RANCANG BANGUN SISTEM PEMANTAUAN DAN PEMUTUS ARUS LISTRIK OTOMATIS BERBASIS *INTERNET OF THINGS* PADA AREA PERUMAHAN RAWAN BANJIR

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ABSTRAK

Banjir yang terjadi di kawasan permukiman tidak hanya menimbulkan kerugian materi, tetapi juga berisiko menyebabkan korsleting listrik yang membahayakan keselamatan penghuni serta merusak peralatan elektronik. Untuk mengatasi hal tersebut, penelitian ini merancang sistem otomatis berbasis Internet of Things (IoT) yang mampu memantau ketinggian air secara real-time dan memutus aliran listrik secara otomatis. Sistem dirancang menggunakan sensor ultrasonik HC-SR04 dan sensor water level analog yang terhubung dengan mikrokontroler ESP32. Saat air mencapai batas ketinggian tertentu, motor servo akan menggerakkan Miniature Circuit Breaker (MCB) untuk memutus arus listrik, serta mengirimkan notifikasi peringatan melalui aplikasi Telegram. Penelitian ini menggunakan metode Research and Development (R&D) dengan tahapan perancangan perangkat, integrasi sistem, dan pengujian fungsional. Hasil pengujian menunjukkan bahwa sistem dapat mendeteksi ketinggian air dengan akurasi sebesar 97% dan memberikan respon pemutusan arus dalam waktu kurang dari 2 detik. Selain itu, pengiriman notifikasi berlangsung stabil selama koneksi jaringan tersedia. Sistem ini dinilai efektif sebagai solusi preventif untuk meningkatkan keamanan kelistrikan di lingkungan rawan banjir.

Kata kunci: Banjir, Pemutus Arus, ESP-32, IoT, Korsleting Listrik.

DESIGN OF AN AUTOMATIC MONITORING AND CIRCUIT BREAKER SYSTEM BASED ON THE INTERNET OF THINGS IN FLOOD-PRONE RESIDENTIAL AREAS

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ABSTRACT

Flooding in residential areas not only causes material losses but also poses a risk of electrical short circuits that endanger residents and damage electronic equipment. To address this issue, this study designed an automatic system based on the Internet of Things (IoT) to monitor water levels in real time and disconnect electrical power automatically. The system is built using an HC-SR04 ultrasonic sensor and an analog water level sensor connected to an ESP32 microcontroller. When the water reaches a certain threshold, a servo motor activates a Miniature Circuit Breaker (MCB) to cut off the power supply and sends a warning notification via the Telegram application. This research adopts a Research and Development (R&D) method, which includes hardware and software design, system integration, and functional testing. The results show that the system can detect water level changes with 97% accuracy and respond by cutting off power in less than 2 seconds. Moreover, the notification system works reliably as long as the internet connection is stable. This solution is considered effective in improving electrical safety in flood-prone residential areas.

Keywords: *Flood, Circuit Breaker, ESP-32, IoT, Electrical Short Circuit.*