GEOG 457 Term Projects 2022

The aim of this project is to answer a research question using remote sensing techniques learned in this course. You will need to determine the data needed to answer your question, build the workflow to process and analyze your data, and write a scientific paper-style report.

Scope of Project

Your project needs to investigate a well-defined research question using open-access remote sensing data (e.g., optical satellite imagery, Synthetic Aperture Radar data, digital elevation models, Lidar data, etc.). Your workflow can be done using code (e.g., Python, R, etc.), or not. It can also be done in the cloud (e.g., Google Earth Engine, Microsoft Planetary Computer, etc.), or not. In fact, you can use any software you would like (e.g., Catalyst/PCI, ArcGIS, QGIS, SNAP, R/R Studio, Python/Jupyter, Google Earth Engine, Microsoft Planetary Computer, etc.). Keep in mind some workflows will be challenging without using code, and some workflows will be challenging outside of Google Earth Engine or Microsoft Planetary Computer due to data volumes. Your project must use advanced techniques learned in this class, such as time series analysis, supervised classification, object segmentation, lidar processing, SAR, InSAR, or others. Ideally, projects will have some degree of automation and should be scalable to different regions or time periods and should demonstrate an understanding of advanced concepts taught this semester.

Project requirements

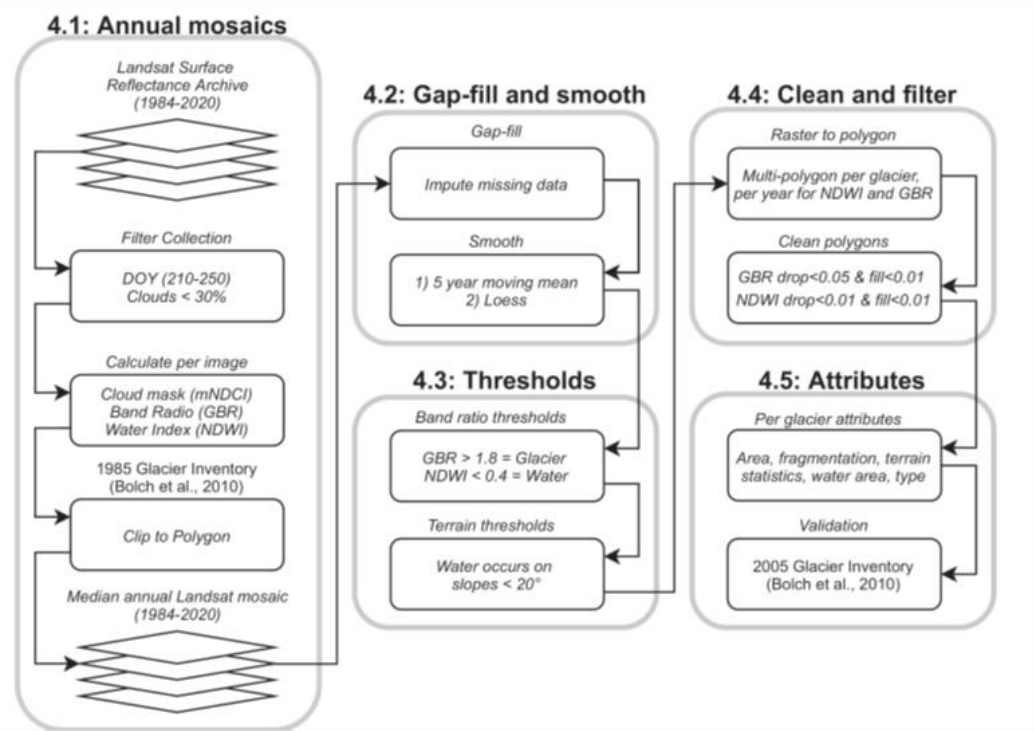
The assignments will be graded out of 40 points:

- Initial Proposal (2 points) - **Due Friday, March 25th at 12:30**
    - Submit on paper or by e-mail to bevington@unbc.ca
    - Requirements: Project title and a one-paragraph (can be point form) description of the project and workflow.
    - Instructors will provide feedback to ensure that the project is reasonable and feasible within the timeline.
- Updated proposal with a flowchart (2 points) - **Due Monday, April 4th at 12:30**
    - Submit on paper or by e-mail to bevington@unbc.ca
    - Requirements: Revised title and project description with a flowchart. The flowchart should include input datasets, pre-processing methods, software/code being used, the main analysis workflow and the anticipated outputs. See below for more information on flowcharts.
- Final Project (36 points) - **Due Monday, April 11th at midnight**
    - Submit by e-mail as a PDF to bevington@unbc.ca
    - The report should take the form of a standard scientific paper. This typically includes the following sections: Introduction, Study Area, Data and Methods, Results, Discussion and Conclusion. A final flowchart must be included as a figure in the report.
    - The report should be between 2500-3000 words (~10 pages of text, 12pt Times New Roman font, double-spaced, normal margins, not including title page, figures, or references) and have between 6 and 8 figures.

- Evaluation
  - Overall presentation: language, formatting, and figure quality (5 pts)
  - Clear research question and supporting background literature (10 pts)
  - Clearly explained datasets and workflow from GEOG 457 (10 pts)
  - Clearly articulated and presented results (5 pts)
  - Thoughtful discussion about the implications and context of the results (5 pts)
  - Properly formatted references (1 pts)
- Late proposal, flowchart, or final projects: -15% per day, respectively

Flowchart examples:

- Flowcharts can be made for free using www.draw.io or using the UNBC license of Visio.
- Here is an example of a flowchart:



Project Ideas

- Investigate the relationship between Sentinel-2 spectral indices and a lidar canopy height model
- Use MODIS to measure how quickly snow disappeared during the 2021 heat dome
- Combine multiple datasets to track the construction of the Site C dam and associated flooding
- Use time series analysis to automatically identify when historic landslides occur
- Use InSAR to investigate slope deformation before a landslide
- Summarize forest disturbance and recovery for a watershed using the LandTrendR algorithm
- Calculate forest recovery following a wildfire
- Map the 2021 floods in the lower mainland using SAR and Optical data
- Investigate trends in land surface temperature over time from Landsat and MODIS
- Track and analyze urban development over time