ABSTRACT

This project focuses on the development of an automatic, sustainable, and self-sufficient fish feeding system, enriched with a water pH sensor and solar panels as an alternative energy source. The system is designed to overcome the limitations of previous projects that relied on laptop electricity and lacked a sensor to measure the pH of the pond water. With solar panels, this system can operate in fish pond environments far from power sources, reducing dependence on conventional electricity and enhancing operational sustainability, especially in conditions of power outages or network disruptions. The water pH sensor allows for the detection of the acidity or alkalinity level of the pond water, a crucial factor affecting the health, growth, and reproduction of fish.

To address various challenges in fish farming, the Smafe application has been developed. This application utilizes Internet of Things (IoT) technology and renewable energy to create an efficient and sustainable fish farming system. The main features offered by Smafe include an automatic feeding system that allows users to adjust the feeding schedule, and a water pH sensor that monitors the acidity or alkalinity level of the pond water in real-time. In addition, Smafe integrates solar panels as an alternative power source for the fish feeding system, allowing users to monitor the battery status and energy consumption of the system. Thus, Smafe facilitates fish farmers to optimize their farming process, save time and effort, and contribute to the environment by using renewable energy.

The research methods include Literature Study, Needs Analysis, Tool Design and Manufacturing, and Testing. The Literature Study includes in-depth research on relevant technologies such as solar panels, water pH sensors, and the Internet of Things (IoT). The Needs Analysis involves gathering information to design the application, including Arduino resources, mobile application development, and understanding the needs of fish farmers to know the water quality conditions of the pond. The system design includes hardware components such as solar panels, inverters, microcontrollers, and pH sensors, as well as IoT-based Smart Feeding tools and application user interface design.

Testing is conducted to ensure that the system can accurately measure the pH of the pond water and that the solar panels can generate enough power to operate the system. The testing involved 20 respondents with an average usability score of 98.75% based on the Likert scale, indicating that the SMAFE application received positive feedback from users.

Keywords: Internet of Things (IoT), Smart Feeding, pH meter sensor, Solar panel.