Remote Control Rescue Robotic Boat for Search Operation

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ABSTRACT

The aim of this project is that we will design such a robotic boat which will help us to find those cars plans and other metal things which drowned in the river or in the sea or in the pound. We can control the robotic boat while sitting outside the sea or river. We can make it to move right, left, forward by controlling it through remote using visual basic the signal will be send through transmitter and received by receiver. The direction of the boat will be changed through propellers with which motors are connected. In this boat we will install under water wireless camera, which will indicate us about the thing which are drowned under the water and it will tell us by switching on and off the desired light which will be used as an alarm, that where are our drowned things under the water. It will also help us in rescue work.

Keywords: Rescue Boot, Search Operation, Remote Control.

1. INTRODUCTION

Water is life. There is no denying. But water is also a source of many disasters and dangers. People get stuck in a water surrounded environment. So it is an unavoidable issue to rescue the people when they fall in such situation. Two kinds of automated rescue mission can be possible in those cases, one is air-borne and another one is water-borne. Water vehicles shows better efficiency instead of air vehicle for developing countries in terms of economy and complexities. Therefore here in this paper, a basic principle and methods towards an automated water-borne rescue system is outlined. The architectures of distributed system along with multi-logics are presented.

2. STATEMENT OF PROBLEM

Nowadays in the technological world and especially in Pakistan in floods or rescue operation areas where there is no approach of humans and need of quick and accurate service, the need of this robotic boat will be felt, we will design such a robotic boat which will help us to rescue the human life and vehicles such as cars, boats and ships

drowned in the river. The Boat will do its job in very short interval of time as compared to sea divers. The idea of this project of Robotic Boat has made us able to control and rescue victims/objects in the most disastrous conditions without risking any human life.

2.1 Specifications of proposed solution

We will design a boat model and we will attach the dc motors and propellers with it for movement in the water. After this we will build a circuit of microcontroller and attach it with the boat motors. Then we will use wireless transmitter receiver. Then we will design an underwater metal sensor circuit for demonstration and test it and attach it with the boat.

2.2 Objectives

The main purpose of the proposed project is to develop:

- An Embedded Robotic System Which rescue human life in case of drowning in the sea or river.
- To rescue cars, boats, ships and other human goods drowned in the river.
- It takes less time to search, because if we don't know the specific area to search then it will help us to search in less time.

2.3 Motivation and Need

- Accessibility – With the help of this boat we can access anywhere in water, anytime, in any dangerous situation and we can quickly find out and rescue human life and precious assets.
- Cost effectiveness – The Embedded system we are making is cost effective as compared To other systems, because our project technique is simple and components used are not so costly.,
- Security and confidentiality – A properly designed Embedded system is very secure and

accurate for its work using wireless technology and working in remote environment and very confidential in searching operations.

- Transparency – The robot is very transparent for its work, and using very easy operating techniques for its operation and giving best throughput for which it is aimed to be.
- Accuracy – The Embedded System we are developing is accurate in its work and giving a good result which is an identification of a complete and best system.

3. PROJECT DESIGN AND IMPLEMENTATION

The whole project is divided into hardware and software parts as shown. In this chapter, the design of the project and the methods of implementation will be discussed.

3.1 Design of the Project Hardware/ Software

The project includes manual mode which is controlled through visual basic. The direction of the boat is changed through visual basic. The signal from the laptop through transmitter which will be received by the receiver which is present in the boat. The manual mode is implemented using visual basic based serial communication application. Camera will be used for the live visual transmission. Before starting project all information from different sources is gathered and finalized all components of hardware and software needed for this. The project is divided into hardware and software parts. List of hardware and software parts is shown as.

Hardware components

- Voltage regulator
- Microcontroller
- Wireless trans receiver
- camera
- Dc motor
- Metal detector
- 12 volt battery
- Propellers
- Camera receiver
- Alarm "bulb"

