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Self-Starting Shiryaev (3S): A Bayesian Change Point Model for Online Monitoring of Short Runs

The Shiryaev's change point methodology is a powerful Bayesian tool in detecting persistent parameter shifts. It has certain optimality properties when we have pre/post-change known parameter setups. In this work we will introduce a self-starting version of the Shiryaev's framework that could be employed in performing online change point detection in short production runs. Our proposal will utilize available prior information regarding the unknown parameters, breaking free from the phase I requirement and will introduce a more flexible prior for change-point parameter, compared to what standard Shiryaev employs. Apart from the on-line monitoring, our proposal will provide posterior inference for all the unknown parameters, including the change point. The modeling will be provided for Normal data and we will guard for persistent shifts in both the mean and variance. A real data set will illustrate its use, while a simulation study will evaluate its performance against standard competitors.

Special/ Invited session

Classification

Both methodology and application

Keywords

Bayesian Statistical Process Control and Monitoring, At Most Once Change (AMOC), Persistent Shifts, Phase I.

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Track Classification: Statistical Process Monitoring