



DeepCube

Explainable AI pipelines for big Copernicus data

Global volcanic unrest detection and alerting



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101004188

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Use Case motivation

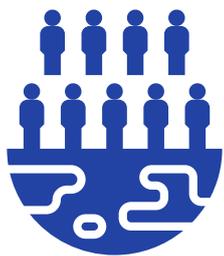
At any given moment, several volcanoes worldwide are erupting, while there are more than 1500 volcanoes capable of reawakening and creating severe or even catastrophic impacts to the society. When worst-case scenarios occur, eruptions can have regional to global consequences and disrupt global transportation, agriculture and trade. Moreover, an estimated 800 million people globally live within a 100 km radius of an historically active volcano. Improvements in monitoring volcanic unrest activity and forecasting eruptions have been shown to reduce fatalities.



Use Case objectives

Historical data from eruptions indicate that they are almost always preceded by volcanic unrest.

Precursory phenomena that provide early warning of possible eruption can be detected with volcano monitoring. Early warning based on detected unrest could be of great importance for civil protection authorities, enhancing their response effectiveness and allowing scientists to deploy critical in-situ equipment. To this end, DeepCube aims to develop a global unrest alert service based on the detection of ground deformation, namely changes to the volcano's ground surface, which is usually due to magma chamber fill-in at depth; an activity considered as precursor for a potential eruption.



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The DeepCube approach

The ground deformation will be monitored and detected using **Interferometric Synthetic Aperture Radar** data from the Sentinel-1 satellite. Fringes detected in wrapped interferograms over volcanic areas indicate the onset of deformation. Until now however, an expert had to visually inspect the interferograms and decide whether the deformation is associated with unrest. DeepCube will research **Deep Learning** architectures that can automatically detect the unrest and will develop an alert service covering several active volcanoes globally.



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Use Case leader

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Interested in learning more? Contact us!

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