

Automatic Vehicle Based Human Detection and Tracking in Underwater

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Abstract: The human detection and tracking is a challenge for underwater. The focus of this research was automatic detection and tracking of realistic underwater. These systems are developed by using vision-based method. Hence, we present our solution of an automatic underwater operated Vehicle in which we will fit the camera to detect the human in optimal time. This essay suggests ways to save people who have drowned in the water because it can be challenging to find and save them if they fell into the lake instead of under the water. In this instance, a life-saving rescuer dove underwater to look for the person who had fallen into the water. This deceives him in two ways, either preventing him from saving a human life or putting him in danger. A new strategy for saving the drowning person under water has been proposed after taking into account all of these factors. The suggested technique makes use of a wireless robot that can be controlled via Li-Fi (Visible light communication) technology, a remotely operated vehicle (ROV), and a PIR (Pyroelectric Infrared Sensor) to detect people in the water. The proposed device, which combines a camera and a sensor, searches underwater for humans to be saved in order to quickly and easily identify them, locate them, and alert the rescue team to save them..

Keywords: Automatic vehicle, Human detection, Underwater tracking.

I. INTRODUCTION

Detecting and controlling automatic vehicles underwater for tasks such as exploration or maintenance can be a complex but vital endeavor. Here's an overview of how human detection and traction control might be implemented in underwater autonomous vehicles. Developing a system that can identify and monitor people in an underwater setting is crucial in order to lower the possibility of a drowning accidently resulting in death [1]. Thus, the purpose of this thesis is to state the possibility of recognizing human presence in an underwater environment and to investigate the usage of deep learning ideas for the purpose of detecting humans from underwater digital data. Autonomous

Underwater Vehicles (AUVs) have garnered significant attention in recent times, owing to its potential applications in subsea inspection, maintenance, and repair operations, resource exploitation, species abundance investigation, and military science. Underwater unmanned vehicles are gaining attention again as a result of recent advancements in the field of artificial intelligence (AI). Target tracking is one of the most important topics of discussion in AUV nowadays. There are three fundamental methods [2].

II. PROBLEM STATEMENT

Nowadays, a large amount of human labor is required in the event that a fire occurs in a building, power plant, etc. Thus, there could be a chance that humans would suffer severe harm. So we are creating a remote control robot with the fire extinguisher and camera.

III. PROPOSED WORK

Automatic vehicles for underwater use require a combination of advanced sensors, machine learning algorithms, precise traction control, and safety measures to detect and interact with humans effectively while carrying out their missions, be it in research, exploration, maintenance, or rescue operations. The primary objective of this thesis is to investigate if deep learning can be used to recognize and track humans in an underwater environment. using Wi-Fi camera and evaluate their performance

Based on the ATmega 328P, the Arduino UNO is an open-source microcontroller board. The board can be directly connected to the computer using a USB cable, which serves as both a serial port and a power source. The Arduino IDE (Integrated Development Environment), which offers a condensed version of C/C++ programming, is used to program Arduino Uno. It's an excellent option for beginners because it's simple for users to write and upload code to the board. A vast library of pre-written code and a supportive community further simplify the programming process.

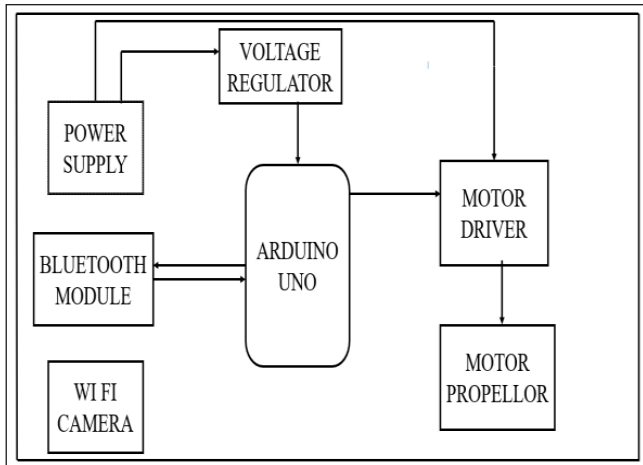


Fig. 1: Block Diagram of Proposed Work

A 12V DC gear motor is an electric motor that operates on 12 volts of direct current (DC) power and is equipped with a gearbox to reduce the speed of the motor’s output shaft. These motors are widely used in various applications, including robotics, automotive, industrial automation, and more. Here’s some content about 12V DC gear motors. When selecting a 12V DC gear motor for your application, it’s essential to consider factors such as speed, torque, and power consumption. Additionally, the motor’s construction and durability should match the demands of the environment it will operate in.

A relay switch is an electrically operated switch that uses an electromagnet to mechanically open or close a circuit. It consists of a control circuit and one or more contacts that open or close when a current is passed through the coil of the electromagnet. When the coil is energized, it creates a magnetic field that pulls or releases the contacts, causing them to switch between the open and closed positions. Relay switches are commonly used in applications where it is necessary to control a high-powered circuit using a low-powered signal, such as in automotive, industrial, and telecommunications systems. They are also used in automation and control systems, HVAC (Heating, Ventilation, and Air Conditioning) systems, and many other applications where switching of electrical circuits is required.

