Master thesis of *Jian-Jie Wang*

Optimal paths based on time and fares in transit networks

Jian-Jie Wang

Institute of Information Management

National Cheng Kung University

In a public transportation oriented metropolis such as Tokyo or Taipei, transit system is a convenient means for personal trip. Historically, most transit passengers rely on printed schedules for trip planning. However, the transit network nowadays has become too complicated to navigate manually. With the advance of technology, various navigation applications have been developed for guiding private vehicles, but few are designed for public transportation. Given an origin, destination, and intended departure time, this study proposes two timetable-based algorithms to search for optimal itineraries so that the total travel time for an individual is minimized in a transit network. Itineraries showing the suggested routes with walking access and egress, bus stops, and Mass Rapid Transit (MRT) information will be generated, considering the time to wait for, to transfer between, and to stay in transit vehicles, as well as the time to walk between transit stations. In addition, this study proposes an innovative fare-based algorithm to search for the cheapest itineraries with non-linear fare structure, and an alternative fare model is specially developed for Taipei transit system. Optimizing trip planning according to time or fare meets the common practices of passengers using transit system in a metropolitan area.

***Keywords*:** shortest path, transit network, multimodal transportation, trip planning, timetable-based algorithm, non-linear fare structure

Thesis advisor: *I-Lin Wang*, ilinwang@mail.ncku.edu.tw
http://ilin.iim.ncku.edu.tw
***Jian-Jie Wang* entered IIM of NCKU in 2006, graduated in 2008.**