contact distance measurements from about 2cm-400cm.Ultrasound is high frequency sound of 400khz .The principle of ultrasonic distance measurement is same as that of radar

UltraSonic Sensor

Servo Motor :

Servo motors have three wires: power, ground, and signal. The power wire is typically red, and should be connected to the 5V pin on the Arduino board. The ground wire is typically black or brown and should be connected to a ground pin on the Arduino board. The signal pin is typically yellow, orange or white and should be connected to a digital pin on the Arduino board. Note that servos draw considerable power, so if you need to drive more than one or two, you'll probably need to power them from a separate supply (i.e. not the +5V pin on your Arduino). Be sure to connect the grounds of the Arduino and external power supply together.

Figure 1.6 Servo Motor

4.3 ARDUINO SOFTWARE :

The Arduino integrated development environment (IDE) is a cross-platform application written in Java, and is derived from the IDE for the Processing programming language and the Wiring projects. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and is also capable of

compiling and uploading programs to the board with a single click. A program or code written for Arduino is called a "sketch".

Arduino programs are written in C or C++. The Arduino IDE comes with a software library called "Wiring" from the original Wiring project, which makes many common input/output operations much easier.

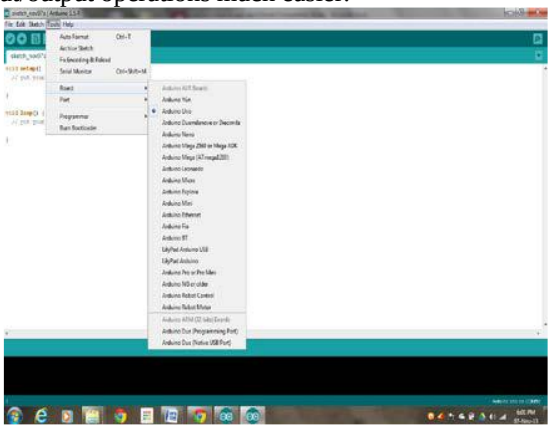


Figure 1.7 Arduino IDE

V. APPLICATION

The idea of making an Ultrasonic RADAR appeared to us while viewing the technology used in defense, be it Army, Navy or Air Force and now even used in the automobiles employing features like automatic/driverless parking systems, accident prevention during driving etc. The applications of such have been seen recently in the self parking car systems launched by AUDI, FORD etc. And even the upcoming driverless cars by Google like Prius and Lexus.

A. Air Force

In aviation, aircraft are equipped with radar devices that warn of aircraft or other obstacles in or approaching their path, display weather information, and give accurate altitude readings. The first commercial device fitted to aircraft was a 1938 Bell Lab unit on some United Air Lines aircraft. Such aircraft can land in fog at airports equipped with radar-assisted ground-controlled approach systems in which the plane's flight is observed on radar screens while operators radio landing directions to the pilot.

B. Naval Applications

Marine radars are used to measure the bearing and distance of ships to prevent collision with other ships, to navigate, and to fix their position at sea when within range of shore or other fixed references such as islands, buoys, and lightships. In port or in harbor, vessel traffic service radar systems are used to monitor and regulate ship movements in busy waters.

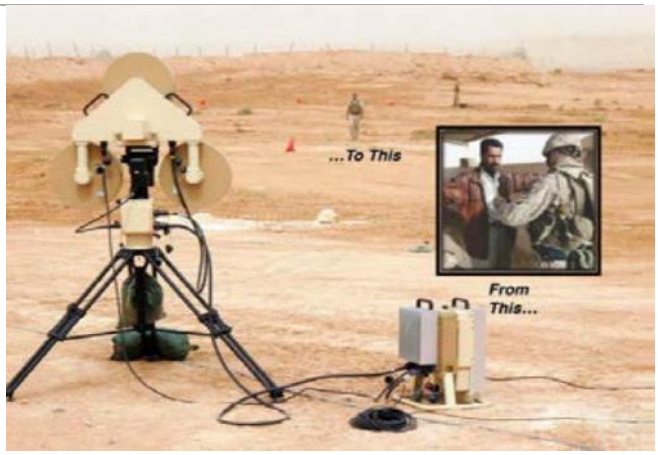
C. Applications in Army

Two video cameras automatically detect and track individuals walking anywhere near the system, within the range of a soccer field. Low-level radar beams are aimed at them and then reflected back to a computer, which analyzes the signals in a series of algorithms. It does this by comparing the radar return signal (which emits less than a cell phone) to an extensive library of “normal responses.”

Those responses are modeled after people of all different shapes and sizes (SET got around to adding females

in 2009). It then compares the signal to another set of "anomalous responses" – any anomaly, and horns go off.

Literally, when the computer detects a threat, it shows a red symbol and sounds a horn. No threat and the symbol turns green, greeting the operators with a pleasant piano riff.



VI. CONCLUSION

Future Radar Concepts Will Result from Multiple interactions and tradeoffs between anticipated requirements, available technologies, and permanent basic limitations. In this paper, an overview of these key factors is given, in order to examine some promising future concepts and to identify main lines along which research and development effort should be oriented. Being highly prospective, this paper is certainly highly critic able. Rather than pretending to determine the future, the main objectives of this paper are to simulate reflexion and discussions about significant evolutions in radar concepts, and possible breakthroughs The views presented here are the result of personal reflexion, past experience, and multiple professional interactions, as such, they should not be considered as representative of any country or company opinion.

REFERENCES

[1]Future Concepts for Electromagnetic Detection - FranGois le Chevalier

[2] Mini UAVs Detection by Radar- Miroslav Krátký*, Luboš Fuxa

[3]ALGORITHM FOR MILITARY OBJECT DETECTION USING

IMAGE DATA - Iq. Pham and M. Polasek, University of Defence, Kounicova 65, 66210 Brno, the Czech Republic

[4] http://www.arduino.cc

[5] http://en.wikipedia.org