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UNDERWATER R.O.V ROBOT

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Abstract – *Underwater R.O.V (Remote Operating Vehicle) Robot. A Underwater R.O.V (Remote Operating Vehicle) Robot is a Fully controllable submarine used mainly for marine environmental research. We aim to develop a low cost, full controllable submarine which is able to travel underwater oceanographic survey, pipeline and subsea structure inspection. The structure was designed and patented using a novel idea of the diving system employing a volume adjustment mechanism to vary the submarine density. These robots are tethered by a series of wires that send signals between the operator and the ROV. All ROVs are equipped with a video camera, propulsion system, and lights. A light weight, flexibility and small structure provided by PVC can be used to construct the liked shape submarine. Four handmade waterproof thrusters control the propulsion system horizontally and vertically of this robot. The camera of this robot works as eyes .Hydraulic seal and O-ring rubbers are used to prevent water leaking. Other equipment is added depending on the specifications required. This submarine is controlled by a wired communication system In order to keep the ROV stable in the water, you need a design that is weighted on the bottom and has floats on the top. For our ROV we decided on a large center tube with two smaller tube located on either side, slightly underneath the center tube.*

1. INTRODUCTION

The world's oceans cover 2/3 of the Earth's surface and have been critical to human welfare throughout history. Our scientific understanding of the deep sea is expanding rapidly through the use of a variety of technologies the first scientific explorations were conducted primarily through the use of diving and human occupied submersibles, complemented by a variety of other technologies such as towed or lower instrument, trawls, dredges, autonomous seafloor instruments, and deep-sea drilling. More recently remotely operated and autonomous vehicles have begun to revolutionize seafloor exploration, often returning superior data at reduced costs. In the near future, seafloor observations linked by fiber-optic cables and satellites will return massive amounts of data from coastal and deep sea sites. The motivation of this research is that it is impractical to manually explore the underwater section of the ship anchored or waiting to be docked Immediately inspect the cracks on ship underwater would reduce unwanted risk. Exploring partial underwater environment is dangerous and impractical for human, especially in precise tasks or needs more time to complete the task [2- 4]. A ROV is a tethered unmanned underwater robot. They are common in deep water industries such as oil and gas exploration, telecommunications, geotechnical investigations and mineral exploration. ROV may sometimes be called Remotely Operated Underwater Vehicle to distinguish it from remote control vehicles operating on land or in water.

1.1 APPLICATIONS

1) Underwater robot currently play prominent roles in a number of scientific, commercial, military tasks.
2) Mainly for marine environmental research.
3) Water tank Inspection.
4) Subsea Structure Inspection & Work.

1.2 OBJECTIVE

- Learn the science principles necessary to construct and ROV such as newton's law of motion.
- Understand the engineering design process and that it is reiterative.
- Describe how ROVs are used in the marine science and underwater archaeology;.
- Compare the technology of an ROV to other technologies.
- Learn more about our nation's National Marine Sanctuary System.

1.3 PROBLEM STATEMENT

The automatic control of underwater vehicles represents a difficult design problem due to the nature of the dynamics of the system to be controlled. Controllers based on simple models of vehicle mass and drag usually yield disappointing performances. The underwater vehicles control is difficult because of the unknown non-linear hydrodynamics effects and parameter uncertainties and difficult to estimate accurately.

2. BLOCK DIAGRAM

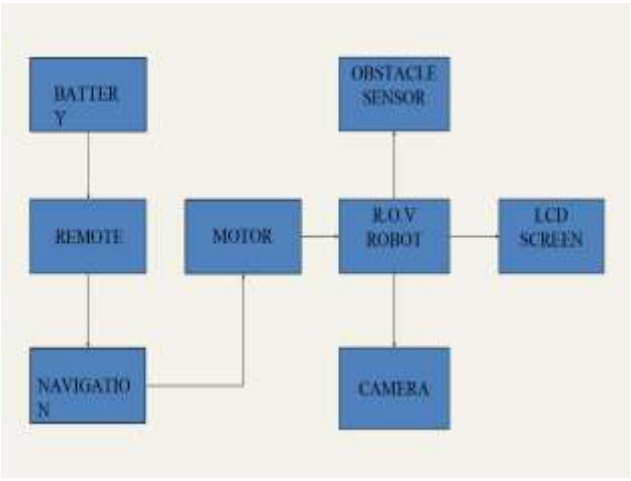

Fig -2: Block Diagram

2.1 Battery:

12V 2.5Amp battery is use to supply power to ROV through Remote Controller.

