

DEPARTMENT OF CIVIL ENGINEERING SEMINAR JOINTLY ORGANIZED WITH HONG KONG SOCIETY FOR TRANSPORTATION STUDIES INSTITUTE OF TRANSPORT STUDIES, HKU

Expected Bipartite Matching Distance in An L^p Space: Approximate Closed-form Formulas and Applications to On-Demand Shared Mobility Services

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Date: July 22, 2024 (Monday)
Time: 4:00 p.m. – 5:00 p.m.
Venue: Room 612B, 6/F Haking Wong Building, The University of Hong Kong

Abstract

In this talk, we discuss how strategic performance evaluation and resource planning of shared mobility services can benefit from new closed-form formulas that estimate the expected distances from a random bipartite matching problem in a D-dimensional L^p space. Asymptotic approximations of the formulas are also developed for some special cases. These formulas provide a theoretical foundation for taxi matching functions in the literature, and also reveal conditions under which the matching function will be most suitable. These formulas can also be easily incorporated into optimization models to select taxi operation strategies; e.g., whether newly arriving customers shall be instantly matched or pooled into a batch for matching. Agent-based simulations are also conducted to verify the predicted performance of the demand pooling strategy for two types of e-hailing taxi systems.

About the Speaker

Yanfeng Ouyang is George Krambles Professor, Paul Kent Faculty Scholar, and Donald Willett Faculty Scholar at the University of Illinois, Urbana-Champaign (UIUC). He is also Associate Director for Mobility of the Illinois Center for Transportation. His work mainly focuses on planning, operations, and control of complex transportation and logistics systems. He currently serves (or previously served) as a Department/Area/Associate/Board Editor of IISE Transactions, Networks and Spatial Economics, Transportation Science, Transportation Research Part B, Transportation Research Part C, and Transportmetrica B. He is also Chair of TRB's AEP40 Committee on Transportation Network Modeling. His work has been recognized by a Merit Award for Technical Study from the American Planning Association, a Walter L. Huber Research Prize from the American Society of Civil Engineers, a High Impact Project Award from the Illinois Department of Transportation, a Faculty Early Career Development (CAREER) Award from the U.S. National Science Foundation, among others.