IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 1, April 2025
Impact Factor: 7.67

Real-Time Earthquake Detection and Intensity Forecasting System

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Abstract: *Earthquakes pose a severe threat to life and infrastructure, necessitating efficient real-time detection and accurate intensity forecasting. This research presents a Real-Time Earthquake Detection and Intensity Forecasting System that utilizes ADXL335 accelerometers and Arduino Uno microcontrollers for seismic data acquisition. The system processes real-time acceleration data, applies noise filtering, and detects seismic events based on predefined thresholds. To enhance forecasting accuracy, a Long Short-Term Memory (LSTM) neural network is employed, leveraging historical seismic patterns for precise magnitude prediction. The integration of sensor-based data collection with deep learning improves system reliability, enabling timely alerts and early warnings. Experimental results demonstrate the system's effectiveness in detecting seismic activity with high accuracy and minimal false positives. This research contributes to real-time earthquake monitoring, offering a scalable and cost-effective solution for early warning applications.*

Keywords: Real-Time Earthquake Detection, Seismic Intensity Forecasting, LSTM Neural Network, Arduino-Based Seismic Monitoring, Accelerometer Sensor Data Analysis

DOI: 10.48175/IJARSCT-24836