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DIGITAL TWINS BASED SYSTEM IN AQUACULTURE

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Abstract

Aquaculture is an important solution to produce food, but it faces many challenges such as water quality control, fish health, and efficient use of resources. A digital twin is a virtual copy of a real system that is continuously updated using data from sensors . This technology allows monitoring, simulation, and better decision-making in real time. In this work, we propose a digital twin-based system for aquaculture implemented in Béchar, Algeria, which is a Saharian region characterized by high temperatures and limited water resources. The system combines Internet of Things (IoT) sensors, data analysis, and a virtual model of the fish farming environment. It monitors key parameters such as water temperature, oxygen level, and water quality, and predicts possible problems before they occur. The proposed system aims to improve fish growth, reduce water and energy consumption, and support sustainable aquaculture in arid environments. By using real-time data and simulation, the digital twin helps farmers optimize feeding, manage water efficiently, and adapt to harsh climatic conditions. This approach represents a promising solution for developing smart aquaculture systems in desert regions.

Keywords:

Digital Twin, Aquaculture, Internet of Things (IOT), Smart Aquaculture, Water Quality Monitoring, Sensor Networks, Real-Time Monitoring, Predictive Analysis, Sustainable Aquaculture