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Swagger Machine to Survey the Ocean

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Abstract: **-- Ocean Exploration and Navigational Research is leading efforts by supporting expeditions with computer vision techniques have shown potential for Sailboat robots developed in order to make measurements at the surface. The marine environment presents an almost ideal test-bed for the evaluation and development of robotic technologies. Robot sailing is a challenging task in both building and controlling the boat therefore it brings together many different disciplines. The sailing robot explores in interpretation of video footage, the identification of sailing features, human-robot interaction, vehicle control, position estimation and mechanical design. Key applications for this vessel are the assessment of marine habitats and complex manoeuvres. An idea presented has been with a Robotic vehicle which activates automatically and manually control the moving object in the water the robot will capture and sends the information to the pc (personal computer) which uses advanced image processing technology and compares relevant images by identifying underwater features which will follow the object present in the surface of ocean. Here ARM7 processor is in built with interfacing a wireless camera which uses RF based communication. The DC motors are used to rotate the arms of the robot to catch habitats.**

Keywords— Sailing robot; Footage; Manoeuvres; Habitats;

I. INTRODUCTION

To Explore, Survey and Mine the ocean. To aim at activating automatically and manually control the moving object in the water, the robot will initialize & capture values and sends information to the Base Station. To implement a human-robot interaction, position estimation and can also be used for transportation of goods. To explore the under water mining and surveillance of borders or other areas of interest.

II. RELATED WORK

A. Transmitter:

The Transmitter section having the four switches placed around the neck and RF Module. Initially the switches are at logic1. When the switch is pressed the concerned switch level goes to logic0.The switches are the inputs to RF transmitter through the RF encoder is shown in fig.1

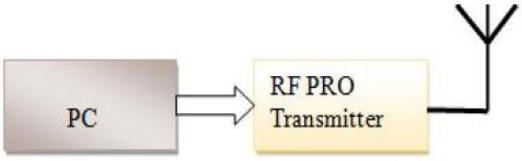

Fig. 1. Transmitter Section

B. Receiver

The received signal from the transmitter is fed to the RF decoder (Serial input and parallel output) .The output of the decoder is given to H-Bridge through the ARM processer shown in fig2.The output of H-Bridge drives the DC motors.

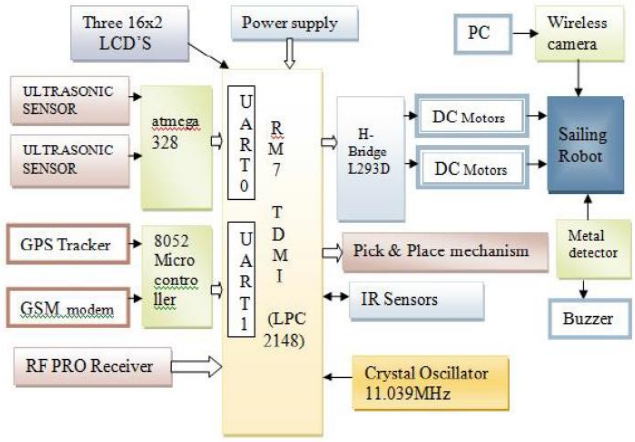

Fig. 2. Receiver Section

III. DESIGN

Radio frequency [RF] has a frequency range about 3Hz to

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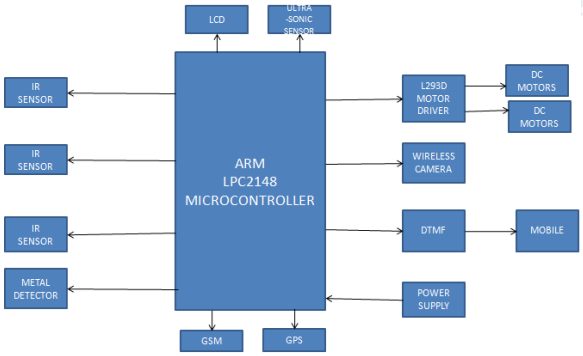
300GHz. This range corresponds to frequency of alternating current electrical signals used to produce and detect radio waves. Since most of this range is beyond the vibration rate that most mechanical systems can respond to RF usually refers to oscillations through paths that contain insulating material, like the dielectric insulator of a capacitor. The degree of effect of this property depends on the frequency of the signals. RF is a radio frequency technology which uses frequencies in the range of 3MHZ to 300 MHZ in general. Here in this RF system, we are using the frequency of 433MHZ which is in the in electrical circuits or electromagnetic radiation. When an RF current is supplied to an antenna, it gives rise to an electromagnetic field that propagates through space. Electrical currents that oscillate at RF have special properties not shared by direct current signals. One such property is the ease with which it can ionize air creates a conductive path through air. Another property is the ability to appear to flow Frequency range. The distance of this radio frequency range is up to 100m in general. In this project, the distance is up to 100m. The main requirements for the communication in RF:

- RF transmitter.
- RF receiver
- Encoder and decoder.

A. Block Diagram



A.RF TRANSMITTER:

The STT--433 is ideal for remote control applications as shown in Fig.1 where low cost and longer range is required. The transmitter operates from a 1.5-12v supply, making it ideal for battery powered applications. The transmitter employs a SAW-stabilized oscillator, ensuring accurate frequency control for best range performance. The manufacturing friendly SIP style package and low– cost make the STT-433 suitable for high volume applications.

