Remote Sensing Data Analysis and Python

Building on the remote sensing portion, the analysis portion of the course will explore how to use the satellite observations to build, evaluate, and improve upon a classifier to automatically detect vegatation and other surface types. The main project will be to develop a classifier.

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Questions concerning technical issues, clarification of lessons & assignments, and anything else related to Python or the course material should be posted in the blackboard discussion forum for the course.

Python Environment
https://www.continuum.io/downloads

Grading
Students will be given two individual homework assignments and 1 group project.

Classwork: 10pts/twice weekly
Project: 10pts/one per section

All analysis and graphics **MUST** be done in Python. Submission of work created in anything else (including but not limited to excel & matlab) is automatic grounds for failure. You may submit either a document or an IPython notebook.

Grades will be posted to blackboard. You are responsible for having a working account. Notify me ASAP if this is not possible.

Plagiarism
In the case of multiple similar homework submissions, plagiarism on assignments is determined based on timestamps-the person who submitted first is assumed to be the originator and anyone else is assumed to have plagiarized. All students who submit similar exam answers are assumed to be cheating. Plagiarism will result in an automatic 0 for the assignment; two incidents will yield an automatic 0 for the course.

Plagiarism is copying solutions from pretty much anywhere, including friends, solution manuals, and random websites. Plagiarism can result in various academic repercussions as described in the CCNY integrity policy:
http://www1.ccny.cuny.edu/current/integrity.cfm and any work suspected of being plagiarized will be dealt with per CCNY guidelines

July 21st	Developing a classifier: • Review of image as array • Filtering data via Boolean masking • Computing statistics on selected regions • Using statistics to build an NDVI classifier • Creating classifiers for water, building, clouds
July 22nd	Training a classifier: • Comparing class statistics • Updating classification rules based on findings. *Homework: Write a 1-2 page report (with graphs) summarizing:* • *The reasoning behind the criteria for each class* • *The differences between the classes* • *Why the classification is reliable*
July 25th	Testing a classifier • Factoring out classifier rules into function • Applying to a new image • Evaluating the results – confusion matrix, etc • Updating the classifier
July 26th	Expanding a classifier • Incorporating Temperature & Optical Depth • Adding classes & subclassing • Comparing classes over time *Homework: Write a 1-2 page report (with graphs) summarizing:* • *How the classes have been improved* • *Why the classification is reliable*

July 28th	Project: Build Your Own Classifier
	
	Develop a classifier for at least 1 surface type or weather phenomena not covered in class. The project must
	• Explain the reasoning for the classification criteria
	• Describe the training & testing of the classifier
	• Evaluate the skill of the classifier
	• Compare the class to:
	  ○ Non-classifier data
	  ○ Data in at least one complementary but opposing class (so NDVI vs. water)
	Extra Credit: Repeat the project with a 2nd surface type/weather phenomena. You may compare this class to the 1st class you built for the project.