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Rescue Boat by Using Wireless Control System

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Abstract: ***The U-shaped lifesaving boat is an innovative design that brings enhanced speed, precision, and safety to rescue operations in water. Its unique U-shape provides excellent stability and buoyancy, making it highly suitable for rescuing individuals in distress. One of the key features of this boat is its remote control capability, allowing the boat to be driven autonomously to the scene of an emergency. This remote-controlled functionality enables it to quickly reach a victim in distress, whether in calm waters or rough conditions, without requiring human intervention in the immediate vicinity.***

Equipped with advanced navigation and guidance systems, the U-shaped boat can autonomously navigate through various water conditions. Its navigation system ensures that the boat can accurately locate the victim and reach them without getting caught in obstacles or dangerous areas. The boat's precision handling is further enhanced by its ability to perform 360-degree rotations, making it highly maneuverable in tight spaces or challenging waters, such as rivers, lakes, or at sea. Once the boat reaches the victim, it can transport them to safety.

Keywords: Rescue operations, boat, remote-controlled,precision handling

I. INTRODUCTION

This project introduces a wireless-controlled rescue boat designed to assist in emergency situations, especially in areas prone to flooding, water accidents, or remote water bodies. By incorporating a wireless control system, this rescue boat can be operated remotely, providing rescuers with a safe and efficient means of reaching victims without putting themselves at risk.The wireless control system enables real-time maneuverability and quick deployment, making the boat highly adaptable for various rescue scenarios. Equipped with sensors and communication modules, the boat can relay crucial information back to the operator, allowing for better decision-making in rescue operations. This innovation not only minimizes human intervention but also significantly enhances the effectiveness and safety of rescue missions. A rescue boat using a wireless control system is an innovative approach to enhancing search-and-rescue operations at sea. This technology allows the boat to be operated remotely, without the need for a crew onboard, making it particularly valuable in dangerous and high-risk environments. Whether it is navigating through rough seas, stormy weather, or hazardous locations such as oil spills or shipwrecks, wireless control enables precise maneuvering of the boat, ensuring that it can reach victims quickly and safely. A rescue boat is a specialized type of vessel designed to provide assistance in emergencies at sea or in other bodies of water. Its primary purpose is to rescue people, retrieve stranded individuals, and provide a means of transport in hazardous situations such as maritime disasters, floods, or other water-related incidents. Rescue boats are often part of a broader search-and-rescue (SAR) operation conducted by maritime organizations, coast guards, or emergency response teams.

These days, lifebuoys can be divided into two categories: smart lifebuoys and manual lifebuoys. The manual life buoy is a traditional one, like the doughnut-shaped life buoy ring. When the sufferer is close to the rescuer's location, using a manual life buoy appears to be a sensible option. In some drowning scenarios, at least one person may need to get into the water with the life ring in order to save the victim because a manual lifebuoy can only reach the victims based on the strength of the rescuer throwing the ring. A person must direct the lifebuoy toward the overboard guy in man overboard scenarios. Even with strong swimming abilities, the situation might still be difficult and dangerous for the rescuer in inclement weather or on rough terrain. When technology was added to lifebuoy, a smart lifebuoy was created as a life-saving substitute. The easiest way to describe it is as a remote-control lifebuoy that is mostly U-shaped (Collins, 2017).

By using this technology, the rescuer may save the person without having to endanger their life by plunging into the water. However, it has been determined that the current smart lifebuoy system is extremely heavy and difficult to use, particularly for women, children, and other individuals with impairments. Therefore, in the event of a man-over-board emergency, this might put the rescue effort in danger. The creation of a lightweight remote-control lifebuoy device is therefore highly desirable. In order to create a lightweight life buoy prototype for this work, the researcher employed Arduino technology.

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The term "rescue boat" refers to a rescue vessel that is typically utilized in situations when a person falls from a boat and floats in the ocean, or when there is a natural disaster, such as floods in a particular location causing water to overflow. Effective and fast rescue and handling of maritime accidents is necessary to prevent major losses. The ship's weight and speed have a big impact on how well it works on the waves. Similarly, the ship's motion reaction is determined by the wave properties, which include height, period, and direction of propagation. Fishermen encounter a number of difficulties in their hazardous line of work, including erratic weather patterns, equipment malfunctions, and maritime mishaps. As a result, having a trustworthy communication system that can locate fisherman and offer them prompt aid in an emergency is essential. In this study, a cable water communications-based Internet of Things-based fishermen tracking and communication system is proposed. Underwater sensors are used by the system to gather information about position, water pressure, and temperature. Wire water communications technology is used to send the data to a central server.

