

# of Artificial Intelligence Techniques to the Mitigation of Anthropogenic Noise in Seismic Data from International Monitoring Stations in Rapidly Urbanizing Areas like Nairobi, Kenya

Thursday, June 22, 2023 9:04 AM (1 minute)

The Comprehensive Nuclear-Test-Ban Treaty (Treaty) of 1996 obliges its signatories not to undertake nuclear weapons tests. Kenya is a signatory to the Treaty and operates an infrasound and a primary seismic station in Nairobi. The city has a 2.8% urban growth rate and in 2019, its population was 4.3 million. An increase in anthropogenic activities directly impacts the International Monitoring Stations in Nairobi, causing more noise in the data. Artificial intelligence algorithms exist which can separate noise from seismic signals. Machine learning algorithms can automatically learn from such data, identify patterns and make decisions while retaining the ability to analyse previously unseen patterns. Deep learning algorithms can apply multiple layers to extract higher level features from the raw noise data. Stanford University developed CRED for seismic event detection, DeepDenoiser for signal denoising analysis, EQTransformer for phase picking and MagNet for magnitude estimation. Thibaut Perol developed ConvNetQuake, which identified 17 more earthquakes than the Oklahoma Geological Survey. Intelligent algorithms can be a viable strategy to reduce anthropogenic noise and hasten the analysis of data. The costs and technical challenges of implementing these algorithms could be mitigated through suitable partnerships between the Comprehensive Nuclear-Test-Ban Treaty Organization and the relevant research institutions, researchers and States Signatories governments.

## E-mail

emulehane@gmail.com

## Promotional text

Leveraging artificial intelligence for enhanced monitoring of nuclear tests.

## Oral preference format

in-person

**Primary author:** ACHOLLA, Emmanuel (University of Nairobi)

**Presenter:** ACHOLLA, Emmanuel (University of Nairobi)

**Session Classification:** Lightning talks: P3.5, P5.1

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