Software components

Software components include

- Visual basic
- Arduino IDE

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3.2 Analysis procedures

Analysed the whole project and structured the method for planning and developing procedures to support activity work. To analyse our searching boat working, controlled the direction and movement of dc motors using Arduino software, camera are used to automatically detect the metals in the water and control the movement of dc motors that will move the boat and also made an application that is visual basic based serial communication application for completion of manual mode (user friendly). This theme was taken from the idea to reduce the incidents occur due to flood and also to help the people to rescue them. The block diagram are,
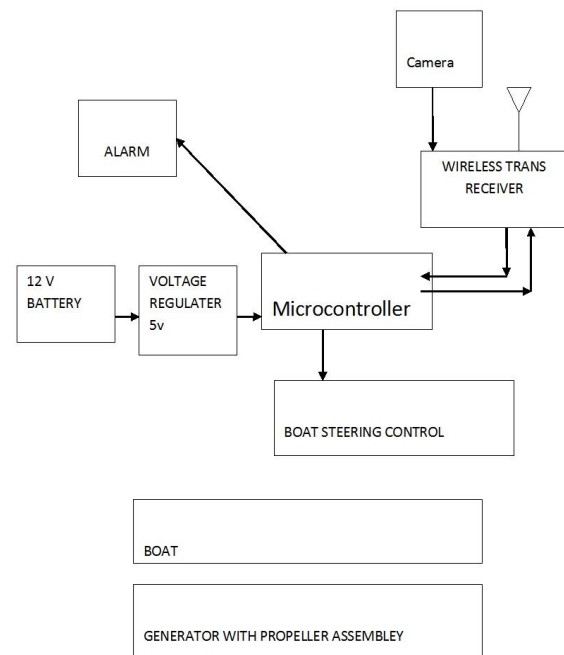
Block diagram of Boat
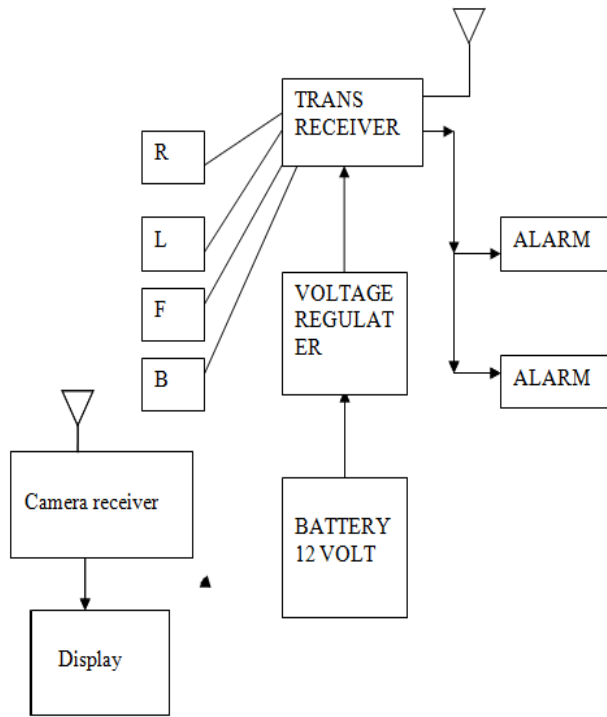
Block Diagram of Remote

3.3 Implementation procedure

Following steps are implemented for the completion of the project.

- Interfaced arduino with dc motors.
- Control the direction of dc motors by using arduino.
- Used visual basic based serial communication application.
- Did programming for buttons (configuration, receive, reconfiguration).
- Selected baud rate and port number for serially communicating with Arduino.
- With the help of keys (up, down, right, left) made in application controlled the direction of dc motors.
- Used camera for the live transmission.

The problems that we faced in this project was in metal sensors. It detects metal as well as give signal when water and hand come in contact so in order to remove this problem we designs in other sensors which was made on ruler and two magnets were attached to it also two wires. When we place this ruler in water and metal come in contact with it will give signal to the arduino. The alarm will be start the bulb will start blinking.

The direction of the boat was controlled by the H-Bridge which consist of SPDT relay and transistor. The base of the transistor is attached to the arduino which will give the signals to turn on and off the motors .When the signal on the base of transistor is high the relay will switch and the motor will starts rotation clockwise or anticlockwise.

R1	R2	L1	L2	Direction
1	0	1	0	Forward
0	1	0	1	Reverse
0	1	1	0	Left
1	0	0	1	Right

Camera were installed on the boat for monitoring. The live streaming of the camera can be seen on TV as well as on laptop.

The motion sensor is also installed on the boat which will detect the humans if it come near the boat. The sensors emits rays. It will work on the base of the infrared rays.

4. RESULTS AND DISCUSSION

The aforementioned robotic boat is tested and simulated by a Microsoft VB application .The designed robotic boat resulted in the operational performance of 5 to 10 minutes. It resulted that the coverage area of both the transmitter and receiver is approximately 10 meters.

5. RECOMMENDATION

- It can be implemented for the advancement in the coastal and marine technology.
- A toolkit can be setup for the retrieval of lost objects in different water bodies.
- Can be incorporated in the security applications for national diplomacy.

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