AUTOMATED TARGETING SYSTEM FOR OPEN SPACE MILITARY AREA

Abisheik T[1], BanuPriya S[2], Avinash R[3], Amali C[4]

[1,2,3]Students, Department of Electronics and Communication Engineering, Valliammai Engineering College.
[4]Assistant Professor, Senior Member, Department of Electronics and Communication Engineering, Valliammai Engineering College.

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Abstract - *A rangefinder is a device that measures the distance from the target to the observer, for the purposes of surveying, determining focus in photography, or accurately aiming a weapon. In this technical project, we make a simple radar using the ultrasonic sensor, this radar works by measuring a range from 3cm to 40 cm as non-contact distance .The movement of the object is controlled by using a small servo motor. Information received from the sensor will be used by software to illustrate the result on a PC screen. If sensor is detected within specified range buzzer will be sound and will be displayed in the LCD.*

Index Terms— *Transmitter, Receiver, Wireless Personal Area Network, Arduino, Current Sensor.*

I. INTRODUCTION

RADAR systems is used in the field of detection and monitoring. Some of these are in the fields of navigation and positioning other applications. In this research, existing radar technologies are examined by Arduino. The advantage of this system is used to reduce power consumption and allow the designers to have access to a wide range of online communities of Arduino programmers and open source reusable code. The system consists of an ultra-sonic sensor, an Arduino micro-controller, a servo motor and a java application for mapping the electro-magnetic waves. A prototype system is built by connecting the ultra-sonic sensors to the Arduino microcontroller's digital input/output pins and the servo motor also connected to the digital input/output pins. Both the ultra - sonic sensor and the servo motor are then clipped together so that as the servo motor sweeps from right to left through an angle of 1800 the servo will rotate alongside it.

RADAR is used in surveillance of 24/7. The basic needs of these are security. RADAR can be used to detect aircraft, spacecraft, missiles, vehicles, weather formation and so on. It consists of Trans-receiver and Processor. RADAR can be of many types. Ultrasonic senor is an object detecting system which is used to monitor an area of short range. Ultrasonic Sensor mounted on a Servo Motor. The RADAR is programmed using embedded C, and the result is observed on MATLAB platform.

PROPOSED SYSTEM

In this proposed system GSM technology is implemented for transmitting the information to the supplier. The system is designed in such a way to prevent the electricity thefts happening in the current scenario. This system is being interfaced with Arduino and sensors which are used to find the problem, if any problem is detected then the message will be sent to the user via GSM. This will prevent the unknown entries. The proposed system gives solution for the existing problems like power theft, wastage of energy and transmission line fault that are faced by the authorized power suppliers.
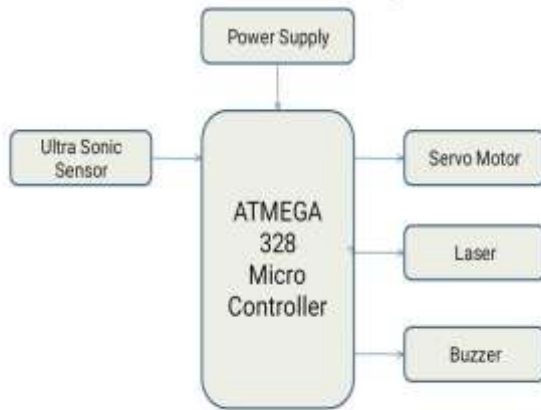
III.HARDWARE SETUP

The hardware setup plays a vital role in the designing process of this system. The following are the building blocks of the system. They are:

- ARUDINO Microcontroller.
- Motor driver.
- GSM.
- Ultrasonic sensor.
- Power supply.

The digital output capabilities for moving the servo on which the ultrasonic sensor is mounted and for generating informative tones from a buzzer using Pulse Width Modulation (PWM). This buzzer would also require a single digital pin for communications over a soft serial port. All of the sensors that I am looking into purchasing run at 5v and are compatible with the Arduino's and internal step-up resistance. This will make assembly of the apparatus straightforward. For the sensor circuitry, I intend to purchase IR sensors manufactured by Solarbotics and an ultrasonic sensor manufactured by Devantech. In my research, I've learned that some servo motors have non-mechanical issues with being commanded to a full 180-degree rotation, the ultrasonic sensors can be mounted which minimize weight and maximize range of motion. For the SONAR sensor i will need a routine that will coordinate movements of the motor with readings from the sensor. Another routine will check the digital ultrasonic sensors and output if an object is detected, and on which sensor. Yet another routine will serve as a sensor manager and call a

routine to generate audible alerts, based on what sensors have been activated. The goal is to generate unique alerts for each of the digital sensors. I would like to use a Voice Box shield leveraging a SpeakJet chip, although a piezo buzzer would also be sufficient. The sensor manager must be designed in such a way that it could easily be merged into a robot's code in order to affect actual movement. An example of how the sensor manager could be applied to a fight control system would be to replace the unique output tones with directional flight commands, and the beacon controls with speed reduction commands.

