Contribution ID: **95** Type: **not specified**

Stochastic Optimization for Data-Driven Dynamic Pricing in Reservation Systems

In reservation-based services with volatile demand and competitive pricing pressures, dynamically optimizing prices is essential for revenue maximization. This paper introduces a data-driven pricing framework that integrates demand forecasting with stochastic optimization. We model customer arrivals using a non-homogeneous Poisson process, where expected demand is estimated through a Poisson Generalized Linear Model (GLM) trained on historical data. Leveraging this demand model, we formulate a dynamic pricing strategy using stochastic dynamic programming to update prices over time, considering real-time availability and market conditions. The approach aims to maximize total expected revenue while adapting to evolving demand patterns.

Special/ Invited session

Classification

Mainly methodology

Keywords

Poisson GLM, Revenue Optimization, Stochastic Dynamic Programming

Primary author: SKAMNIA, Ekaterini (University of Patras)

Co-authors: ECONOMOU, Polychronis (University of Patras); BERSIMIS, Sotiris (University of Piraeus, Greece)

Presenter: ECONOMOU, Polychronis (University of Patras)

Track Classification: Statistical/Stochastic Modelling