



Introduction

- Gravitational waves (GW) were discovered on September 14, 2015
- There are many challenges in data analysis and noise characterization for GW detectors
- \sqrt{r}
- Seismology waveform data can be used to mimic GW data

Transfer of knowledge Initial learning **Evaluation** Traditional learning **Time-frequency** representations Results **Machine learning**

- It is not always possible to collect sufficient data for quality predictions
- The research focuses on two issues
 - Is it possible to improve the accuracy of detection and determination of the magnitude of an earthquake?
 - Is it possible to achieve good accuracy even in the case of small datasets?

ML data & models



- Lomax
- LEN-DB
- STEAD
- Speech commands
- EMG
- S&P 500



- VGG16
- Resnet50
- Alexnet
- ConvNetQuakeINGV
- MagNet
- MLSTM FCN
- TCN

A network for Gravitational Waves, Geophysics and Machine Learning – Cost Action CA17137

Marko Njirjak, Erik Otović, Jonatan Lerga, Ivan Štajduhar University of Rijeka, Faculty of Engineering



- Multiple machine learning architectures

- Evaluation was
- their counterparts obtained by to traditional machine learning

Pseudo Wigner-Ville time-frequency representation



achieved

