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Detecting Emergent Anomalies in Telecommunications Data

The observed traffic at a particular point on a telecommunications network typically has a similar shape from day to day due to customer behaviours, and so it is natural to adopt a functional data paradigm to describe its structure. However in some instances one can observe a deviation from this typical functional form of the data. Such deviations, which we call anomalies, are potentially of substantial practical interest. In particular, there is significant benefit in being able to detect the early onset, or emergence, of these features.

Existing functional data methods require the entire time period to be observed before anomaly detection can take place. As such, they are not suited to detect the emergence of a new anomaly. To address this issue we propose FAST, a novel method that sequentially monitors a stream of partially observed functional data to detect anomalies as they emerge. The mathematical details of FAST will be discussed and we will apply it to a telecommunications dataset to demonstrate how our method can identify unusual behaviour in real time.

This is joint work with Idris Eckley and Lawrence Bardwell

Keywords

Anomaly Detection; Functional Data; Telecommunications

Classification

Both methodology and application

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