IV. BLOCK DIAGRAM DESCRIPTION

ARDUINO IDE

Arduino IDE is a cross platform application in programming language in java. Its used to write the program and upload the program to ardunio compatible .arduino ide supply a software library from the wiring project which provides common input and output procedures

It consists of a standard programming language compiler and a boot loader that executes on the microcontroller.
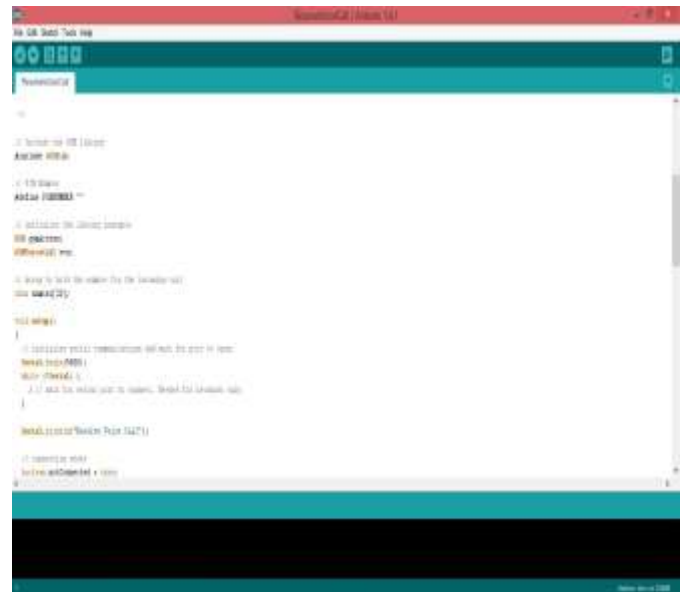
ARDUINO SPECIFICATION

NAME	SPECIFICATION
Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage	6-20V
Digital I/O Pins	14
Analog Input Pins	6
DC Current per I/O Pin	40 Ma
DC Current for 3.3V Pin	50 Ma
Flash Memory	32 KB
SRAM	2 KB

EEPROM	1 KB
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

ARDUINO SOFTWARE

Arduino software *refers to an open-source electronics platform or board and the* ***software*** *used to program it.* ***Arduino software*** *is designed to make electronics more accessible to artists, designers, hobbyists and ayone interested in creating interactive objects or environments.*

GSM

GSM is Global System for Mobile Communication. GSM uses digital wireless techniques like TDMA and CDMA. GSM has an inbuilt dual band GSM engine-SIM 800A. GSM can carry about 64 kbps to 120 Mbps of data rates. GSM also provides advanced voice and data services. It has both transmitting and receiving pins which are used to send and receive messages.

ULTRASONIC SENSOR:

The ultrasonic sensor is simple and use high-frequency sound waves that are evaluated when the sensor received back the waves. Ultrasonic sensor determine the distance between the robot and object, the sensor measure the elapsed time between sending and receiving the waves. Ultrasonic sensors are ideal for measurement in different environments where measurements cannot be affected by the surface, material, light, dust, or other noises.

Ultrasonic senor is one of the most popular ultrasonic sensors used in robotics by students and hobbyists to determine the distance from a robot to objects. Ultrasonic senor is available at a low-price, it is stable and has high accuracy. Ultrasonic senor working principle is similar to bats or dolphins, and its operation is not affected by sunlight or other noises.HC-SR04 provides measurement function between 2 and 400 centimeters at a range accuracy of 3 millimeters. The Ultrasonic senor module hosts the ultrasonic transmitter, the receiver and control circuit.

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Ultrasonic senor is used in a wide range of applications including here the measurement of distance, presence detection, or detect the position of an object.

