Simple Overview of Statistical Concepts of week 7

Kriging. Kriging is a method used for interpolation and prediction of values at unsampled locations based on information in a set of sampled data points.

Simple kriging assumes that the underlying data follows a stationary process with constant mean and variance, and uses a weighted average of nearby points to estimate the value at a target location. The weights are determined by the spatial correlation between the target location and the nearby points.

Ordinary kriging is similar to simple kriging, but it also estimates an unknown mean value for the entire dataset rather than assuming a constant mean.

Universal kriging takes into account additional explanatory variables (such as elevation, temperature, or soil type) to improve prediction accuracy. It involves fitting a spatial regression model to the data, with the estimated spatial correlation structure of the residuals. Universal kriging is useful when there are systematic spatial trends in the data that can be explained by the additional variables.

Spatial moving window. A spatial moving window is a technique used in spatial analysis when a window of fixed size is gradually moved across a dataset. The window can be any shape, such as a square or circle, and its size can be adjusted to fit the specific needs of the analysis.

As the window moves, data within the window are analyzed and summarized based on a specific function, such as calculating the mean, maximum or minimum value. As the entire area can be inhomogeneous, this allows researchers to identify patterns and trends in spatial data over this area considering smaller sub-areas with a similar behaviour. It also can substantially speed-up computations.

The output of the mowing window application is a set of new data, which represents the summarized values for each location in the study area.

Cross-validation. Cross-validation is a data science technique that is commonly used in spatial model diagnostics to evaluate the performance of a model and identify potential problems. It involves splitting the data into several subsets or "folds" and then fitting the model to each subset while holding out the remaining data. This process is repeated multiple times with different subsets, allowing for a comprehensive assessment of the model's performance across the entire dataset. By comparing the predicted values to the actual values of the held-out data, cross-validation can help identify any systematic biases or errors in the model and suggest improvements or modifications to the model