31st IAA SYMPOSIUM ON SPACE AND SOCIETY (E5)
Space Assets and Disaster Management (4)

Author: Prof. Avid Roman-Gonzalez
Peru

Ms. Natalia Indira Vargas-Cuentas
Image Processing Research Laboratory (INTI-Lab). Universidad de Ciencias y Humanidades - UCH, Peru

ANALYSIS OF EARTHQUAKE AFFECTED AREAS USING DATA COMPRESSION TECHNIQUES

Abstract

Peru is a country prone to earthquakes due to the presence of the Nazca tectonic plate. Face to an earthquake, post-disaster management plays a critical role in bringing the necessary help to those affected. To make an excellent post-disaster management and make correct decisions, it is essential to analyze the affected area, the level of affectation, the type of affectation, and in this way, determine the kind of help to be provided and by what route to send it. In that context, satellite images can provide an overview of the area to be analyzed, and through them, identify areas that have buildings collapsed by the earthquake. For this task, one proposes the use of data compression techniques that can differentiate, in an image, the areas with fallen buildings from the zones without affectation. The methodology to follow is mainly based on the execution of the following stages:

- The study of state of the art will be carried out through scientific searches in the primary databases such as IEEE Xplore, Google Scholar, Science Direct, among others.

- It is necessary to have a database of satellite images that contain areas affected by earthquakes, and that includes collapsed buildings. These images may be collected from the International Disaster Charter, Google Data Set, among other data sources.

- Data compression, which is based on information theory, will be the primary technique for the development of the proposed algorithm. When one compress an image, the compression rate depends a lot on the visual complexity of the image, a visually complex image is compressed less than a visually more straightforward image. In a satellite image, the compression of entire areas will be different from the compression of zones that have buildings collapsed due to an earthquake.

- To evaluate the success of the developed algorithm, tests will be carried out based on data to determine the error of our proposal statistically.

This proposal will be a tool to analyze satellite images and identify affected areas in a faster way to have better decision making in the face of an earthquake.