

Scalable Gaussian Processes and the search for exoplanets

Wednesday, November 11, 2015 2:00 PM (45 minutes)

Gaussian Processes are a class of non-parametric models that are often used to model stochastic behavior in time series or spatial data. A major limitation for the application of these models to large datasets is the computational cost. The cost of a single evaluation of the model likelihood scales as the third power of the number of data points. In the search for transiting exoplanets, the datasets of interest have tens of thousands to millions of measurements with uneven sampling, rendering naive application of a Gaussian Process model impractical. To attack this problem, we have developed robust approximate methods for Gaussian Process regression that can be applied at this scale. I will describe the general problem of Gaussian Process regression and offer several applicable use cases. Finally, I will present our work on scaling this model to the exciting field of exoplanet discovery and introduce a well-tested open source implementation of these new methods.

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