A Study Of Significant Volcanic Eruptions

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Abstract

Volcanoes and their eruptions have an impact on everyone's daily life whether they are aware of it or not. Besides the most evident impact resulting from a volcanic eruption, such as loss of life, change in the landscape, monetary loss and high recovery costs, there are long term effects that have been influencing life as we know for hundreds of years.

Volcanic eruptions have serious effects on climate change as their discharge contributes to lowering air quality. The pollution generated by the volcanic ashes and dust may linger for months after the eruptions, having a direct impact on water reserves, food availability, global travel and the lives of both humans and animals.

Most volcanoes are located between tectonic plates, and are characterized by being an opening on earth's surface allowing magma, ash and gases to escape. An eruption happens when gases and lava (magma that has reached earth's surface) are released from the volcano. This release can be, but not limited to, explosive eruptions.

Most eruptions are of scale 0 to 2 on the Volcanic Explosivity Index (VEI). VEI is an index used to measure the explosiveness of volcanic eruptions, the index ranges from 0 to 8, with 8 being the most explosive volcanoes.

This project will study the most significant volcanic eruptions from 4360 BC to 2014, the sample data is available in the Tableau resources webpage (see References). Eruptions considered

significant are the ones that have caused fatalities, moderate damage of approximately or superior to $1 million, VEI index of 6 or greater and were associated with an earthquake of large magnitude or generated a tsunami. There are 36 variables and 658 entries in this dataset. The data will be collected, prepared and cleaned to create the train and test datasets. The analysis will focus on different multiclass classification methods such as KNN and Decision trees to test and predict the Volcanic Explosivity Index of most significant volcanic eruptions. Python is the selected tool for performing these analyses and the Exploratory Data Analysis.

References

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