Features:

433.92Hz Frequency, Low cost, 1.5-12V operation, small size. PIN OUT:

GND: Transmitter ground. Connect to ground plane.

DATE: Digital date input. This input is CMOS compatible and should be driven with CMOS level inputs.

VCC: Operating voltage for the transmitter VCC should be bypassed with a .01uF ceramic capacitor and filtered with a 4.7uF tantalum capacitor . Noise on the power supply will degrade transmitter noise performance.

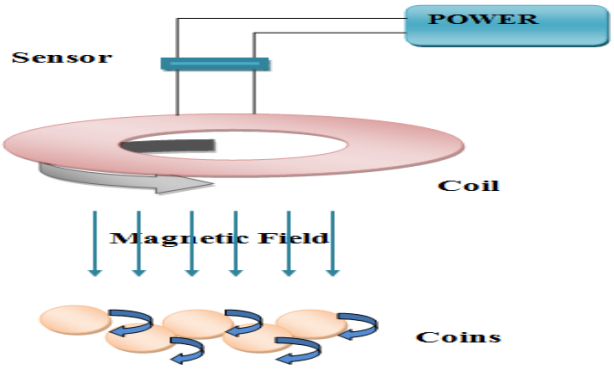
ANT: 50ohm antenna output. The antenna port impedance affects output power and harmonic emissions. Antenna can be single core wire of approximately 17cm length or PCB trace antenna.

Features:

- Low current (max.100ma)
- Low voltage (max.65v).

IV. WORKING PRINCIPLE & MODEL

The whole system involves the ARM processor to which all the peripherals are connected like GPS, DTMF, GSM, LCD, Motor drivers and DC motors, Wireless camera and Sensors. The robot can be operated manually and autonomously too the manual operation can be controlled by mobile by the DTMF. The wireless camera sends the video footage to the projector through RF communication. The sensors detects if any obstacles are present in the surface of the water and under the water too. If present then through the GSM a message is sent to the mobile indicating about the obstacle and it is also displayed in the LCD. The location of the robot is known by using GPS and it sends the co-ordinates of the location to the mobile and it used for tracking the location if the robot is lost The output of the H-Bridge drives the DC motors and two DC motors are used to rotate the arms of the robot in all directions



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A. Working of DTMF

In order to control the robot, make a call to the cell phone attached to the robot (through head phone) from any phone, which sends DTMF tunes on pressing the numeric buttons. The cell phone in the robot is kept in "auto answer" mode. (If the mobile does not have the auto answering facility, receive the call by "OK" key on the rover-connected mobile and then made it in hands-free mode.) So after the ring the phone accpets the call.

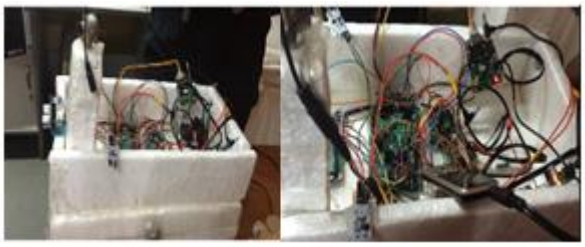
B. Working principle of GPS

The Global Positioning System (GPS) is a satellite navigation system that provides location information anywhere on or near the Earth's surface. It comprises a number of satellites in orbit above Earth. Each satellite continually transmits messages that include the time the message was transmitted, and the satellite position. On the ground the GPS unit receives these messages and, by comparing the time at which the message was received (on its internal clock) against the time which the message was transmitted, it works out how far away it is from each satellite. In order to calculate its location the GPS unit must receive messages (signals) from a minimum of four satellites.

C. Working principle of Sensors

All objects which have a temperature greater than absolute zero (0°K) possesses thermal energy and are sources of infrared radiation as a result. Sources of infrared radiation include blackbody radiators tungsten lamps and silicon and silicon carbide. Infrared sensors typically use infrared lasers and LEDs with specific infrared wavelengths as sources. When an object is close to the sensor, the light from the LED bounces off the object and into the light sensor. This results in a large jump in the intensity, which we already know can be detected using a threshold.

D. Model



V. RESULTS

The swumanoid a sailing robot for oceanographic research is used to explore all the details on the surface of the water. This robot is used for locating the position of the system using GPS and GSM, detects metal present in the ocean, and measures the depth and boundries and used for the survillence and research operation

VI. COST ANALYSIS

Implementation process of the project can cost around Rs 3 lakhs @ min & as a part of implementation process i.e., cost of metal detector and sensors depends upon how much can the owner afford financially, that includes based on size, quantity &quality (Q&Q). This project can be implemented in Ocean for oceanographic research and for mining.

VII.CONCLUSION

We introduce a successful working prototype model of maneuver sailing mobile robot is designed for oceanographic research. An autonomous sailing robot offers major advantages compared to submerged operated vehicles. This robot is used for locating the position of the system. The surface environment of ocean i.e., ocean exploration and navigational research can be studied.

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