

Rescue Bot

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Abstract— In the advancement of technology & the emergence of new sciences, the needs of humankind have changed. Robotics is one of these sciences responding to major needs. As an attempt to solve one of the major problems faced by people which is safer water rescue. We have worked on a conceptual robotic rescue vehicle which can be operated remotely. Through this project we aim to reduce the risk involved in water rescue operations & also to save many lives. This project is a rescue vehicle which can be operated remotely or manually. This bot can be used for rescue operation or in transporting medical/food to stranded people. This is an inflatable robot built to withstand unpredictable weather conditions. This robot can withstand for 2-3 hours straight during operations & can carry loads up to 100kg.

Keywords—Bot

I. INTRODUCTION

A Rescue-bot is a machine designed for rescue services in water. It is designed to minimize the risk involved in rescuing a person drowning in a strong current/ wave. This project is a rescue vehicle which can be operated remotely or manually. This bot can be used for rescue operation or in transporting medical/food to stranded people. This is an inflatable robot built to withstand unpredictable weather conditions. There is an added feature of GPS Tracking to locate the person exactly. The bot is designed in a way so that the individual can ride along with it using the side handles. This is an inflatable robot built to withstand unpredictable weather conditions. This robot can withstand for 2-3 hours straight during operations & can carry loads up to 100kg. It aims at reducing the risk involved during rescuing a person from harsh waters & also operability in bad weather conditions, also helps to reduce cost of operating multiple helicopters and rescue boats. It is useful for distributing medicines & food in flood affected area. It is capable of carrying out most activities like diving operations, transportation of men and materials, search and rescue operations better than rigid boats of equivalent type.

II. GOAL AND OBJECTIVE

The goal of this project is to design and create a fully functional system that can be integrated in a boat to locate and retrieve a person who has fallen in the water. During floods these bots can be deployed to rescue people safely and effectively. As an attempt to solve one of the major problems being faced by human, that is safer water rescue, we have worked on a conceptual robotic rescue vehicle which can be

operated remotely. This project aims to reduce the risk involved in water rescue operations & also to save many lives. Water rescue boat is widely used in emergency rescue scenes such as sea, inland rivers, ferry, urban flooding, etc. It features miniaturized storage and transportation. This boat is designed in V shape to assist during rescue operations and to rescue peoples in distress during an emergency. These boats are designed for the sole purpose of rescuing people and hence are decked with features that will enable it to do the same.

III. METHODOLOGY

When the operator receives the message like a person struck/drowning in the water. He switch the rescue boat then it is inflated. After that it is thrown into the water. Then using remote control the bot is driven to the drowning person. At this stage, the person has to enter the bot under his or her own power, again with the help of remote control the operator brings the boat back to the shore along with the fallen person. There is an added feature of GPS Tracking to locate the person exactly. The bot is designed in a way so that the individual can ride along with it using the side handles. AM waves are used for communication with the bot which enhances the range more than 500m. 360degree rotation possible to avoid stranding. Mobile communication helps to communicate clearly with the rescuer and bot.

IV. WORKING

In the block diagram Fig1, at the right is the working of the remote control section and the block diagram at the left is the working of the bot. When the left, right, forward or reverse command is given on the remote control, the message is transmitted via the antenna and reaches the radio control receiver. The radio control receiver then sends the command to the relay driver circuit which will operate accordingly for the forward, reverse, left and right operation. We have also provided switches on the bot for manual control. Motor A is placed on the left side and Motor B is placed on the right side. For the bot to turn right, Motor A will rotate clockwise and motor B will turn anticlockwise. For the bot to turn left, motor B will rotate clockwise and motor A will rotate anticlockwise. For forward operation both motors will rotate clockwise and for reverse operation both motors will rotate anti-clockwise. The rotation operation is achieved with the help of the relay driver circuit. We have a battery pack of 18V of 3 batteries of 6V each for the motor and 9V battery

for the Radio control receiver and mobile communication. On the remote control we have 9V battery for remote control transmission.

