CSE 5524 Project Proposal

Name: Neng Shi

Team members

Neng Shi

Project Title

Content-Based Image Retrieval and Classification for Geographic Images

A short description of the project:

This project will investigate content-based image retrieval and classification for geographic images, in which the most important part is feature extraction. In this project, I aim to explore and implement different feature descriptors. Meanwhile, I will explore different similarity-matching metrics and classification methods.

Source of the data

UC Merced is a 256 x 256 remote sensing image dataset with a spatial resolution of 0.3m per pixel. It has 21 land categories with 100 images for each type of land, for a total of 2,100 images.

What to code/develop

For the feature descriptors, I plan to implement:

- color moment of the Hue, Saturation, and Value (HSV) of the image and RGB of the image,
- scale-invariant feature transform (SIFT) descriptors,
- Gabor filter (GIST) descriptors,

among which the latter two are texture features. I will explore use the raw image and use one or multiple features to perform image retrieval and classification.

For the similarity-matching metrics, I consider using the three general approaches mentioned in the class:

- Sum-of-absolute differences (SAD)

- Sum-of-squared differences (SSD)
- Normalized cross-correlation (NCC)

For the classifciation method, I will use kNN.

How to evaluate the work/result

Since we use kNN as the classification method, the classification result is highly relied on the retrievaled images. Therefore, we can use the classification result to evaluate the retrieval results as well.

For the classification result, precision, recall and F1 are typically used metrics.