Comparative Analysis of Explosion Signals on Smartphones and Seismometers

Samuel Kei Takazawa[1], Luis Ocampo Giraldo[2], Jay Hix[2], David Chichester[2], Scott Thompson[2], Blaine Blockholt[2]
Advisor: Milton Garces[1]
[1]University of Hawai‘i at Mānoa
[2]Idaho National Laboratory
takazaw4@hawaii.edu

Abstract:

The detection and classification of explosions is a key element of nuclear non-proliferation monitoring. Traditionally, explosion analysis is done by using experimental data collected from strategically deployed sensors. However, with the abundance of IoT sensors in the current age of smartphones, there is an untapped network of sensors that can be used for explosion analysis. To investigate the usefulness of the accelerometer sensors on the smartphones, we present a comparison of a 150 kg TNT equivalent yield explosion signatures captured on a smartphone and a calibrated seismometer. We compared the raw waveforms, power spectral density, and time frequency representations of the signals.