Autologistic Work

Work performed

- Code to obtain adaptive lasso estimates from both the centered and uncentered autologistic models with one spatial neighborhood (and arbitrarily many temporal neighborhoods). Intercept, spatial, and temporal parameters are pre-estimated and thus not penalized.

- Partial application of bootstrap and analytic variance-covariance estimators (from the paper by Comets and Janzura)

- Simulation to generate 100 estimates for 15x15, 20x20, and 25x25 grids of data with one spatial neighborhood (and maybe a couple of time lags). Preliminary summaries of statistical characteristics of the resulting estimators.

- Application to the mountain pine beetle data from British Columbia.

(Note: I also spent some time investigating whether we could empirically pre-center the autologistic model and apply the uncentered method, but I think it will just speed up computation at the expense of either bias or higher variance in the estimates.)

Work needed

Necessary modifications:

- Re-running, formalizing, and tabulating the simulation and MPB data application results.

- Cleaning or speeding up the code (some potentially heavy matrix operations in the centered model).

- Getting the analytic variance-covariance estimates to compute correctly (and efficiently).

- *Theory*: consistency, asymptotic normality (results given in Gaetan and Guyon)

- Write-up of all methods, theory, and results

Potential modifications:

- Generalize the code to allow for multiple spatial neighborhoods.

- Empirically pre-centering the model for computational speed and investigating the subsequent estimators for losses in bias or variance

- Another (or different) application to data

References

Autologistic model:

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Theory:

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