



NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2025 - 2026

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| Batch Number | DG5 |
| Team Members | Ammisetty Chamundeswari (22471A05L1) Tadi Anusha (22471A05O4) Chaganti Rethika Reddy (23475A0509) |
| Guide | N. Vijay Kumar, M.E |
| Title | Earthquake Prediction Using Deep Learning with Spatiotemporal Priors |
| Domain/Technology | DEEP LEARNING |
| Base Paper Link | https://ieeexplore.ieee.org/document/10679183 |
| Dataset Link | https://www.kaggle.com/datasets/mostafamousavi/stanford-earthquake-dataset |
| Software Requirements | Browser: Any latest browser like Chrome Operating System: Windows 7 Server or later Python (COLAB) |
| Hardware Requirements | System Type: Intel Core i5 or above RAM: 8 GB Number of cores:5 Number of Threads: 4 |
| Abstract | This paper presents a real-time earthquake early warning (EEW) system using a hybrid Transformer-LSTM deep learning model to improve the speed and accuracy of epicenter distance and magnitude estimation . By leveraging the first 3 seconds of P-wave data from a single seismic station, our model integrates attention mechanisms and lightweight neural networks for rapid, low-latency predictions. We enhance traditional LSTM approaches with Transformer-based architectures to better capture long-range dependencies in seismic signals, while quantization and pruning optimize the system for edge deployment. To overcome limitations in long-distance detection, we incorporate early S-wave features and multi-station fusion where available. Experimental results show a reduction in prediction error by 20% compared to existing methods, with sub-second inference times , making it suitable for real-time alerts. Our framework also introduces uncertainty estimation and explainable AI to improve reliability and trust in EEW systems. |

Signature of the student(s)

Signature of the Guide

Signature of the project coordinator