

Project Title: Reliable Routing in Transit Networks

Principal Investigators:

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Center Project Number: Y5-03

Award Amount: \$67,600

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The purpose of this project is to develop routing algorithms that help travelers hedge against uncertainties in transit networks, to measure and analyze the reliability performance of transit services using these algorithms, and to implement a prototype reliability-based transit route planning tool and test it on real-world problems. The research team plans to leverage on the collaboration with Chicago Transit Authority (CTA) and Google Inc. to deploy and evaluate the proposed methods and tools.

Travel reliability is a critical dimension in user experience of public transportation services. A recent survey of commuters from the Chicago metropolitan area (Nie, Wu, Zissman, Lee & Haynes 2010) reveals that reliability is the second most important factor that affects commuters' route choice, next only to travel time. Transit systems are affected by uncertainties of various sorts, ranging from extreme weather conditions, serious traffic accidents to unforeseeable mechanical failures and human errors. While these uncertainties could adversely disrupt transit services, their overall impacts are rarely documented and understood in existing systems. As a result, neither transit operators nor transit users are able to make proactive decisions to ensure travel reliability. Ignoring the impacts of uncertainties often result in misallocation of limited resources in the transit system. From the user point of view, the lack of reliability either encourages overly conservative risk-averse behavior or leads to uncomfortable, sometimes disastrous, disruptions. Not surprisingly, almost half of the commuters in the aforementioned survey describe their transit service as "unreliable".