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Evolving towards the Future: Internet of Things based Precision Aquaculture System

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Abstract

Humans and technology have been developing continuously from the prehistoric period to the present, and it has evolved into a key component for assisting with daily tasks in today's world of technology. As an approach to fulfilling nutritional needs and a variety of other necessities, civilizations established agriculture millennia ago. Aquaculture is yet another important concept in agriculture, where farmers cultivate fish in ponds and tanks for human consumption. Aquaculture, or fish farming, has long been recognized for its significance by agriculture, which has its roots in satisfying human needs and it is only one of the many industries that are undergoing advancements driven by modern technologies. As technology continues to evolve, Internet of Things (IoT) based aquaculture systems are gradually replacing traditional fish farming techniques. By applying IoT and AI-based technologies, the system enables fish farmers to accurately monitor the growth and wellbeing of fish as well as the water quality, temperature, and pH levels in fish tanks. This system, which is readily accessible through computers, tablets, and mobile phones, minimizes manual labor while significantly expanding aquaculture outcomes, resulting in advantages for the fishery's marketing industry. The primary objective of this research project is to explore the prospective benefits associated with implementing IoT and AI technologies in aquaculture and artificial intelligence utilization in aquaculture worldwide, focusing on analytical models, AI-powered image recognition and vision-based algorithms for disease management and sustainable methods to improve awareness of the role that technology plays in strengthening efficiency and ensuring long-term sustainability for the aquaculture sector by examining certain scenarios and possible benefits.

Keywords: *Aquaculture, Internet of Things, Artificial Intelligence, Remote access, Solar power*