ABSTRACT

Flash floods are natural disasters that frequently occur in Indonesia with extensive detrimental impacts, including damage to infrastructure, natural resources, economic losses, and loss of life. Data from the National Disaster Management Agency (BNPB) shows a significant number of flood cases during the 2019–2023 period, indicating the need for attention to flood disaster mitigation. Rainfall is a key parameter in early warning of flash floods because rain has a big impact, especially when it has high intensity. Conventional methods are often slow and have limitations in helping to carry out early flood detection. Internet of Things (IoT) integration offers an effective solution for monitoring the environment and collecting accurate rainfall data. Through the tipping bucket method, rain intensity measurements can be made accurately and quickly. This research was conducted to design an early flood detection system using IoT technology and the tipping bucket method, and it is hoped that its implementation can increase the responsiveness of the early warning system and reduce the negative impacts resulting from flash flood disasters. The design of the flash flood early warning monitoring system based on the Internet of Things (IoT) using the tipping bucket method is capable of measuring rainfall and sending real-time data to the Telegram platform. The system has an average sensor accuracy of 98.65%, with an average delay of 1786ms, an average throughput of 9.187Bps, and a packet loss rate of 0.

Keywords: *Flash flood, Internet of Things, rainfall, monitoring, tipping bucket.*