
New partition algorithms for 1-D event data. Preliminary report.

This talk is on work done as part of the Center for Applied Mathematics, Computation, and Statistics (CAMCOS) at SJSU. We consider the analysis of 1-D event data (i.e., a list of times at which some event, like the detection of a photon, happens). Specifically, we consider the problem of optimally partitioning an interval of time over which event data is collected into blocks of roughly constant event rate. A previous CAMCOS team developed a provably optimal algorithm to solve this problem that runs in $O(N^2)$ time.

We present several new algorithms for solving the partitioning problem and variants. Most notably, we describe an algorithm, based on the idea of local changepoint detection, that often seems to work significantly faster (on the order of 3–8 times faster) on large data sets than the existing algorithm does, at the cost of a possible loss of accuracy. We also discuss work in progress and future directions. (Received August 03, 2012)