Patent Search

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Abstract:

The invention relates to an IoT-enabled aquaculture pond monitoring and aerator control system that integrates multi-parameter water-quality sensing, electrical anomaly detection, automated capacitor switching, and remote aerator operation. The system comprises sensors for dissolved oxygen, temperature, pH, and turbidity, an electrical monitoring module for detecting phase failure and motor overload, a microcontroller for real-time analysis, and a communication interface for transmitting data to a mob application. The system automatically activates or deactivates aerators based on environmental and electrical conditions, generates alerts for critical events, and maintains historical data logs for informed decision-making. The invention improves reliability, reduces crop mortality, optimizes power consumption, and provides a scalable and co effective solution for aquaculture farms.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention relates to the field of aquaculture automation, environmental monitoring systems, and IoT-based electromechanical control technologies, an more particularly to a pond monitoring and aerator management system that integrates multi-parameter water quality sensing, phase-failure detection, aerator fault identification, automatic capacitor switching for power factor optimization, and remote-control functionality through a mobile application. The invention encompasses a microcontroller-based, sensor-integrated platform designed to continuously monitor critical aquaculture parameters such as dissolved oxygen, pH, temperature, turbidit and electrical phase conditions, while enabling real-time data acquisition, cloud connectivity, alert generation, and remote aerator operation, thereby reducing manual involvement, minimizing operational losses, and improving the reliability and sustainability of aquaculture practices.

BACKGROUND OF THE INVENTION

[002] Aquaculture operations, particularly pond-based fish and shrimp farming, depend heavily on continuous monitoring of water quality parameters such as dissolved oxygen, temperature, pH, turbidity, salinity, and electrical conductivity. Traditionally, these parameters are measured manually using handheld instruments or visual observation, resulting in infrequent sampling and delayed responses to adverse conditions. Aquatic organisms are highly sensitive to fluctuations in water quality, and ev short-term imbalances can lead to stress, disease outbreaks, reduced feed conversion, and large-scale mortality. The absence of real-time surveillance, coupled with hea

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