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Underwater Rescue Machine for Flood Disaster

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Abstract: *Flood disasters pose significant risks to human life, often resulting in drowning incidents and challenging rescue operations. To address this critical issue, we propose an innovative underwater rescue machine designed to efficiently locate and extract victims trapped in flooded areas. A robust gripping mechanism ensures the secure extraction of victims from hazardous situations. The machine can be remotely controlled by trained operators, minimizing risks to human rescuers. By leveraging these cutting-edge technologies, this underwater rescue machine aims to significantly enhance the efficiency and safety of flood rescue operations, saving lives and reducing the impact of natural disasters. Flood disasters cause significant damage and endanger lives, especially in areas with limited emergency response capabilities. Underwater rescue machines provide a promising solution for flood rescue operations, offering advanced navigation, obstacle detection, and human retrieval systems. These machines can operate through controlled remotely, making them ideal for searching submerged areas, rescuing stranded individuals, and providing real- time data to emergency response teams. The design considerations focus on mobility in floodwaters, durability, and adaptability to various terrains. This technology aims to enhance rescue efficiency, minimize risks to human rescuers, and ultimately save lives during flood disasters...*

Keywords: Underwater rescue machine, Flood disaster, Disaster response technology, Human retrieval system, Floodwater mobility, Remote-controlled rescue

I. INTRODUCTION

An underwater rescue machine for flood disasters is a specialized device designed to operate in submerged environments to assist in rescue missions. During floods, the underwater landscape becomes unpredictable, making it difficult for traditional rescue teams to navigate and reach those in need. This machine, equipped with advanced sensors and navigation systems, can explore flooded areas, locate trapped victims, and assess the damage which is essential for planning rescue operations and post-disaster recovery. By enhancing the efficiency and safety of rescue missions, this technology plays a crucial role in saving lives and reducing the impact of flood disasters.

India has recently been grappling with severe floods across several regions, leading to widespread destruction and loss of life. Sikkim: Flash floods triggered by a glacial lake out- burst in early October have killed at least 55 people, with over 140 still missing. To save the lives and to avoid this type of incidents the underwater rescue machine is use. This machine helps to reduce the man power of coast guard which help to save the life of people in danger

II. LITERATURE SURVEY

The paper [1] A possible solution to minimize the delay in rescuing the coastal areas' ships accident and useful kit for underwater research has been illustrated in this paper. An underwater research and rescue robot has been designed, tested and analyzed for the coast guards and rescue team to save lives. This robot may also be used in research work since Bangladesh has a very large coastal boarder in the Bay of Bengal. Researchers may find this robot useful while doing their research to utilize the resources covered up beneath the Bay of Bengal. However, the robot can also be used in the personal research work. A raspberry pi is used as the communication and control device in this project. Pi camera has been used to get live video streams from the robot to the user.

The paper [2]. The exploration of the underwater world has always been an intriguing endeavor, presenting unique challenges and opportunities for scientific discovery, environmental monitoring, and industrial applications. In recent

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years, underwater drones have emerged as versatile tools for conducting a wide range of tasks in aquatic environments. The primary objective of this research is to examine the evolution and capabilities of underwater drones, also known as unmanned underwater vehicles (UUVs) or remotely operated underwater vehicles (ROVs). These autonomous or remotely controlled vehicles are equipped with sensors, cameras, and manipulators, enabling them to perform various tasks such as oceanographic surveys, marine life monitoring, underwater archaeology, offshore infrastructure inspection, and search and rescue operations.

