SMART AQUARIUM MANAGEMENT SYSTEM

A Project-Based Learning report submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING (SPECIALIZATION IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

under the supervision of

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SCHOOL OF COMPUTER SCIENCE AND TECHNOLOGY
DIVISION OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled, "**Smart Aquarium Management System**" is a bonafide record of Mini Project work done during the even semester of the academic year 2023- 2024 by

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in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering of Karunya Institute of Technology and Sciences.

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Signature of the faculty

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ABSTRACT

The Smart Aquarium Management System represents a cutting-edge endeavor to revolutionize the maintenance and care of aquarium ecosystems through advanced automation and remote monitoring capabilities. This comprehensive study aims to conceive, develop, and implement a sophisticated system capable of overseeing and optimizing critical aspects of aquarium management, including feeding schedules, real-time monitoring of essential water parameters such as temperature, oxygen levels, and turbidity, and the seamless execution of water replacement procedures.

Methodologically, the project employs an intricate integration of hardware components and software systems, leveraging state-of-the-art technologies to realize the vision of a fully automated aquarium management solution. Key hardware elements include servo motors for precise control of feeding mechanisms, an SG90 Mini sensor for monitoring environmental conditions, ultrasonic sensors for accurate water level detection, and a turbidity sensor for continuous assessment of water clarity. These components are orchestrated by an Arduino UNO board and relay modules, providing robust control and coordination of system operations. Complementing the hardware infrastructure is a meticulously crafted GUI-based Python application, designed to provide users with intuitive control and remote monitoring capabilities, ensuring ease of interaction and accessibility.

Through rigorous experimentation, testing, and validation exercises, the Smart Aquarium Management System has yielded significant insights and findings. Notably, the system has demonstrated exceptional accuracy and reliability in monitoring and regulating water parameters, effectively maintaining optimal conditions for aquatic inhabitants. Furthermore, the integration of remote monitoring capabilities has empowered users with unprecedented visibility and control over aquarium operations, fostering greater engagement and understanding of aquatic ecosystems.

In summary, the Smart Aquarium Management System stands as a testament to the transformative potential of advanced automation and remote monitoring technologies in aquarium management. Looking ahead, future iterations of the system may benefit from further enhancements and refinements, including the integration of additional sensors for expanded monitoring capabilities, optimization of control algorithms for increased efficiency, and strategic considerations for scalability and commercial deployment. Ultimately, the Smart Aquarium Management System represents a significant step forward in the evolution of aquarium care practices, promising enhanced sustainability, efficiency, and user experience in aquatic ecosystem management.

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