GIS 5571 Lab 3

**Deliverables Summary**

* Two lab reports. One for part one. Another for part two.

**Lab 3 -- Part 1 Deliverables**

Submit an updated lab report for Lab 2 on Canvas as a PDF (see [report form](https://docs.google.com/document/u/0/d/1gOGBtTe3dQzrXCEMl644QIVdJgMp8ahN/?rtpof=true&usp=drive_fs)). Include all your code on GitHub as both .ipynb files and PDFs of the notebooks.

**Lab 3 – Part 1 Specifics**

In lab 2, you created a cost surface for Dory. Now, your goal is to compare / contrast three different weighting approaches to generating that cost surface for determining optimal paths for Dory.

You will submit in your lab report three optimal paths from where Dory lives to Whitewater State Park. You will do this by changing how the cost surface is calculated. You can manipulate data inputs or weights.

Following is the original prompt for Dory for reference.

*Dory lives just outside of Whitewater State Park at a farm site. She moved to the area because she loves fly fishing, which she does every day in the spring. Dory enjoys hiking to and from her house to fly fish in the park. Your goal is to identify the optimal route for her given her preferences.*

*Start point: Her farm can be found on google maps at 44.127985, -92.148796*

*End point: North Picnic area*

*Specific preferences: Dory prefers to not walk through any farm fields because they can be muddy in the spring. She also doesn’t like crossing water bodies if there isn’t a bridge. Other than that, she just wants to take the path that is the most gradual in terms of slope.*

**Part 2 Deliverables**

**Goals**

1. Build a fully functional real-time data visualization and analysis workflow
2. Compare and contrast three types of interpolation

**Deliverables**

Submit a part 1 lab report on Canvas as a PDF (see [report form](https://docs.google.com/document/u/0/d/1gOGBtTe3dQzrXCEMl644QIVdJgMp8ahN/?rtpof=true&usp=drive_fs)). Include all your code on GitHub as both .ipynb files and PDFs of the notebooks.

**Specifics**

Your goal is to deliver a notebook and lab writeup that can interpolate the last 30 days of NDAWN data on-the-fly. Some specific steps:

* Build an ETL to pull the last 30 days of temperature data from the [DNAWN site for all of the NDAWN stations](https://ndawn.ndsu.nodak.edu/). Be able to make a map of all the station points and their average monthly temperature.
* Follow the ESRI decision guide for choosing [interpolation methods](https://desktop.arcgis.com/en/arcmap/latest/extensions/geostatistical-analyst/classification-trees-of-the-interpolation-methods-offered-in-geostatistical-analyst.htm). Use this to justify your methods.
* Compare and contrast at least 3. One must be IDW. Another must be a form of Kriging.
* Be able to run your notebook and create an interpolated temperature map for the highs and lows of the last 30 days from NDAWN in real-time.
* What does the literature recommend be used for interpolating temperature data? Why? (Find one or two articles to support your claims and reference them in the lab writeup)