II. LITERATURE SURVEY

1) Masmitja, G. Masmitja

The creation of a control system for an autonomous underwater vehicle devoted to ocean observation is suggested in this paper. In accordance with a predetermined plan, the vehicle, a hybrid of autonomous surface vehicles (ASV) and autonomous underwater vehicles (AUVs), drives on the sea's surface and makes vertical immersions to acquire profiles of a water column. The vehicle's displacement on the surface enables radio-modem telemetry communication and GPS navigation. The car is 320 mm in width and 2300 mm in length. It has a maximum depth of 30 meters and weighs 85 kilograms. An embedded computer-based control system that enables autonomous navigation has been devised and built for this vehicle.The navigation, propulsion, safety, and data acquisition subsystems comprise this control system.

2) M. H. Ghani et al.

A U-shaped life-saving device, often referred to as a U-shaped lifeline or rescue sling, is designed to provide a secure grip for individuals in distress. This device forms a U-shape, with the open side facing the individual, allowing them to hold on and stay within the protective U-shaped area. It is commonly used on boats or ships to assist people who have fallen into the water. The U-shape ensures stability and minimizes the risk of slipping out, while the person can use the grip to stay within the device until help arrives or they are safely pulled back aboard.

3) S. Thanakodi et al.

The performance of a rescue boat during high-speed operations in waves is crucial for ensuring safety and efficiency in emergency situations. When operating at high speeds in rough seas, the boat's stability, handling, and response to wave conditions become critical factors. Rescue boats must be designed with reinforced hulls and advanced stabilization systems to maintain control and minimize risks such as capsizing or losing maneuverability.

4) N. B. Shetty et al.

Double-sided driving is a key feature in certain vehicles, especially in specialized rescue boats, amphibious vehicles, or certain types of machinery. This feature allows the vehicle to be driven from both the front and rear, providing greater maneuverability and flexibility in tight or challenging environments. It is particularly useful in rescue operations, where the vehicle may need to reverse or change direction quickly without turning around. Double-sided driving can improve efficiency, save time, and enhance safety, as it allows for faster and more controlled movements in constrained or hazardous situations, like navigating rough waters or narrow spaces.

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Fig. 1 Photographs of actual working setup

III. RESULT

The integration of a wireless control system in rescue boats has brought a significant transformation to modern emergency response operations, enabling safer, more efficient, and more precise missions, particularly in hazardous or difficult-to-reach environments. Traditionally, rescue operations involving boats required personnel to be physically present on board, exposing them to numerous risks, including drowning, strong currents, contamination, dangerous debris, or even unstable weather conditions. However, with the development of wireless-controlled rescue boats, operators can now manage rescue missions remotely, significantly reducing risk to human life and increasing the overall effectiveness of emergency response strategies.

In an emergency, a lightweight lifebuoy allows the rescuer to deploy it more quickly, which may indirectly increase the victim's chances of survival. However, in terms of rescue range, the created Prototype Y and the current smart lifebuoy (Brand S) are more capable than the lifering. Whereas the manual life buoy (life ring) relies on the strength of the rescuer's muscles, the smart life buoy's rescuing range is established by the range of the remote-control link.

IV. APPLICATION

1) Remote Operation in Hazardous Areas

Wireless control allows rescuers to operate the boat without putting themselves in disaster areas harm's way. Swift water rescue: Remote control can help guide the boat into fast-moving currents that may be too risky for human drivers.

2) Search and Rescue Missions

Autonomous navigation with wireless guidance can help in large-area searches

3) Medical Supply Delivery

Can be used to deliver first-aid kits, life vests, or emergency supplies wirelessly to stranded victims before human rescuers arrive.

4) Real-Time Monitoring & Communication

Equipped with cameras, microphones, and sensors, the wireless-controlled boat can stream live data to the command center. Two-way audio can allow communication between victims and rescuers.

5) Autonomous Return & Recharge

Some systems allow for autonomous docking, meaning after a mission, the boat can return and dock at a station wirelessly for recharging or refueling.

6) Multi-Boat Coordination

A fleet of wireless-controlled boats can be coordinated from a central control system to cover wider areas efficiently.

V. CONCLUSION

Rescue boat plays a vital role in saving. Live& providing critical support during emergency Situation their design equipment & operation require carefully consideration to ensure effective & safe rescue operation. The wireless control system provides greater flexibility, enabling real-time monitoring, quick response times, and coordination with other rescue units. It also allows for precise navigation in complex environments, optimizing the boat's maneuverability. Furthermore, advancements in wireless technology, such as improved communication protocols, have made these systems more reliable and robust, ensuring that the boat can continue operations even in challenging conditions.

