Extension of the Hyper Run Assignment Model to Real-Time passengers forecasting in congested transit networks considering dynamic service disruptions

Lory Michelle Bresciani Miristice

Guido Gentile

Francesco Corman

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Abstract
Recurrent and non-recurrent congestion phenomena increasingly affect densely interconnected

transit networks. In particular, typical congestion phenomena, service disruptions, and atypical demand can lead to low levels of service, harming planned schedules. Therefore, transit operators require a tool to perform service recovery (e.g., introducing new runs) and inform passengers about crowding (e.g., through real-time information panels or trip planners). This research proposes a run-based macroscopic dynamic assignment model that incorporates real-time measurements and events to forecast passengers' flows on transit networks. It simulates the effects of real-time disruptions, computing the users' elastic route choices under the assumption that passengers are fully informed. The model can also include countermeasures, allowing the operators to test several recovery scenarios on large transit networks faster than in real-time.

Keywords
implicit hyperpaths, public transport services, real-time data, schedule-based assignment, short-term forecast, vehicle capacity constraints