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Signed Sequential Rank Shiryaev-Roberts Schemes

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We develop Shiryaev-Roberts schemes based on signed sequential ranks to detect a persistent change in location of a continuous symmetric distribution with known median. The in-control properties of these schemes are distribution free, hence they do not require a parametric specification of an underlying density function or the existence of any moments. Tables of control limits are provided. The out-of-control average run length properties of the schemes are gauged via theory-based calculations and Monte Carlo simulation. Comparisons are made with two existing distribution-free schemes. We conclude that the newly proposed scheme has much to recommend its use in practice. Implementation of the methodology is illustrated in an application to a data set from an industrial environment.

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