III. PROPOSED METHODOLOGY

The underwater rescue machine for flood disasters is an advanced, autonomous, and remotely controlled system designed to operate efficiently in submerged and high-risk environments. Equipped with sonar and infrared sensors, it can detect survivors and obstacles even in murky waters with low visibility, ensuring precision in search and rescue missions. AI-powered navigation, integrated with GPS, allows for accurate movement, while robotic arms facilitate the safe retrieval of individuals trapped in floodwaters. Constructed using lightweight yet durable materials such as high-density polymer and aluminum, the machine maintains buoyancy and structural integrity even in strong currents. A waterproof communication system ensures real-time coordination with rescue teams, enhancing situational awareness and decision-making. To ensure uninterrupted operation, the system is powered by rechargeable batteries with a solar backup, while hydraulic and electric propulsion mechanisms provide efficient movement through turbulent waters. Before deployment, rigorous testing will be conducted in controlled environments, followed by real-world field trials to assess performance and reliability. Once integrated with disaster response teams, the machine will undergo continuous monitoring and AI-driven optimizations to enhance rescue efficiency and adaptability to various flood scenarios. Large-scale production and scalability will allow for widespread implementation, ensuring that this innovative technology plays a crucial role in improving disaster response efforts and saving lives during catastrophic flooding events.

IV. BLOCK DIAGRAM

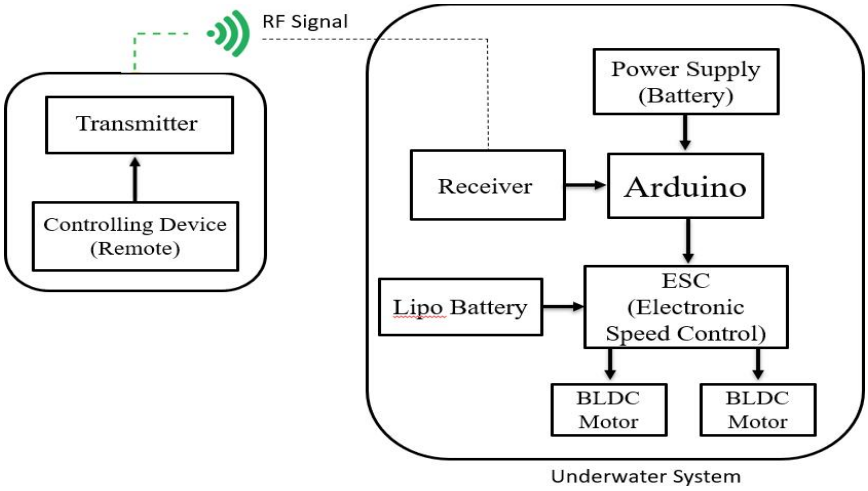

Figure 2: Block Diagram of System

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IV. MODELING AND ANALYSIS

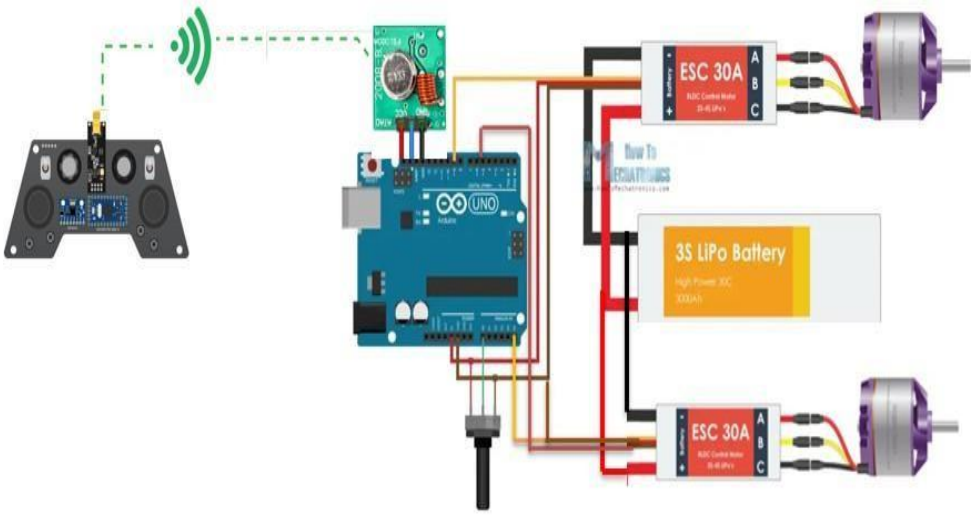
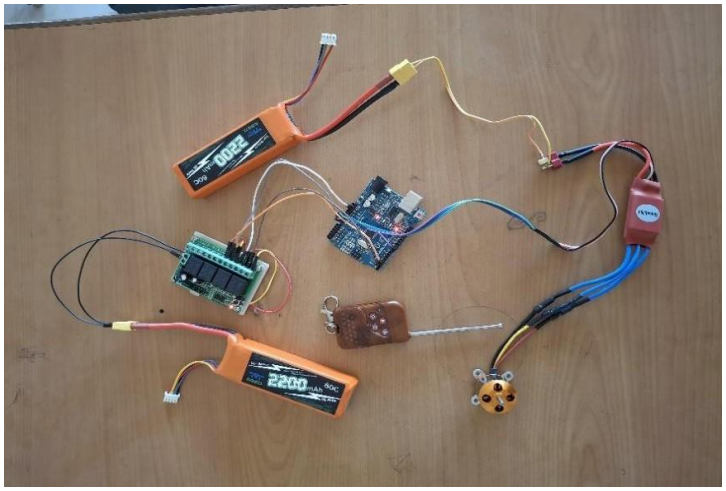


