IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 1, July 2023

Robotic Boat

Mr. Swaroop Baba KS and Mr. Santosh Kumar T C
BGS Institute of Technology BG, Nagara, India

Abstract: *This project focuses on the design and development of a motor-driven thruster-operated water robot. The objective is to create a robotic system that can operate in areas where humans cannot, reducing the risk to human life. The project begins with an analysis of potential hull shapes, followed by the selection of a cylindrical hull design based on efficiency calculations. To implement the design, an Arduino Mega microcontroller is utilized along with various hardware components such as ultrasonic sensors, DC motors, servo motors, motor drivers, wireless cameras, temperature sensors, humidity sensors, pressure sensors, P V C pipes, and cutter blades. These components are carefully integrated into the system to enable autonomous navigation and robust communication capabilities. The chosen hardware configuration allows the robot boat to gather real-time data about water conditions, including temperature, humidity, and pressure. The wireless camera provides a visual feed, enabling remote monitoring of the robot's surroundings. To ensure obstacle avoidance and precise manoeuvrability, ultrasonic sensors are employed. The development process involves building a low-cost thermocol prototype due to cost constraints. The mathematical model and calculations support the efficiency of the chosen hull shape and the use of two thrusters. Additionally, the design includes an electronic and communication system specifically tailored to overcome challenges that may arise during water navigation. By successfully creating an autonomous robot boat, this project opens avenues for exploration, data collection, and surveillance in hazardous water environments. It holds significant potential for applications in areas such as marine research, disaster response, and underwater exploration.*

Keywords: Robot boat, water robot, autonomous navigation, hull shape design, efficiency analysis, low-cost prototype, electronics design, water navigation challenges, Arduino Mega, sensors, motor drivers, wireless camera, hazard reduction, remote monitoring, data collection, underwater exploration

REFERENCES

[1] Jagjeet Singh, Dhiraj Gandhi, MayankSanghani, P. S. Robi, S.K. Dwivedy , “Design and Development of Underwater Robot”, International Conference on Robotics, Automation, Control and Embedded Systems – RACE 2015, 18-20 February 2015, Hindustan University, Chennai, India.
[2] HumairaMohiuddin, SayidulMorsalin, Khizir Mahmud, “Design and Fabrication of a Prototype Submarine Using Archimedes Principle”, 3rd INTERNATIONAL CONFERENCE ON INFORMATICS, ELECTRONICS & VISION, 2014, 2014978- 1-4799-5180-2/14/$31.00 , Chittagong University of Engineering and Technology Chittagong, Bangladesh
[3] https://randomnerdtutorials.com/guide-for-bmp180-barometric-sensor-with-arduino/ (Accessed on 21-5-2019)
[4] "Design and implementation of a low-cost autonomous surface vehicle for environmental monitoring" by N. K. Gupta, et al. in Journal of Field Robotics, 2018.
- "Development of an unmanned surface vehicle for oceanographic surveying" by J. M. O'Kane, et al. in Journal of Field Robotics, 2016.
[5] "Development of an autonomous surface vehicle for environmental monitoring" by Y. Li, et al. in International Journal of Advanced Robotic Systems, 2018.
[6] "Design and development of an unmanned surface vehicle for water quality monitoring" by S. M. A. Islam, et al. in Journal of Intelligent and Robotic Systems, 2019.
[7] "Autonomous surface vehicles for oceanographic research: Recent developments and future directions" by R. E. Davis, et al. in Marine Technology Society Journal, 2014.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 1, July 2023

[8] "Autonomous surface vehicles: A review of developments and challenges" by M. J. Dunbabin and L. Marques in Journal of Field Robotics, 2012.
[9] "Autonomous surface vehicles: Recent advances and future directions" by M. J. Dunbabin and L. Marques in Marine Technology Society Journal, 2012.
[10] "Autonomous surface vehicles: A survey of applications and technologies" by J. R. Smith, et al. in Journal of Field Robotics, 2019.
[11] "Design and implementation of an autonomous surface vehicle for water quality monitoring" by A. K. M. M. Hossain, et al. in Journal of Intelligent and Robotic Systems, 2019.
[12] "Autonomous surface vehicles for oceanographic research: Recent developments and future directions" by R. E. Davis, et al. in Marine Technology Society Journal, 2014.