

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Societal and Economic Applications, Challenges and Benefits (5)

Author: Mr. Joel Diaz Sotelo
Universidad de Ciencias y Humanidades (UCH), Peru

Prof. Avid Roman-Gonzalez
Business on Engineering and Technology S.A.C. (BE Tech), Peru

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

PUBLIC HEALTH STUDY BASED ON SATELLITE IMAGES: CASE - MALARIA IN PERU 2015

Abstract

The rise of observation satellites and satellite image data generates much information. This information, generally, is temporal and has spatial dynamics. The storage and analysis of this data require a particular architecture that allows us to extract relevant and timely information. These data, known as "spatiotemporal", represent the dynamics of certain phenomena, such as epidemics, geo-climatic changes, among others. The adequate analysis of these data allows the monitoring and prediction of critical events; the idea is to take preventive measures in real-time. This work proposes developing a bioinformatics platform for managing spatiotemporal information from satellite images, allowing its analysis to be applied to public health problems. The results to be achieved will serve for prediction and decision-making when defining prevention and control strategies against the appearance of epidemics in Peru. For this, one proposes to obtain information from LANDSAT multispectral satellite images, with which one will estimate a series of geo-climatic parameters relevant to the needs mentioned above. This proposed platform comprises three levels:

- Implement and manage a database of satellite images and extraction of geo-climatic parameters.
- Standardize spatiotemporal statistical analysis tools for the evaluation of risk factors of epidemiological relevance.
- Develop deterministic and probabilistic mathematical models to model the transmission of diseases based on the parameters described above.

As the proof of concept and starting point, one seeks to study the problem of malaria transmission in endemic areas in Peru. Changes in geo-climatic and environmental factors are associated with malaria transmission risk. All of these are quantifiable and estimable from satellite imagery. Analyzing this information will allow us to identify the degree of influence of each of these factors. This knowledge will allow us to propose mathematical models to simulate the spatiotemporal dynamics of malaria transmission in the study areas.