

GPUs, linear algebra, and efficient computing for Gaussian process models in R

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Here we present recent work on implementing *R* and *C++* tools that leverage existing GPU linear algebra libraries to improve the computing performance of common tasks in the implementation of Gaussian process models. We will focus our discussion of areas like covariance calculation (both simple and complex), likelihood evaluation, and prediction - all important computational bottlenecks for even moderately sized data sets. Our implementation builds on existing libraries and allows for the exploitation of commodity GPU hardware without the need for specific expertise in developing for these processors. Finally, we present performance results from a model for large scale air pollution data in order to demonstrate how our approaches are complementary to existing methods for working with large data (e.g. predictive processes).