GNR 605: Assignment 3 (Spatial Interpolation using R)
Due: 26/11/2024

Use the data sets below:

Data:
1. Pbcon.txt: Soil Lead concentrations
2. Rain.tx: Rain data
3. Synthetic data(sample.txt): toy data set

R-Packages : gstat,sp

Write the report in IEEE format. Report should contain: Introduction, Methodology, Results, Conclusions, and References.

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1)

a) Use inverse distance weighting with a power of 1, 2, 5,10 to estimate:

I. Rainfall at each of the grid points. Plot showing the predicted rainfall at each grid point.

II. Lead (Pb) concentrations at each of the grid points. Plot showing the predicted lead concentration at each grid point.

b) Fit a linear trend surface and predict

I. Lead (Pb) concentrations at each of the grid points. Plot showing the predicted lead concentrations at each grid point.

II. Rainfall at each of the grid points. Plot showing the predicted rainfall at each grid point.

c) Compare a, b and provide an analysis of your results.

2)

(a) Kriging of rain data values to predict rainfall. Use a spherical model, exponential model and compare them. Show Sill, Nugget, and Range.

(b) Use the soil lead samples (Pbcon.txt) for Kriging. Use Spherical model, Exponential model, and Gaussian model. Show Sill, Nugget, and Range.

(c) Show the interpolated surface generated by Kriging.

(d) How do you validate the results of the above two (a, b) (Bonus marks)