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However, there are still challenges to address, such as ensuring the security of wireless signals, preventing interference, and improving battery life for longer rescue operations. Despite these challenges, the integration of wireless control systems into rescue boats marks a promising future for search-and-rescue operations, making them safer, faster, and more effective.

In conclusion, the Rescue boat by using remote control system. it is sustainable and eco-friendly. Watercraft. It work on remote Control System. It does not impact on the environment and remote controller. This innovative watercraft is works on sensor and remote control system.

Despite these challenges, the future of wireless-controlled rescue boats is promising. They are not only safer, faster, and more effective but also sustainable and eco-friendly. These boats, powered by sensors and remote control systems, do not harm the environment and operate efficiently, marking a significant step forward in rescue technology and contributing to more effective and environmentally responsible search-and-rescue operation.

REFERENCES

[1] Masmitja, G. Masmitja, J. González, S. Shariat-Panahi, and S. Gomariz, “Development of a control system for an autonomous underwater vehicle,” 2010 IEEE/OES Auton. Underw. Veh. AUV 2010, no. May 2014, 2010, doi: 10.1109/AUV.2010.5779647.

[2] M. H. Ghaniet al., “The sailBuoy remotely-controlled unmanned vessel: Measurements of near surface temperature, salinity and oxygen concentration in the northern gulf of mexico,” Methods Oceanogr., vol. 10, no. September, pp. 104–121, 2014, doi: 10.1016/j.mio.2014.08.001.

[3] S. Thanakodiet al., “A study into the development of a light weight smart life buoy prototype (LWSLB),” Trans. Marit. Sci., vol. 10, no. 2, pp. 383–389, 2021, doi: 10.7225/toms.v10.n02.008.

[4] N. B. Shetty, N. Rao, P. Umesh, and K. V. Gangadharan, “Remotely operated marine rescue vehicle,” AIP Conf. Proc., vol. 2247, no. July, 2020, doi: 10.1063/5.0004147.

[5] S. Kathole, T. Galphade, S. Sonavane, and S. Patne, “Design, Analysis and Fabrication of Remote-Controlled Life Saving Buoy,” Int. Res. J. Mod. Eng. Technol. Sci., no. 08, pp. 2582–5208, 2021, [Online]. Available: www.irjmets.com.

[6] U. Ismat, M. Nasri, K. Ali, D. Rifai, A. N. Abdalla, and M. A. Faraj, “Design of Adaptive RFID on IoT Platform with Passive Tag Based on Laboratory Management System (LMS),” vol. 4, no. 2, pp. 105–118, 2023.

[7] N. Tabish and T. Chaur-Luh, “Maritime Autonomous Surface Ships: A Review of Cybersecurity Challenges, Countermeasures, and Future Perspectives,” IEEE Access, vol. 12, no. January, 2024, doi: 10.1109/ACCESS.2024.3357082.

[8] G. G. Giesbrecht and G. K. McDonald, “My car is sinking: Automobile submersion, lessons in vehicle escape,” Aviat. Sp. Environ. Med., vol. 81, no. 8, pp. 779–784, 2010, doi: 10.3357/ASEM.2769.2010.

[9] K. Ali et al., “IoT System Design of Thermoelectric Generator for Harvesting Motorcycle Exhaust Heat Energy,” Lect. Notes Electr. Eng., vol. 921, no. 1, pp. 213–226, 2022, [Online]. Available: https://link.springer.com/chapter/10.1007/978-981-19-3923-5_19.

[10] S. Kale, “Developments in Unmanned Surface Vehicles (USVs): A Review,” Int. Conf. Appl. Eng. Nat. Sci., vol. 1, no. 1, pp. 596–600, 2023, doi: 10.59287/icaens.1064.

[11] K. Ali, R. Ghoni, and A. N. Abdalla, “Advanced control of hybrid-PLC system,” in Procedia Engineering, 2012, vol. 38, doi: 10.1016/j.proeng.2012.06.029.

