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Automatic Intelligence Petroling / Serveillance Boat for Navy

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Abstract: **The automatic patrolling boat is an unmanned self-guided drive system.it is equipped with the automated programmed drive system interfaced with directional sensors IR sensors, distance measurement sensors, accelerometer, heat sensing element motion sensors and long distance audio video camera with a 360 degree rotation mounted on it is small in size and capable of tracking any illegal activity near costal area and take necessary actions and send data to control room**

Keywords:- **Unmanned, sensor, automation, programmed, matlab**

I. INTRODUCTION

The behind this project is inspired by the attack of 26/11 happened in Mumbai Maharashtra India which was so terrifying which shook the whole world and people still won't be able to forget that incident till now and on that day around 200 people got murdered by terrorist came from Karachi Pakistan these terrorist came from sea way via one speed boat and entered in the Mumbai city although there were security but that security wasn't enough to track them down even before they came to Mumbai is such technology was present at that time then maybe we could have saved lots of people life and had much time to think about further actions so in future this should not happen again this is the project which will be helpful to increase the security over sea areas so that we can detect the threat ever before came in to city that's why we developed the project of automatic patrolling boat for navy which is programmed and there is no need to control it by any wireless technology or man controlled this boat is equipped all motion detector sensor ,heat sensor, laser sensor high definition A/Vcamera interfaced with MATLAB toolbox to view the live image and programming unit.

II. INTERFACING PROTOTYPE BLOCK DIAGRAM

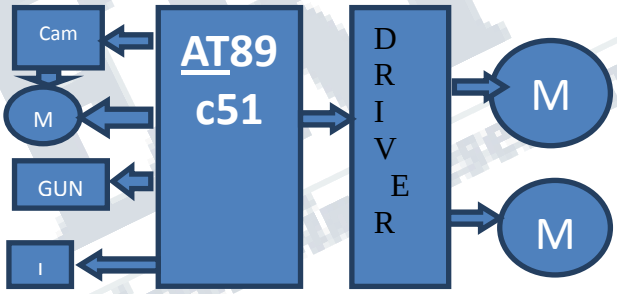


Fig 1.1

As shown in above block diagram we can see that we used microcontroller AT89c51 interfaced with L293D motor driver IC and on the left hand side we interfaced IR sensor, motionsensor, directionalsensor ,camera and all other necessary sensors to provide the necessary data to control room in order to maximize the security. Microcontroller is a low power device which is min to max operating voltage range from 4v to 5.2 v but the we have interfaced the two motors with microcontroller for propeller s in terms of drive system for boat and both the motors are DC motors runs at 12/24 volt and AT89c51 is not able to prove such high voltage to motor so we need to interfaced driver IC named L293D /uln02003 which require the 12 v external power supply in order to drive the motor this IC can take logic from AT89c51 which is of 5 volt and with the help of that it drive the motor at 12/24 v .two motors are used to drive propeller and one motor is used to rotate the camera from 0 degree to 360degree rotation in order to provide 3D view to control room to keep watch over the sea area which is to be patrolled all the three motors are interfaced with single microcontroller and

programmed so that no need to control the boat by hand or any other medium it is all automated and can take self-decisions during surveillance .

III .DC MOTOR

Fig 1.2

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. Opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. Starting by looking at a simple 2-pole DC electric motor (here red represents a magnet or winding with a "North" polarization, while green represents a magnet or winding with a "South" polarization). Every DC motor has six basic parts axle, rotor (a.k.a., armature), stator, commutator, field magnet(s), and brushes. In most common DC motors, the external magnetic field is produced by high-strength permanent magnets. The stator is the stationary part of the motor. This includes the motor casing, as well as two or more permanent magnet pole pieces. The rotor (together with the axle and attached commutator) rotates with respect to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the commutator. The above diagram shows a common motor layout with the rotor inside the stator (field) magnets. The geometry of the brushes, commutatorcontacts, and rotor windings are such that when power is applied, the polarities of the energized winding and the stator magnet(s) are misaligned, and the rotor will rotate until it is almost aligned with the stator's field magnets. As the rotor reaches alignment, the brushes move to the next commutator contacts, and energize the next winding. Given our example two-pole motor, the rotation reverses the direction of current through the rotor winding, leading to a "flip" of the rotor's magnetic field, driving it to continue rotating.

IV. TOUCH PLATE CIRCUIT

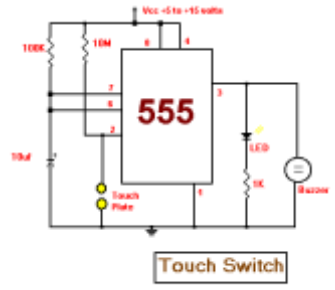


Fig 1.4

This is a very simple touch sensor switch that is built with the555timerIC.You just need to touch the metal plate and the relay gets energised and is kept in this state for about 100 seconds, then is released. This kind of sensor switch is suitable for making touch operated bells, buzzers of small toys which operate for a small time and then switch off automatically. The input impedance of the trigger is very high and the touch sensor switch can be triggered by the voltage induced in the human body. The relay is a 12 V DC relay operating at currents less than 200 mA.