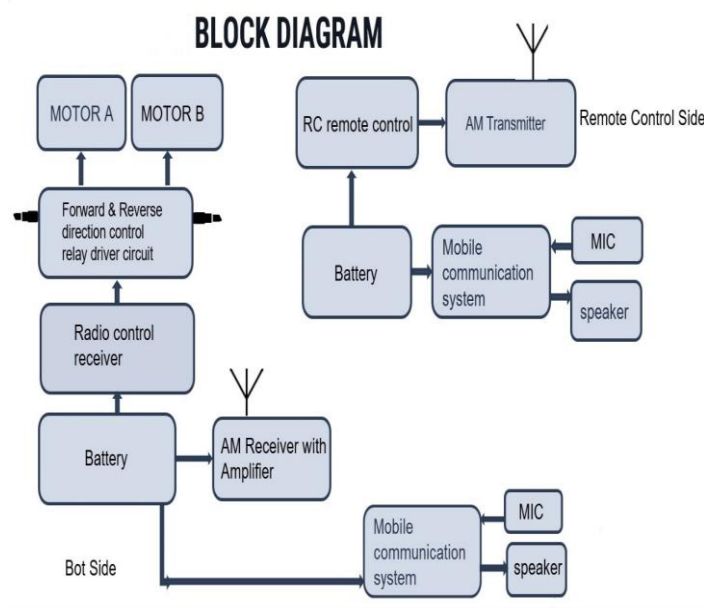


Fig 1: Right side of block diagram indicates the working of Remote Control , Left side represents the Bot

Fig2 shows the working of the motor used in this project. The figure represents working of one motor similarly there is another motor also to drive this project. When switch S2 is closed the SPDT relay in the right side gets activated and the SPDT relay position changes to NC that is closed position and at the same time switch S2 is open circuited so the position of SPDT relay in left is NO that is open position. Therefore, when S1 is pressed the circuit gets completed as shown in the above figure, thus the motor rotates in clockwise direction and when S1 is pressed the opposite operation happens, that is SPDT relay in the left gets activated and position changes to NC and at the same time SPDT relay position is in open circuit NO and the motor rotates in anti-clockwise direction. When both the relays are in NO position or in NC position, the circuit is incomplete and the motor don't work. Here we have used a SPDT (single pole double throw) relay for switching between on and off. A 12v 9.5ah battery powers the motor. Since there are two motors when both the motors rotate in clockwise direction bot moves forward and when both the motors rotate anti-clockwise direction the bot moves in reverse direction. For moving to left and right both the motors are rotated in opposite direction. This is done for faster turning and also enables 360° rotation of the bot hassle free. The boat can be controlled using a remote control or the person on board the bot.

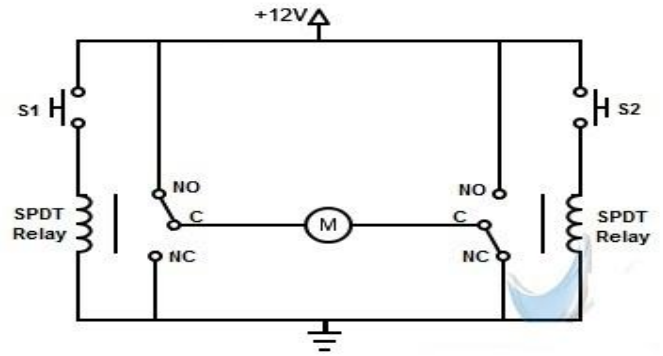


Fig 2: Working of Motor

V. COMPONENTS

1. DC MOTOR

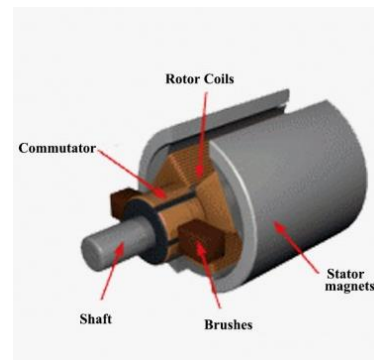


Fig 3: DC Motor

DC Motor whose poles are made of Permanent Magnets is known as Permanent Magnet DC (PMDC) Motor. The magnets are radially magnetized and are mounted on the inner periphery of the cylindrical steel stator. The stator of the motor serves as a return path for the magnetic flux. Rechargeable, 0.25Hp, 2000rpm 24V DC battery is used for the RESCUE BOT purpose.