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MOTOR DRIVER:

The motor driver is available for providing User with ease and user friendly interfacing for embedded application. Motor driver is mounted on a good quality. The pins of motor driver IC are connected to connectors for easy access to the driver IC's pin functions. The motor driver is a Dual Full Bridge driver that can drive up to 1Amp per bridge with supply voltage up to 24V. motor driver can drive two DC motors, relays, solenoids, etc. The device is TTL compatible. Two H bridges of motor driver can be connected in parallel to increase its current capacity to 2 Amp.

V. SOFTWARE USED

ARDUNIO IDE is software for microprocessor simulation, schematic capture, and printed circuit board (PCB) design. It is developed by Labcenter Electronics.

ARDUNIO user dismiss schematic capture as a necessary evil in the process of creating PCB layout but we have always disputed this point of view. ARDUNIO PCB layout now offering

automation of both component placement and track routing, the design into the computer can often be the most time consuming element of the exercise. if you use circuit simulation to develop your ideas, you are going to spend even more time working on the schematic.

Other general features include:

- Runs on Windows 2k onwards.
- Automatic wire routing and dot placement/removal.
- Arduino support for buses including component pins, inter-sheet terminals, module ports and wires.
- Arduino outputs to suit all popular PCB layout tools.

The ISIS incorporates a number of features which aid in the management of large designs. The number of our customers have used it to produce designs containing many thousands of components.

1) ISIS & ARES

ARES indeed other PCB software will find some of the following PCB design specific features of interest:

- Isis & ares Sheet Global Net Properties which allow you to efficiently define a routing class for all the nets on a given sheet
- Isis & ares Physical terminals which provide the means to have the pins on a connector scattered all over a design.
- Support for heterogeneous multi-element devices. For example, a relay device can have three elements called RELAY:A, RELAY:B and RELAY:C.
- Isis & ares is a visual packaging tool which shows the PCB footprint and its pin numbers alongside the list of pin names for the schematic part. Isis & ares facilitates easy and error free assignment of pin numbers to pin names

2) ISIS & Simulation

ISIS & simulation provides the development environment for PROTEUS VSM, our revolutionary interactive system level simulator. ISIS & simulation product combines mixed mode circuit simulation, micro-processor models and interactive component models to allow the simulation of complete micro-controller based designs.

 ISIS & simulation architecture for real time interactive simulation and a system for managing the source and object code associated with each project. ISIS & simulation number of graph objects can be placed on the schematic to enable

conventional time, frequency and swept variable simulation to be performed.

Major features of PROTEUS VSM include:

- *ISIS & simulation True Mixed Mode simulation based on Berkeley SPICE3F5 with extensions for digital simulation and true mixed mode operation.*
- *ISIS & simulation Support for both interactive and graph based simulation.*
- *ISIS & simulation CPU Models available for popular microcontrollers such as the PIC and 8051 series.*
- *Virtual Instruments include voltmeters, ammeters, a dual beam oscilloscope and a 24 channel logic analyser.*
- *ISIS & simulation On-screen graphing - the graphs are placed directly on the schematic just like any other object.*
- *ISIS & simulation Graph Based Analysis types include transient, frequency, noise, distortion, AC and DC sweeps and fourier transform. An Audio graph allows playback of simulated waveforms.*
- *ISIS & simulation Direct support for analogue component models in SPICE format.*
- *ISIS & simulation Open architecture for 'plug in' component models coded in C++ or other languages.*
- *ISIS & simulation is aDigital simulator includes a BASIC-like programming language for modelling and test vector generation.*
- *ISIS & simulation design created for simulation can also be used to generate a netlist for creating a PCB - there is no need to enter the design a second time.*

3) ISIS & Networks

ISIS & network is a network compatible, and offers the following features to help Network Managers:

- *ISIS & network Library files can be set to Read Only. ISIS & network prevents users from messing with symbols or devices that may be used by others.*
- *ISIS & network individual user configuration in the windows registry*

VI.CONCLUSION

The project presents design, prototyping, and tests of a low-cost mini radar system, with specific interest on the synchronization of radar and navigation data. The project presented system has been conceived for radar applications on board unmanned aerial platforms. Hence, the prototype needs to be agile, flexible, and reliable, able to operate in different modes, according to the requirements of the application. The

employment of the radar on board of RPAs involves severe limitations in terms of weight, consumption, and overall dimensions. The required radar capabilities and the moving nature of the sensor imply a fine synchronization between radar and navigation data

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