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Impact of Assortment Optimization in Platform-Based Urban Mobility

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Abstract: This talk presents an integrated approach to optimizing platform-based urban mobility services, emphasizing the critical role of context effects in shaping user choices. We initially introduce the Choice-Driven Dial-a-Ride Problem (CD-DARP), a profit-maximization model that fuses choice models and assortment optimization into routing plans, serving as a robust planning tool for shared mobility services. Building on this, we critique classical Random Utility Maximization (RUM) models for their shortcomings in capturing context effects. In real-time planning of on-demand services, understanding these context effects allows us to steer customer choices toward more sustainable yet traditionally less attractive alternatives. Utilizing the Random Regret Minimization (RRM) model, we propose an algorithm for optimal assortment definition. Comparative analyses and linkages to the Multinomial Logit (MNL) model confirm the significant behavioral impact of considering context effects. Our work culminates in a synthesized roadmap for dynamic service menu optimization and operational planning, significantly enhancing both service efficiency and customer retention.