2.2 Remote:

Remote Controller is use to control ROV Robot. It can be used to control Motor on ROV Robot. It use to move Robot in Upward and downward direction and it can also control forward and reverse direction with the help of remote controller. It can also control robot in changing direction on left and right side.

2.3 Navigation:

It is use to navigate the movement of ROV robot by blinking LED'S of respective Direction.

2.4 Motor:

Motors are controlled by remote controller to Move ROV Robot in forward and backward direction .And Upward and downward direction .By increasing the speed of motor we can increase the speed of robot . Motors are the most important parts of this project.

2.5 R.O.V Robot:

It is a combination camera, sensors, motors, LED'S. It travels underwater and it is waterproof. ROV Robot is the main part between the operator and other parts of the Robot

3. CIRCUIT DIAGRAM

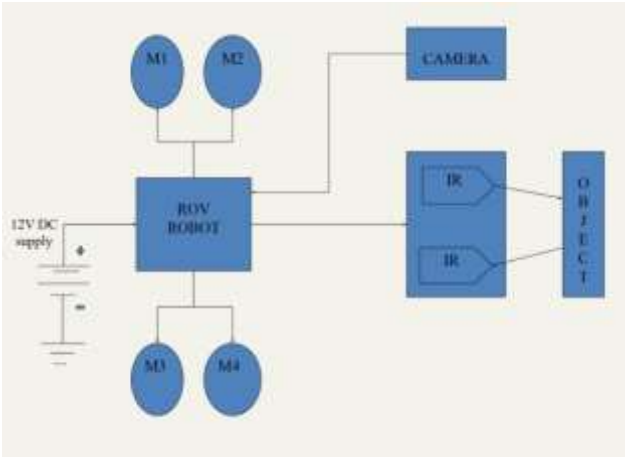

Fig -3: Circuit Diagram

3.1 DC MOTOR

Fig -3.1: DC Motor

Speed	100RPM
Voltage	12v
Current	Upto7.5A (Max)
Torque	35kgcm

A DC motor is any motor within a class of electrical machines whereby direct current electrical power is converted into mechanical power. Most often, this type of motor relies on forces that magnetic fields produce. Regardless of the type, DC motors have some kind of internal mechanism, which is electronic or electromechanical. In both cases, the direction of current flow in part of the motor is changed periodically.

3.2 CAMERA

Fig -3.2: Camera

A camera is an optical instrument used to record images. At their most basic, cameras are sealed boxes (the camera body) with a small hole (the aperture) that let light in to capture an image on a light-sensitive surface (usually photographic film or a digital sensor). Cameras have various mechanisms to control how the light falls onto the light-sensitive surface. Lenses focus the light entering the camera, the size of the aperture can be widened or narrowed to let more or less light into the camera, and a shutter mechanism determines the amount of time the photo-sensitive surface is exposed to the light.

3.3 THRUSTER

Fig -3.3: Thruster

One of the most important features of an ROV is movement. We found that most people use marine bilge pumps as a means of thrust. BIlge pumps have many advantages. They are meant to be submerged, they are fairly powerful and they are easy to add to an existing ROV. Most use them in their current configuration, but we opted to use propellers to increase thrust. A thruster is propulsive device used by spacecraft and watercraft for station keeping, attitude control, in the reaction control system, or long-duration, low-thrust acceleration.

4. CONCLUSION

We are going to have an experimental drive in the ocean to observe oceanographic environment and take data, images and videos. The ROV proved to be capable of completing all task within a timely manner.

4.1. FUTURE SCOPE

Underwater drones operate at great depths. They aren't a particularly new development and up until recently they haven't been widely used, besides for commercial purposes such as research in the gas and oil industry. The past couple of years they have however started to become a more familiar sight.

Ocean exploration organisation's and universities have started using them for various purposes such as mapping the ocean floor.

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