

Optimal Bayesian Control of the Proportion of Defectives in a Manufacturing Process

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Abstract : In this paper, we present a model and an algorithm for the calculation of the optimal control limit, average cost, sample size, and the sampling interval for an optimal Bayesian chart to control the proportion of defective items produced using a semi-Markov decision process approach. Traditional p-chart has been widely used for controlling the proportion of defectives in various kinds of production processes for many years. It is well known that traditional non-Bayesian charts are not optimal, but very few optimal Bayesian control charts have been developed in the literature, mostly considering finite horizon. The objective of this paper is to develop a fast computational algorithm to obtain the optimal parameters of a Bayesian p-chart. The decision problem is formulated in the partially observable framework and the developed algorithm is illustrated by a numerical example.

Keywords : Bayesian control chart, semi-Markov decision process, quality control, partially observable process

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