Monitoring System for Dengue Fever (DBD) Vectors in TPA (Water Reservoirs) Based on IoT

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ABSTRACT

Dengue Hemorrhagic Fever (DHF) remains a serious public health issue in Indonesia, largely due to the uncontrolled growth of Aedes aegypti mosquitoes in water storage containers. This study proposes an Internet of Things (IoT)-based monitoring system to assess the potential for mosquito larvae development in various types of water containers (TPAs), based on key environmental parameters: water temperature, pH, and Total Dissolved Solids (TDS). The system uses Arduino Nano to read data from DS18B20 (temperature), 4502C (pH), and TDS sensors. These readings are transmitted to an ESP32 module, which then sends the data to a Flask-based server via HTTP, where it is stored in a MySQL database. A real-time web interface named "Jumantik" was developed to visualize this data for users. To determine the potential of a site to support mosquito breeding, a Sugeno fuzzy inference system is embedded in the Arduino Nano. This system processes the sensor data and classifies each water source as "potential" or "non-potential" for mosquito development. The test results demonstrate that the system works accurately and efficiently in real time, providing relevant information to support early prevention of DHF outbreaks. The integration of IoT and fuzzy logic offers a reliable, scalable, and automated solution for environmental monitoring and vector control efforts.

Keywords : Dengue, Aedes aegypti, IoT, Fuzzy Sugeno, Water Quality, Environmental Monitoring