



## RESUMEN

The main problem in remote sensing is that there are not always satellite images completely free of clouds, especially in regions of tropical climates, and humid, which causes complications and perhaps serious restrictions for the analysis of the image. The clouds cause serious interference in aerial and satellite images altering the radiometric response or causing reduction in the useful area of the image. This causes that the number of satellite images for different studies to be reduced and and therefore many times there is no real information on the study area.

The reconstruction of an image is a very important problem in image processing. The problem of removing clouds from satellite images can be viewed as an issue of reconstruction or restoration of images, which involves recovering an original scene of missing or damaged observations from information present in the image or using multispectral images.

My thesis topic is the reconstruction of cloud-contaminated satellite images for the analysis of data for other studies, using mathematical and computational methods. In addition, to study the different existing methods in the literature for the reconstruction of lost data.

We study the classic Mixture model for the classification of class (in particular for Gaussian mixtures) using the Expectation-Maximization algorithm. Also, we study Mixture regression models and other approaches based on these methods. We used for the reconstruction of an image, the inpainting technique, whose objective is to restore a damaged (missing) area in a visually plausible manner using information outside of the damaged domain. We propose to use the Criminisi method together with a texture descriptor to obtain the most similar patch. In this part our experiments were done only in texture images. For the description of textures, we propose to use the Local Mapped Pattern.

Also, we use the Expectation Maximization algorithm to determine the data classes (modes) within an image to look for similar regions. Here we propose two methods to look for the most similar patch or patches. In the first proposed method we find only a most similar patch; and the second method, we find  $k$  most similar patches. Once the most similar patch or patches are found, in each region a predictor is used to predict the missing data. In this part our experiments were done in texture images, real images and satellite images.

To reconstruct a satellite image that presents clouds, it is to use multi-temporal images. One of the techniques used for the reconstruction of an image in a temporal series is to use the proposed method by Melgani but in the training and reconstruction phase, we use Mixtures of linear Regression.

### Referencias

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Luis Armando

**ENLACE**

**La Escuela de Posgrado UNI le está invitando a una reunión de Zoom programada.**

**Tema: SUSTENTACION DE TESIS**

**FECHA: Viernes 01 de diciembre de 2023**

**HORA: 09h00 Lima**

**Unirse a la reunión Zoom**

**Entrar Zoom Reunión**

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**Dr. Victor Antonio Caicedo Bustamante**  
**Director (e) de la Escuela de Posgrado**

Atentamente,

  
M.Sc. Sonia Anapan Ulloa  
Secretaría General



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