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Author: Prof. Avid Roman-Gonzalez
Business on Engineering and Technology S.A.C. (BE Tech), Peru, avid.roman-gonzalez@ieee.org

Ms. Natalia Indira Vargas-Cuentas
Image Processing Research Laboratory (INTI-Lab). Universidad de Ciencias y Humanidades - UCH, Peru, nvargas@uch.edu.pe
Mr. Victor Romero-Alva
Image Processing Research Laboratory (INTI-Lab). Universidad de Ciencias y Humanidades - UCH, Peru, nielsrom93@gmail.com

PROPOSAL FOR A SATELLITE, DRONE AND GROUND SENSOR INFORMATION FUSION APPLIED TO PUBLIC HEALTH

Abstract

Data from remote sensing satellites and satellite images generate considerable information. The storage and analysis of these data require a particular architecture that allows extracting relevant information varying through/in time. These data could represent the dynamics of certain phenomena, such as epidemics and geo-climatic changes. Properly analysing these data could allow tracking and predicting critical events to take preventive measures, all in real-time. The sensors carried by the UAVs provide real-time information about the environment for complex decisions and perform actions for social benefits. In this work, one proposes to develop a bioinformatics data management platform for heterogeneous information - satellite images, drone images, ground sensors, population data, environmental, transactions, etc. allowing its analysis to be applied to public health problems. The results obtained will serve for prediction and decision-making when defining strategies for prevention and control against epidemics in Latin America. The proposed platform comprises three levels:

1. Implementation and management of a database of satellite images (past dates) and extract geo-climatic parameters Standardise spatiotemporal tools for evaluating epidemiologic risk factors relevant statistical analysis using drone images and ground sensors Develop deterministic and probabilistic modelling of disease transmission from the parameters described above mathematical models.

As a proof of concept and a starting point, one will study the problem of malaria transmission in endemic areas in Peru and Argentina. Changes in geo-climatic and environmental factors are associated with the risk of malaria transmission. Analysing this information will allow us to identify each factor's degree of influence (level of association). This knowledge will enable us to propose mathematical models (deterministic and probabilistic) to simulate the spatiotemporal dynamics of malaria transmission in the study areas.