Data Driven, Dynamic, and Smarter Urban Transportation Systems

Urban traffic gridlock is a familiar scene. With the ubiquitous availability of location enabled mobile devices and wireless communication, the time is ripe for a data driven, dynamic, and Smarter urban transportation system. In such a system, vehicles, users, and infrastructures interact with each other and are informed in real-time. They collaborate to avoid Matthew Effect; form seamless traffic flow; allow alternative and convenient means of transportation; and enable realtime ridesharing. In this talk, we present our efforts towards realizing such a system. Specifically, we describe our efforts in analyzing taxicab datasets to reduce cruising and live mileage ratio of taxicabs, identifying alternative transport mode, and building a large scale real-time ridesharing system. We first present a simple yet practical method for reducing cruising miles by suggesting profitable locations to taxicab drivers. The concept uses the same principle that a taxicab driver uses: follow your experience. We then describe a flexible minishuttle like transportation system called flexi by analyzing passenger trip data from a large set of taxi trajectories. The flexi system provides a transportation mode in between buses and taxis so that inconvenience in switching to the system can be minimized overall. Finally, we introduce our Noah system: a large scale real-time ridesharing system with service guarantee on road networks. In Noah, trip requests are dynamically matched to vehicles while trip waiting time and service time constraints are satisfied.

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