V.DARK SENSOR

In above circuit R1 can be used to adjust the sensitivity. And the working of the circuit is very simple. The LDR will have very low resistance during day time so the transistor Q1 will be in OFF condition. And during night time the resistance will be very high so automatically the transistor Q1 will be ON. The Q1 is PNP transistor and the emitter of Q1 is given to base of Q2. So the Q2 transistor will be ON only if the transistor Q1 is ON. The TRIAC is used in the circuit to make is circuit complete. As the TRIAC will allow voltage to pass from either direction only when there is a certain threshold voltage in gate terminal. And the gate of TRIAC is controlled by transistor Q2. So totally the lamp will be ON during night time and will be again switched off during day light. To change the sensitivity of the circuit to light adjust R2

VI. IR SENSOR

The frequency, or repetition rate, of the output pulses is determined by the values of two resistors, *R*1 and *R*2 and by the timing capacitor, *C*.

The design formula for the frequency of the pulses is:

$$f = \frac{1.44}{(R1 + 2R2) \times C}$$

Here, R1=R2=1k and C=1 uF. Hence, output frequency is be obtained as,

$f = 480$ Hz….Theoretically

Practically, we obtained value as

$f = 485$Hz ….Practically

This output is given to the IR LED through a PNP driver transistor. The output of IR LED is received by IR receiver. When there is no obstacle in-between, IR receiver remains ON and base of transistor Q5 is grounded. When car is placed in the slot, IR rays are obstructed and receiver D3 turns OFF. Thus, input to base of Q5 is Logic '1'. Transistor Q5 acts as an inverter and hence logic '1' at its input is converted to logic '0' at its collector output. The output of Q5 is a square wave of frequency 487Hz. This again acts as input to another transistor Q4 which provides inverted output logic '1' at itscollector. The output obtained at collector of Q4 is improper. This output is applied as input to IC 40106 which is a Schmitt trigger and it converts the improper logic 0/1 to proper 0/1. This output of IC 40106 is given to input of microcontroller. IC 40106 ensures that microcontroller is not falsely switched ON/OFF.

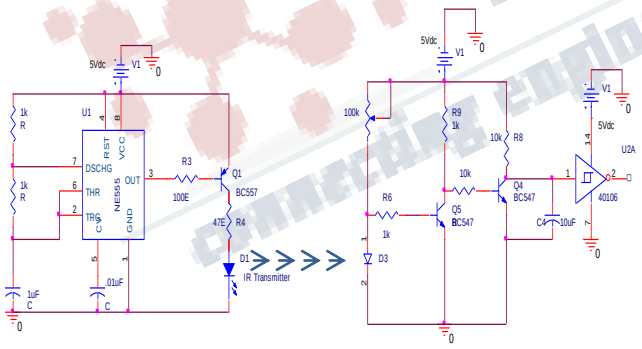


Fig 1.6

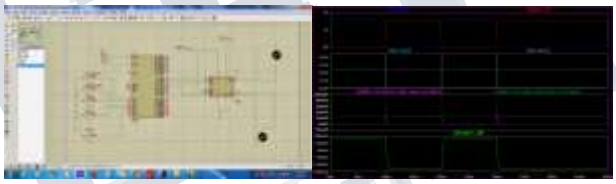
VII.SOFTWARE IMPLIMENTATION

RIDE is a 32-bit Windows Integrated Development Environment (IDE) which contains a set of development tools for 8051 and XA microcontroller applications. This development environment includes color-coded syntax highlighting editor, a project manager, on-line help, and provides all the facilities needed to call the different RAISONANCE development tools. We used the ride software to decode the program file in to HEX file in rdert o upload it in to microcontroller

RIDE editor

Fig 1.7

Proteus is one of the most famous simulators. It can be uses to simulate almost every circuit on electrical fields. It is easy to use because of the GUI interface that is very similar to the real Prototype board. Moreover it can beused to design Print Circuit Board (PCB).we used this software to do necessary simulation of our microcontroller circuit diagrams



Simulation of L239D motor

Fig 1.8

VIII. PCB LAYOUTS

Fig 1.9

IX.WORKING MODEL

Fig 1.10

X. CONCLUSION

If we implement this project we can save the coastal areas and automation could eliminate some human errors and make the system of such operation safer. Itcan be used to prevent suspicious activity as well as illegal activity in coastal area.

REFERENCE

1. www.wikipedia.com
2. www.youtube.com
3. www.coursera.com
4. www.edx.com
5. Sensor Technology Handbook: Jon S. Wilson
6. www.nptel.com
7. www.ride.com