

# Natural Phenomena Early Warning System

Hanafi, Aziz (School: International School of Carthage)

Natural disasters have devastating consequences to huge numbers of people every year, often causing major damages, heavy death tolls and much suffering. Saving people's lives by alerting them is a prerequisite. Hence, my project goal is to detect Natural phenomena before their occurrence. Specifically, it intends to forecast/ predict earthquakes and volcano eruptions. A research on the volcano eruption and earthquake precursors was carried out. It revealed that in an earthquake there are two main waves: the P wave which is the first, the fastest and unnoticeable by humans. It precedes the S wave that causes the whole damage. Also, days before the earthquake, Radon gas is released due to pre-seismic stress and the fracturing of the rock. It is the signal for an impending quake. At this stage, I created a system based on two high sensibility vibration sensors as well as a radon gas sensor. My project also forecasts volcano eruptions. A research on its precursors showed that among the signs we find the deformation of the volcano caused by the magma along with the emission of gases. Therefore, I built a system attached to a homemade copter allowing the daily calculation of the volcano deformation and swelling through a laser distance sensor. It also detects the actual intensity of the volcano gases. The results were significant with the different user interfaces I developed allowing a real time observation and automatic alerts in case of a natural disaster occurrence.

## **Awards Won:**

King Abdulaziz &

his Companions Foundation for Giftedness and Creativity: Award of \$1500 in Machine Learning in Real-World Bio-engineering Applications