ID: **P3.5-792** Type: **E-poster**

in Deep Learning Approaches for Local to Teleseismic Earthquake Detection and Phase Picking

Deep learning approaches are effective for earthquake detection and phase picking. However, challenges in existing research include using non-uniform datasets, such as training on limited event distances and excluding noise samples. Models trained exclusively on local events often fail to perform well on teleseismic signals, while models trained only on signals struggle with robustness in the presence of noise. To address these limitations, we constructed a comprehensive dataset based on MLAAPDE, comprising approximately 800,000 2-minute waveform samples at 100 Hz. Half of the samples consist of event data with P, Pn, Pg, S, Sn, or Sg arrivals, while the other half are noise samples. Noise samples were selected as 2-minute windows with no cataloged phase arrivals before the first P-wave. The dataset spans local (0°–3°), regional (3°–30°), and teleseismic (30°+) distances. We train and evaluate four architectures—U-Net, U-Net with transformer, CNN-RNN, and CNN-RNN with transformer—on this dataset. Preliminary results indicate that the U-Net with transformer achieves the highest detection AUC (0.96). Trained on this local to teleseismic dataset, each model demonstrated robust detection across all distance ranges and low residual variability, underscoring the importance of diverse datasets in building generalized and reliable seismic detection models.

E-mail

mayarehem@gmail.com

In-person or online preference

Primary authors: REHEM, Maya (Bayesian Logic, Inc.); Dr ARORA, Nimar (Bayesian Logic, Inc.)

Presenter: REHEM, Maya (Bayesian Logic, Inc.)

Session Classification: P3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data