GPU Computing for Regression Covariate Selection

Covariate selection for regression models quickly becomes computationally infeasible as the number of possible covariates increases. A promising method of speeding up these computations is massively parallel processing using GPUs. In fact, GPUs have already been used to speed up the requisite linear algebra calculations in fitting a single regression model in, e.g., the gputools R package. Using gputools as a starting point, I explore several natural extensions to perform covariate selection. I find modest gains in speed for large-n problems just by using GPU computing to speed up linear algebra operations. A more promising approach is fitting regression models in parallel on the GPU. I’ll conclude with several possible methods of implementing this along with some commentary on their strengths and weaknesses.