

Abstract

Project Title: Early Earthquake Detection

Project ID: 223

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A brief explanation of your project. Enables judges to receive a base understanding of your project and work.

Rocky shorelines are prone to erosion as waves routinely strike against the lower rocks disrupting the foundation supporting the rock above. Michigan's Pictured Rocks National Lakeshore is a rocky shoreline that has become an increasingly popular tourist attraction. On August 12th, 2019 a piece of the Pictured Rocks National Lakeshore sheared off into Lake Superior. The shearing occurred next to a hiking trail that is a large attraction to tourists and causes concerns for future tourism in the area. To prevent damage and human deaths, scientists try to predict seismic activity by using high tech equipment. The goal of this project is to create an early earthquake detection system to detect seismic activity and to test the reliability of the system. In Phase I of the experiment, a detection system was created by coding an Arduino Uno to accept outputs from an ADXL335 accelerometer. The results of Phase I provided data to show acceleration changes in three dimensions. In Phase II of the experiment, the reliability of the detection system was tested. The hypothesis in Phase II stated that if two Arduino Uno detection systems are simultaneously used to measure changes in acceleration, then there will not be a significant difference between the two systems. The outputs of two accelerometers were measured under different acceleration settings and compared using a Paired t-test. No significant differences were found at a 95% confidence interval between the two accelerometers which supports both the hypothesis that reliable seismic activity detection systems could be produced.