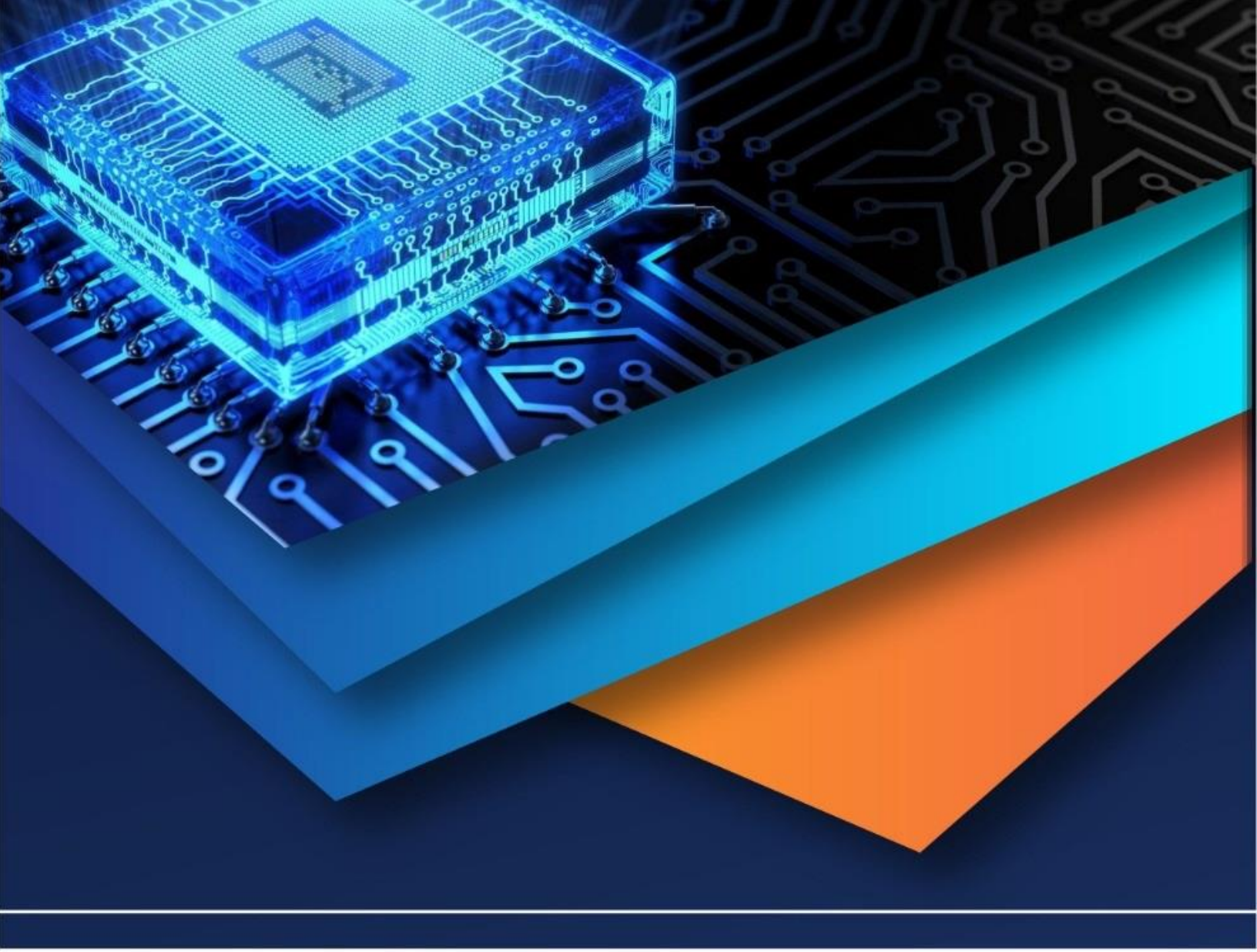
[12] I. Bae and J. Hong, “Survey on the Developments of Unmanned Marine Vehicles: Intelligence and Cooperation,” Sensors, vol. 23, no. 10, 2023, doi: 10.3390/s23104643.

[13] K. Ali, M. Fajehi, D. Rifai, R. Adimah, and T. Ibrahim, “Long Distance Wireless Monitoring Security House System,” vol. 8, no. 4, pp. 560–566, 2014.

[14] T. J. D. Kharudin Ali, A JoraimeeMohamad, DamhujiRifai, KohSiaw Paw, Chen Chai Phing, Chong Tak Yaw, “Control, instrumentation and mechatronics : theory and practice,” LNEE, vol. 921, p. 866, 2022, doi: doi.org/10.1007/978-981-19-3923-5.

[15] S. Sreenath, H. Malik, N. Husnu, and K. Kalaichelavan, “Assessment and Use of Unmanned Aerial Vehicle for Civil Structural Health Monitoring,” ProcediaComput. Sci., vol. 170, pp. 656–663, 2020, doi: 10.1016/j.procs.2020.03.174.

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