Fitting a Stochastic Model to Eye Movement Time Series in a Categorization Task

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Abstract: Our goal is to develop an efficient framework for fitting stochastic continuous-time models to experimental data in cognitive psychology. As a simple test problem, we consider data from an eye-tracking study of attention in learning. For each subject, the data for each trial consists of the sequence of stimulus features that the subject fixates on, together with the duration of each fixation. We fit a stochastic differential equation model to this data, using the Approximate Bayesian Computation framework. For each subject we infer posterior distributions for the unknown parameters in the model.