2. BATTERY

A 6V battery is a lead acid type cell that is made up of a collection of four larger cells. Here 4.5 Ah, three number of batteries used for the bot. 9V batteries are made of six individual cells that are then enclosed in a singular wrapper to form a block and are available in several chemistry types. Typical standard 9V batteries being either carbon-zinc or alkaline or lithium-iron disulphide batteries. Three number of 9V batteries are used here for the communication purpose.



Fig 4: The figure of a 6V 4.5Ah battery



Fig 5: The figure of a 9V battery

3. AM TRANSMITTER

AM transmitter takes the audio signal as an input and delivers amplitude modulated wave to the antenna as an output to be transmitted. Here 9V AM transmitter is using. Power amplifier is used to increase power levels of AM wave.

4. AM RECEIVER

AM receiver receives AM wave and demodulates it by using the envelope detector. AM super heterodyne receiver takes the amplitude modulated wave as an input and produces the original audio signal as an output.

5. REMOTE CONTROLLER

The transmitter enables control through AM radio waves and the receiver activates the motors. When we press a button on the transmitter to make the RC bot go forward or backward, a pair of electrical contact touch. Receiver identifies signals, sends it to circuit.



Fig 6: Figure of a Remote Control

6. RELAY DRIVER

Relay is an electromagnetic switch. It is a type of mechanical Switch which is pulled by a electro-magnet so its resistance is very low and thus it can control large power appliances. Single Pole Double Throw (SPDT) relay is used here. It has five pins. Two for coil, one for common contact and two for normally open and normally close. The figure represents the working of a SPDT relay.

7. MOBILE COMMUNICATION

For the communication purpose, an auto answering phone is used. It will automatically attend the call through which the operator and the person in bot can easily communicate with each other.

8. SPEAKER

Speakers are transducers that converts electromagnetic waves into sound waves. Speakers are regularly connected to digital audio devices. Here through mic and speaker, communication between the operator and person who is in the Bot made easy. The speaker is waterproofed.

9. PROPELLER

A propeller is a rotating fan-like structure which is used to propel the ship by using the power generated and transmitted. It has two basic dimensions: diameter and pitch. Here a seven inch propeller is used.



Fig 7: Figure shows a Propeller

10. PVC PIPE

Polyvinyl chloride (PVC) is a familiar and versatile thermoplastic especially known as a piping and fitting material. T-bend and V-bend shaped PVC is used for the construction of bot.



Fig 8: Figure shows a V-bend PVC Pipe

VI. FINAL PRODUCT



Fig 9: Bot in water



Fig 10: The figure of running of bot in water

VII. CONCLUSION

This project aims at reducing the risk involved during rescuing a person from harsh waters & also operability in bad weather condition also. This project helps to reduce cost of operating multiple helicopters and rescue boats. It can also be useful while distributing medicines & food in flood affected area. Through this project we aim to reduce the risk involved in water rescue operations & also to save many lives. This project is a rescue vehicle which can be operated remotely or manually. This is an inflatable robot built to withstand unpredictable weather conditions. This robot can withstand for 2-3 hours straight during operations & can carry loads up to 100kg. It aims at reducing the risk involved during rescuing a person from harsh waters & also operability in bad weather conditions, also helps to reduce cost of operating multiple helicopters and rescue boats. It is useful for distributing medicines & food in flood affected area. It is capable of carrying out most activities like diving operations, transportation of men and materials, search and rescue operations better than rigid boats of equivalent type.

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