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Sarjana Komputer (S.Kom)

By:
MUHAMMAD FADLY SWITANTO
012202200074

FACULTY OF INFORMATION SYSTEM STUDY PROGRAM
CIKARANG, AUGUST 2025

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FloodAWARE

ANDROID-BASED APPLICATION FOR IOT FLOOD MONITORING AND EARLY WARNING SYSTEM USING FIRE-BASE

ABSTRACT

Flooding is one of the most persistent environmental hazards affecting the industrial region of Cikarang, West Java, Indonesia. Seasonal floods in this area not only cause significant damage to residential properties but also disrupt industrial operations, leading to financial losses and compromised infrastructure. In collaboration with PT Persada Multipac Abadi, a chemical manufacturing company specializing in water treatment, this research aims to develop a practical and integrated solution to mitigate flood impacts. The project resulted in the creation of FloodAware, an IoT-based flood monitoring and early warning system. This system combines real-time data collection using the JSN-SR04T ultrasonic sensor connected to a NodeMCU ESP8266 microcontroller, which transmits water level readings to the Firebase Realtime Database. An Android-based mobile application was developed using Flutter to provide users with live flood status, historical data, and early warning notifications directly on their devices.

The system's development process adopted the Waterfall methodology, enabling a structured progression from requirements gathering to system testing. The mobile application offers an intuitive interface, making it easier for both industrial stakeholders and the general public to monitor water levels and receive timely alerts. Functional and non-functional testing confirmed the reliability, usability, and stability of both the hardware and software components. Notably, the mobile application performs efficiently in retrieving data, rendering information, and issuing alerts when thresholds are breached,

thereby demonstrating its readiness for real-world deployment in flood-prone areas like Cikarang.

Future enhancements are anticipated to further improve system capabilities. These include the integration of Firebase Cloud Messaging (FCM) for more robust notification delivery, the addition of user authentication for personalized experiences, and the incorporation of supplementary environmental sensors such as rain gauges and humidity sensors. Expanding support to iOS platforms would also increase user accessibility across devices. Through these advancements, FloodAware can evolve into a comprehensive and scalable solution that supports both disaster mitigation efforts and community safety initiatives in Indonesia's flood-vulnerable regions.

Keywords: *Flood Monitoring, IoT, Early Warning System, Mobile Application, Firebase, Flutter, NodeMCU ESP8266*

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