

Online updating of space-time disease surveillance models via particle filters

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Online surveillance of disease has become an important issue following the 9/11 terrorist attacks. In the US, an annual syndromic health surveillance conference now attracts substantial audiences (see e.g. www.syndromic.org). Space-time (S-T) monitoring of disease forms an important part of any syndromic system. However methodology for these systems is generally lacking. One approach to S-T monitoring of health data is to consider the S-T model parameters as the focus and to monitor their changes as multivariate time series ([1],[2]). However with complex S-T models this becomes very time consuming. Some simplifications may be necessary and these can be made in a number of ways. In this presentation, the focus is on using particle filters that can be used to resample the history of the process and thereby reduce computation time. An example of application to the Boston ER data will be given.

Reference List

- [1] Lawson AB. Some Issues in the Spatio-Temporal Analysis of Public Health Surveillance Data. In: Brookmeyer R, Stroup D, editors. *Statistical Principles and Methods for Public Health Surveillance*. New York: Oxford University Press; 2004. p. 43.
- [2] Lawson AB, Kleinman K. *Spatial & Syndromic Surveillance for Public Health*. New York: Wiley; 2005.