For the purpose of rotating a wheel or carrying out a certain task, even the most basic robot needs a motor. Motors demand more current than a microcontroller pin can normally produce, so you’ll need a switch of some kind that can take in a tiny current, amplify it, and produce a larger current—which feeds the motor even more. A person referred to as a motor driver completes this full procedure. That process is made easy using the L293D Motor Driver IC, which has been used in a lot of applications with ease. The most popular driver for bidirectional motor driving applications is the L293D H-bridge driver. The DC motor may run in either direction thanks to this L293D IC. A 16-pin integrated circuit (L293D) is capable of controlling two DC motors at once.

IV. RESULT AND DISCUSSION

The power supply is given to the circuit by using 12V battery. The power is regulated by the voltage regulator and to the regulator. Bluetooth is used to control the kit. The wifi camera is used to monitor the live by mobile by using motor and propeller it can work and move under the water.

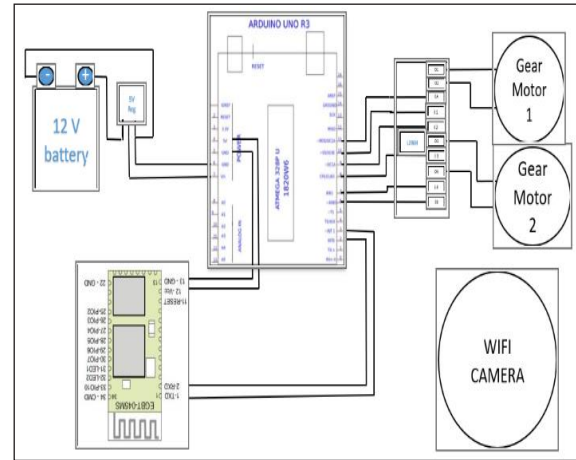


Fig. 2: Circuit Diagram

The Arduino uno is brain of our project, arduino has programmed already with software Arduino IDE. In that program we are able to control the robot and operate the switches when we need .we are fixing an identifier to identify the robot when the robot struct at the fog. Identifier means light, buzzer etc. The robot has a Bluetooth module HC-06 for wireless communication. An Android app installed on a mobile device is used to establish a Bluetooth connection with the robot. And using this bluetooth we are able to control the movement of the robot and pump.

The Android app provides a user interface that allows the operator to control the robot’s movement and fire extinguishing mechanism such as pump. The app typically has buttons or controls for moving the robot forward, backward, left, and right and some buttons for pump, light control. The interface between the control circuits and the motors is provided by motor drivers. While the controller circuit operates on low current signals, the motor requires a large quantity of current. Consequently, the purpose of motor drivers is to convert a low-current control signal into a higher-current signal that is capable of powering a motor. Motor driver is need for controlling.

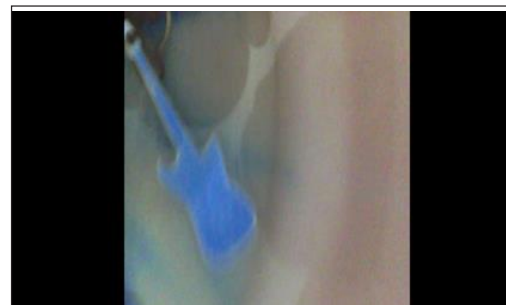


Fig. 3: Prototype Model Work

The Control pins IN1 and IN2 for motor 1 and control pins IN3 and IN4 for motor 2 regulate the direction of rotation. Prior to controlling speed, the rotational orientation of IN1 and IN2 must be verified. Enabled terminals will then receive PWM pulses. Here the motor1 means two motor have parallel connection and same for the motor2. Here I am using 12V dc motor, A 12V DC gear motor is an electric motor that operates on 12 volts of direct current (DC) power and is equipped with a gearbox to reduce the speed of the motor's output shaft. These motors are widely used in various applications, including robotics, automotive, industrial automation, and more.

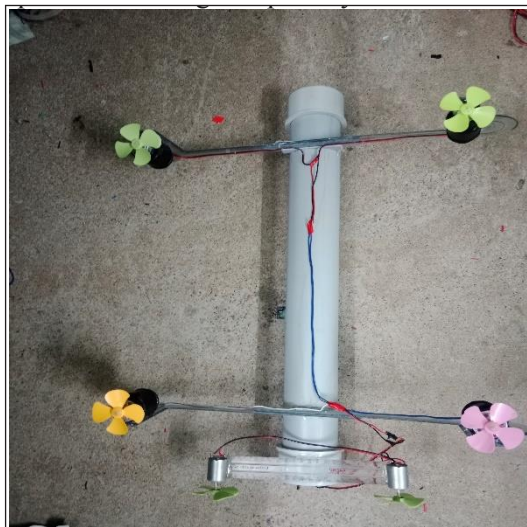


Fig. 4: Object Find Under Water

V. CONCLUSION

In this research, AUV vehicle with Bluetooth and Wi-Fi camera a data showing people in different underwater settings with the goal of identifying and tracking people in an underwater environment. This could help lower the incidence of fatal drowning accidents. The 3200 frames of real-world events that the trained algorithms were tested on yielded findings that were gathered and examined utilizing accuracy. However, as the goal of this thesis is to address a practical issue, it can be said that

an AUV vehicle is the best option for efficiently detecting and tracking people in an underwater environment.

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