



SAIPy: A Python Package for single station Earthquake Monitoring using Deep Learning

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Seismology has witnessed significant advancements in recent years with the application of deep learning methods to address a broad range of problems. These techniques have demonstrated their remarkable ability to effectively extract statistical properties from extensive datasets, surpassing the capabilities of traditional approaches to an extent. In this study, we present SAIPy, an open-source Python package specifically developed for fast data processing by implementing deep learning. SAIPy offers solutions for multiple seismological tasks, including earthquake detection, magnitude estimation, seismic phase picking, and polarity identification. We introduce upgraded versions of previously published models such as CREIME_RT capable of identifying earthquakes with an accuracy above 99.8% and a root mean squared error of 0.38 unit in magnitude estimation. These upgraded models outperform state-of-the-art approaches like the Vision Transformer network. SAIPy provides an API that simplifies the integration of these advanced models, including CREIME_RT, DynaPicker_v2, and PolarCAP, along with benchmark datasets. The package has the potential to be used for real-time earthquake monitoring to enable timely actions to mitigate the impact of seismic events.