University of Pittsburgh | School of Computing and Information

Proposal Defense

Doctor of Philosophy in Information Science – Telecommunications Focus

"**Uncovering and Estimating Excess Demand in Urban Lives**" by **Xin Liu**

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Abstract:

In urban lives, citizens are motivated to visit business venues by personal needs and venue attractiveness. This creates the demand from citizens on urban businesses. As citizens move around the city to visit multiple business venues, they rely on the urban transportation systems. This creates the demand from citizens on transportation systems. To provide decent service, business venues and transportation systems are designed to satisfy a specific demand level per the operator's expectation. However, the actual demand can exceed the operator's expected demand level due to external factors (e.g., peak hour, weather, special events nearby). The portion of the demand exceeding the operator's expected demand level is identified as the excess demand. Generally, existing works did not consider excess demand since such demand can easily be unobserved and ignored; this leads to biased analysis and forecasting for the actual demand. In this thesis, firstly, we use the real-world data to uncover the existence of excess demand. Then we estimate the excess demand volumes of the urban business and the urban transportation systems. Our proposed estimation approach incorporates the real-world and simulated data. The estimated excess demand provides insights for business owners and transportation operators to satisfy more demand, which increases their revenue and creates more convenience for citizens.