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Approaches for Allocating Products to Users*. Preliminary report.

In order for an e-commerce platform to maximize its revenue, it must recommend customers items they are most likely to buy. However, the company has business constraints on these items, such as the number of each item in stock. In this problem, our goal is to recommend items to users as they arrive on a webpage in an online manner, in a way that maximizes reward for a company, in terms of clicks on an item or purchases, but also satisfies budget constraints. To have a performance comparison for our online customer arrival algorithms, we first approach the problem in an offline manner, where the sequence of customer arrival is known in advance. Then, based on the offline problem, we tackle the problem as an online optimization problem, modeling the customer arrival process as a stationary Poisson process. After creating this algorithm, we make the model more complicated but more realistic, treating the arrival process as a non-stationary Poisson process. Finally, we consider the amount of time the user spends looking at a certain item: we maximize the average dwell time, providing a collection of recommended items to each customer. (Received September 04, 2019)