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UNDER WATER DRONE WITH CAMERA

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Abstract - The integration of unmanned underwater vehicles (UUVs) with high-definition cameras has opened new frontiers in underwater exploration, surveillance, and environmental monitoring. This project aims to design and develop an underwater drone equipped with a sophisticated camera system for versatile underwater applications. The primary objective is to create a compact, maneuverable, and cost-effective UUV capable of capturing high-quality images and videos in diverse aquatic environments.

***Key Words*:** Underwater Drone, Arduino Uno, BLDC Motors, ESC, ESP32 Camera, Subaquatic Exploration, Marine Robotics.

1.INTRODUCTION *(Size 11, Times New roman)*

OVs are pivotal in ocean research and industries, performing tasks from mine tracking to underwater surveillance. They aid in laying optical fiber cables and exploring marine archaeology sites. Efforts in precise sensing and underwater communication persist, alongside innovations like programmable acoustic detectors and AUV algorithms. Ongoing developments in real-time acoustical imaging systems promise to enhance underwater exploration further. Despite strides, ROV research remains rich with opportunities due to the complexity of underwater operations and the need for optimal functionality across diverse applications.

2. WORKING

The primary objective of this project is to create a versatile and cost-effective underwater vehicle capable of exploring aquatic environments for various applications such as marine research, underwater inspections, and recreational activities. The integration of Arduino Uno facilitates the control and coordination of the BLDC motors for propulsion and maneuverability, while the ESC ensures precise speed regulation. Additionally, the ESP32 camera provides real-time video streaming for underwater observation and documentation. The design considerations, hardware setup, software implementation, and experimental results are thoroughly discussed in this paper. The proposed underwater drone offers a promising platform for underwater exploration and research, with potential for further enhancements and applications in the field of marine robotics.

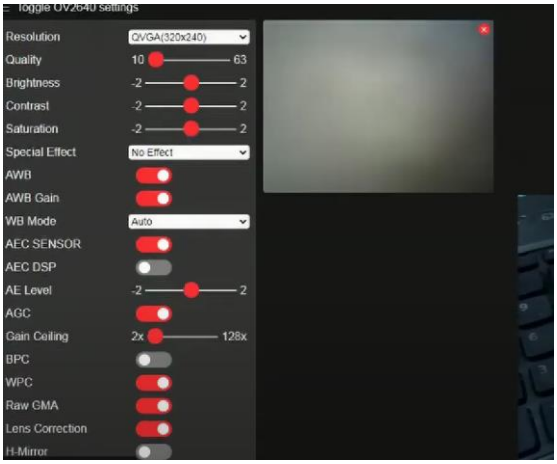
Table -1: component list

1	1000KV BRUSHLESS MOTOR	4
2	FTDI232	2
3	30A SIMONK ESC	4
4	ARDUINO UNO R3	1
5	ESP 32 CAM	1
6	3.7 V BATTERY	1
7	2200MAH LIPO BATTERY	1
8	JUMPER WIRE	-

- DESIGN

Fig -1: Figure

- Camera view



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HARDWARE DESIGN

The selection of hardware components is crucial for the performance and reliability of the underwater drone. The BLDC motors offer high efficiency and thrust-to-weight ratio, making them suitable for propulsion in aquatic environments. The ESCs ensure smooth and precise control of motor speed, enabling the vehicle to navigate with stability and agility. The Arduino Uno microcontroller serves as the central processing unit, executing control algorithms and interfacing with external sensors and modules. The ESP32 camera module captures high-definition video footage, which is transmitted wirelessly to the surface for monitoring and analysis.

CONCLUSIONS

The development of an underwater drone using Arduino Uno, BLDC motors, ESC, and an ESP32 camera module represents a significant step forward in the field of marine robotics. Through the integration of these components, we have created a cost-effective and versatile platform for subaquatic exploration. Our experiments have demonstrated the robustness, maneuverability, and reliability of the underwater drone in various aquatic environments, validating its potential for applications in marine research, underwater inspections, and recreational activities.

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