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GEOG 4140-001

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Lab 10 Deliverable 9

Explain some of the limitations of interpolation that you learned about in this lab. What types of data would be better or worse suited to interpolation?

It is best to utilize IDW when points are concentrated or dense enough for the algorithm to measure the weight of the nearest points—as its foundations are based on Tobler's First Law—it is not ideal for point datasets that are too distant from one another and could produce results that are not as accurate. This is also not ideal to utilize for datasets with the existence of spatial autocorrelation as it does not consider spatial patterns of datasets because it only uses known z-values and distance weights to interpolate.

Spline is a much smoother method compared to IDW and is best utilized on continuous data that has gradual changes such as temperature as it aims to reduce the surface curvature as much as possible while passing exactly through input points. An advantage is that both it and IDW's computation times are faster compared to kriging, and spline produces much finer results than IDW.

Kriging is similar to IDW in the fact that they share a foundation of Tobler's First Law. However, kriging is the most detailed and finest of the other aforementioned interpolation methods as it not only utilizes known z-values and distance weights for calculating unknown values, but also uses statistical models for the existence of spatial autocorrelation. Unfortunately, kriging is an algorithm that asks more of the computer than IDW, so the hardware has to be able

to run kriging on large datasets, and because it is a statistical method, an investigation of the spatial patterns of the datasets must be conducted before determining if this method is the best option.