USER INTERFACES FOR ACCESSING AND MANIPULATING SATELLITE IMAGES

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Introduction

One of the main issues when dealing with satellite images is the variety of sites maintaining images repositories with different formats and different visualizations. The tools typically used to handle satellite images target specific formats and visualizations. This problem limits the accessibility of images to prospective users worldwide.

Another issue with satellite images is the lack of tools for finding images with particular characteristics. In order to get a desired image a user needs to be acquainted with the database of images and rely on their recollection of the image geographical coordinates. Thus, searching for an image requires previous knowledge of the image.

This project intends to find solutions for the abovementioned issues. The objective is to develop a Web-based application that can facilitate the access and manipulation of satellite images independently of their site, format or visualization. In order to accomplish this objective it will be necessary to identify image repositories worldwide and gain public access to them. It will also be necessary to create databases of mapping of the images to geographical areas such as cities, forests, basins and wetlands. In addition it will be necessary to develop effective image search facilities.

Current Work

Our current work concentrates on two projects. The first projects focus in the development of a tool for mapping images to geographic areas such as cities, shores, lakes, rivers, basins, wetlands, forests, etc. The second project focus on the development of a Website for facilitating geographically-based search of images worldwide.

The tool for mapping images to geographical areas will be able to use a contour of a region such as the one shown in figure 1 and map it to existing images corresponding to that region. The region may correspond to a mosaic of images of a database as shown in figure 2. The task of the tool is to identify the images of the mosaic that correspond to a sector (or sectors) of the region of interest and save a reference to them in a database. For the Vega sector of the region shown in figure 1 references to the images with yellow shadow in figure 3 will be saved in a database.