Figure 3: Circuit Diagram

V. RESULTS AND FINDINGS

Underwater rescue machines, such as remotely operated vehicles (ROVs) and autonomous underwater vehicles (AUVs), are playing a vital role in flood disaster management. These machines are equipped with advanced sensors like sonar, cameras, and infrared detectors, allowing them to locate submerged objects and individuals even in low-visibility conditions. They can be remotely operated, reducing risks to human rescuers while navigating through debris and strong currents. Recent developments in places like New South Wales, Australia, have seen the integration of drones and unmanned surface vessels to enhance disaster response efficiency. These technologies enable faster rescues, safer operations, and improved coordination during flood emergencies, making them essential tools in modern disaster management.



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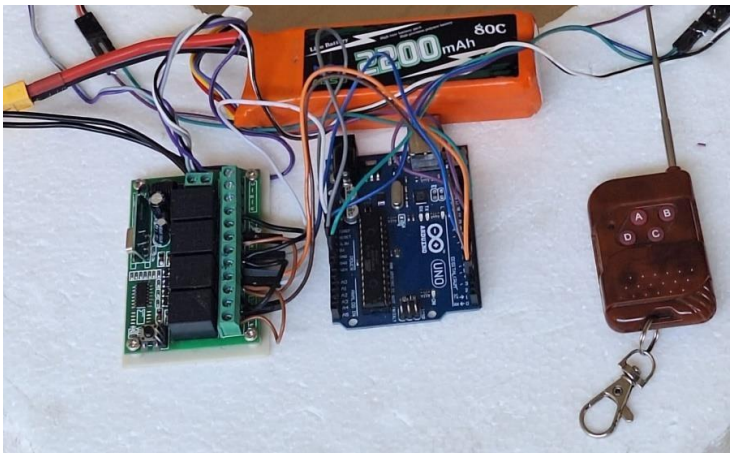

Figure 4: Output of Final System

VI. CONCLUSION

In addition to the general methodology outlined in the previous section, there are a few specific considerations to rescue the people from the flood disaster.

– Project Scope and Objectives: Establish what the project aims to achieve, such as improving rescue operations during floods, reducing response time, and increasing the safety of both victims and rescuers.

Scope: Determine the extent of the project, including the development of the machine, testing, deployment, and training of rescue teams.

– Maintenance: Establish a regular maintenance schedule to keep the machines in optimal working condition.

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[4] Under Water Surveillance and Rescue Drone with Camera 1J.Mounika, 2D.Meghana Sandhya, 3A.Bhanu Prakash, 4G.sailendra, 5Mr.K.Rajasekhar 5Assistant Professor, Department of ECE, N S RAJU Institute of Technology, Sontyam, Visakhapatnam, A.P, India. 1,2,3,4U.G. Scholars, Department of ECE, N S RAJU Institute of Technology, Sontyam, Visakhapatnam, A.P, India 2023