

ABSTRACT

This research develops an Automated Weather Station (AWS) integrated with modern web technologies for environmental monitoring. The system gathers data from sensors that measure wind speed, temperature, humidity, and pressure, which are essential for disaster management and weather prediction. A client-server architecture is utilized, with Next.js powering the frontend for an interactive user interface, and MySQL alongside Prisma handling backend data management. The system ensures high performance, regular updates, and robust data security through encryption and user authentication. The Prototype method is employed for iterative design and collaboration, allowing for quick adjustments based on user feedback. Testing results demonstrate the system's efficiency: API load tests showed optimal response times, averaging 43.5 ms for GET requests, and performance tests indicated a throughput of 61.2 requests per second. Functional tests confirmed secure user authentication, role-based access control, and reliable system operations. This AWS-based system offers a scalable solution for monitoring weather conditions, especially in disaster-prone coastal areas, and is designed for future integrations, such as machine learning, to improve weather prediction accuracy.

Keywords: Automatic Weather Station, Dashboard monitoring, Disaster management, MySQL, Next.js.