The objective is to automate the mapping process. The tool will use as input a contours of a region with labels identifying sectors within the region, the coordinates corresponding to the region, and a database of images of the region. The output of the tool will be database entries with the names of the sectors and references to the images that make up that sector. For example, for the region shown in figure 1 the tool will produce sets of images references for the Llanos, Vega and Punta sectors.
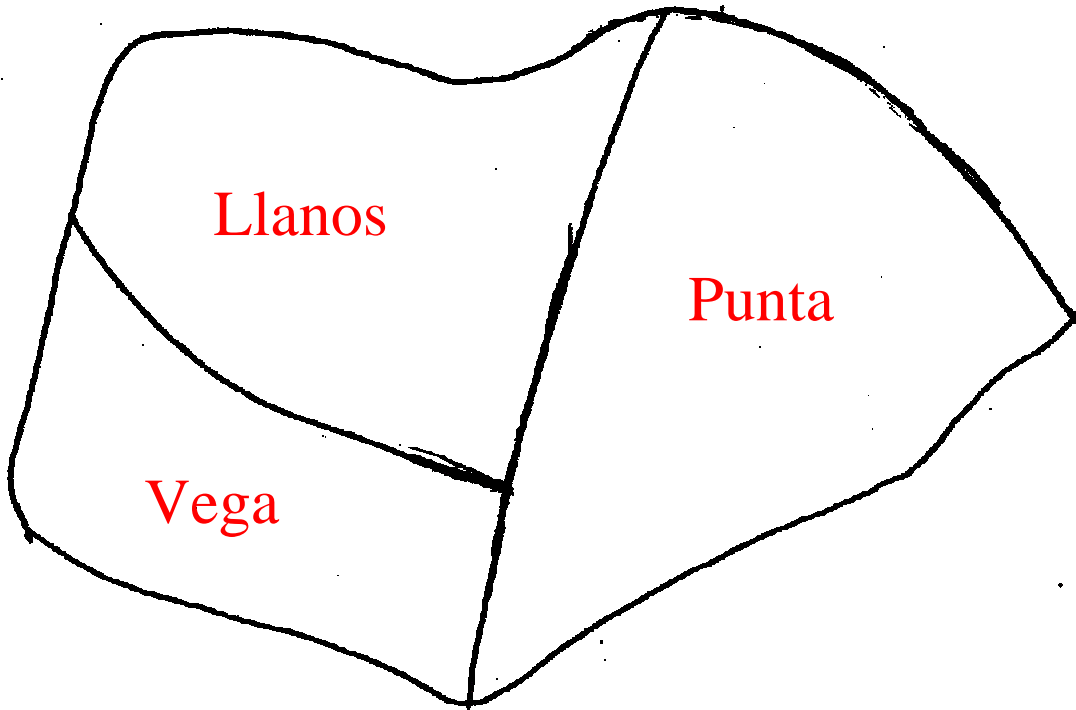
Figure 1. A region.
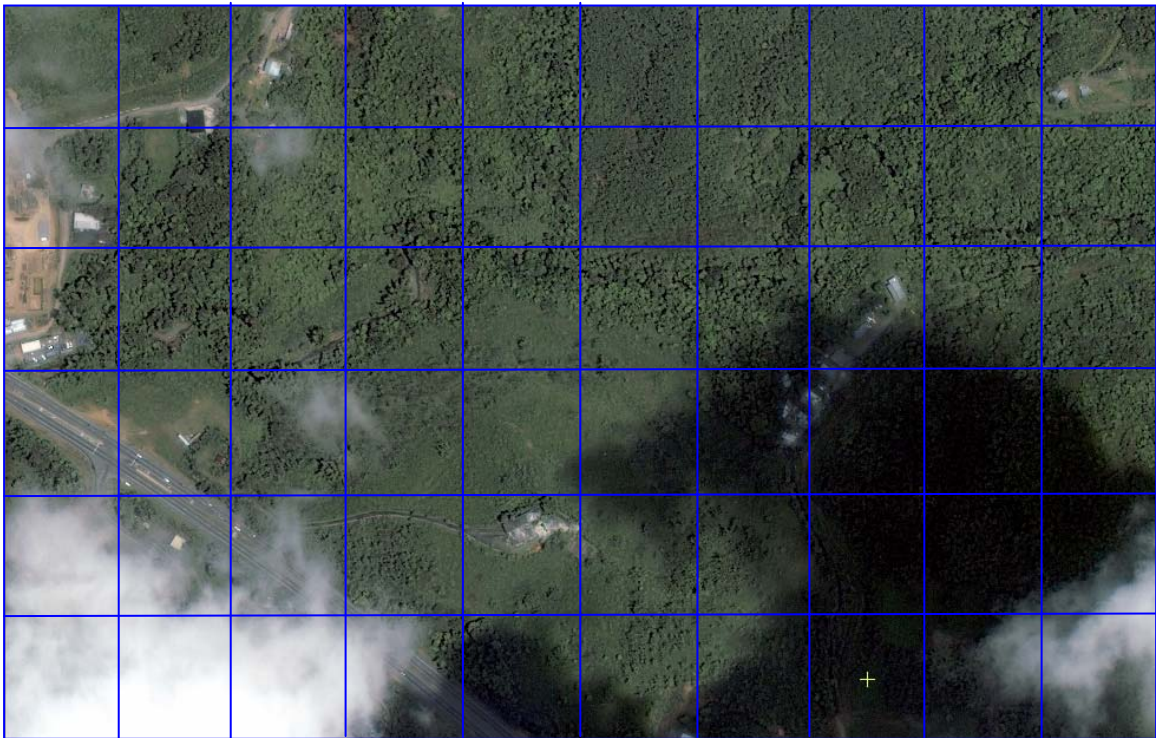
Figure 2. A Mosaic of images of a region.
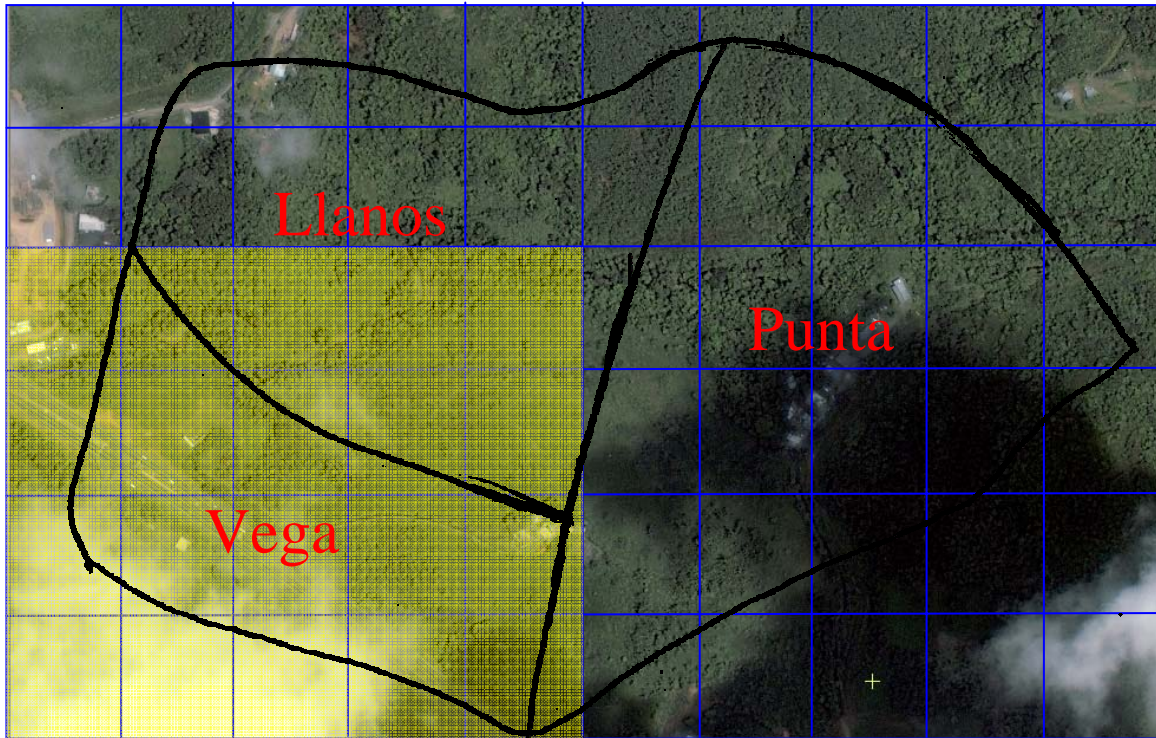
Figure 3. Images corresponding to a sector of a region.

A website will be developed that will facilitate access to satellite images independently of the site, format and visualization. This website will provide facilities for finding images of a wide variety of geographical areas. In the process of developing this website it will be necessary to identify and have access to images websites worldwide.

The mapping tool previously described will be instrumental in creating the image databases that will facilitate the search of the images. For example, a user could provide a map of all the cities of Puerto Rico with labels identifying them and a database of satellite images of Puerto Rico and the tool will generate database entries with references to the images corresponding to each city. Similar mappings could be made of other regions creating databases that can facilitate searching for images of geographical areas. Thus, a user no longer will need to remember the coordinates of a region to find images of that region. She/he only needs to enter geographical keywords and a search engine will come up with references to the images corresponding to the region of interest.

The mapping tool will be available to users through the Web so that they can add their mappings of interest to the database of the website. Thus, their mappings will become searchable mappings for other users.