Comparison Between Amazon Go Stores and Traditional Retails Based on Queueing Theory

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Abstract

The Amazon Go Store model's introduction posed a breakthrough in the shopping market due to its ground-braking approach, in which customers exercise the so-called self-service checkout. Although many qualitative analysis studies can be found, along with some quantitative approaches, a literature review on this matter shows a lack of comparative analysis between this model and traditional retail models using queueing theory, which could provide powerful insight into the improvements introduced by Amazon Go Store system. This work sets out the path to quantitative approaches for such comparison, as it aims to provide a performance analysis through queueing theory. The article compared two queueing systems; a traditional retail store vs. the Amazon Go Store. Both systems were analyzed as queueing stochastic networks. First, the traditional retail store was modeled as a two-stage (shopping and payment) network. On the other hand, the Amazon Go Store was modeled as a single-stage (shopping + payment) network. Both systems were assessed in two case scenarios: a high-demand typical day and a low-demand typical day. The implemented methodology allowed obtaining, for both compared systems, the key performance indicators (KPIs) such as the cycle time (CT), work in process (WIP), and the throughput (TP), revealing that the Amazon Go Store model exhibits better performance regarding the WIP and CT. Therefore, the Amazon Go Store model renders a higher-quality, more cost-effective service in the retail sector.

KEYWORDS: Queuing theory, Markovian model, Jackson networks, Retail shopping, Amazon Go Store