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Detecting changes in Multistream Sequences

Tuesday, 14 September 2021 15:00 (30 minutes)

Multiple statistically independent data streams are being observed sequentially and we are interested in detecting, as soon as possible, a change in their statistical behavior. We study two different formulations of the change detection problem. 1) In the first a change appears at a single unknown stream but then the change starts switching from one stream to the other following a switching mechanism for which we have absolutely no prior knowledge. Under the assumption that we can sample simultaneously all streams, we identify the exactly optimum sequential detector when the streams are homogeneous while we develop an asymptotically optimum solution in the inhomogeneous case. 2) The second formulation involves a permanent change occurring at a single but unknown stream and, unlike the previous case, we are allowed to sample only a single stream at a time. We propose a simple detection structure based on the classical CUSUM test which we successfully justify by demonstrating that it enjoys a strong asymptotic optimality property.

Keywords

Sequential Detection, Quickest Detection

Special/invited session

Statistic for change point detection (Organizer: Sabine Mercier)

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Session Classification: Breakdown detection

Track Classification: Other/special session/invited session