Florida Department of Transportation Research

Enabling Cost-Effective Multimodal Trip Planners through Open Transit Data
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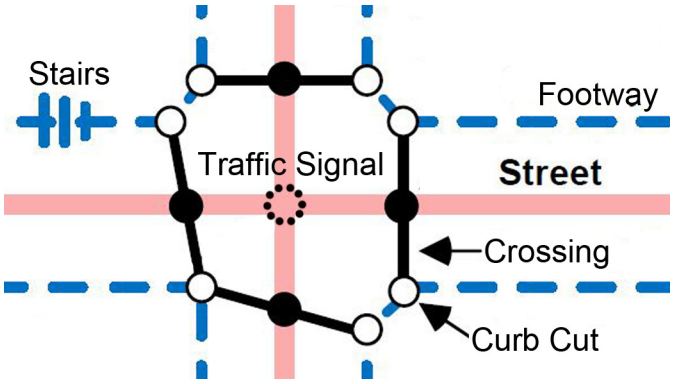
Electronic navigation systems are now common and widely used -- via Internet services, handheld devices, and devices in vehicles -- to guide drivers using instructions and maps. Next generation systems will plan trips by other modes, including public transportation, bicycling, and walking, and will be able to link different modes in one trip (e.g., bike to bus). Multimodal navigation systems will serve a broad range of users and promote alternative transportation.

Current trip planners, such as Google Maps or Bing Maps, use proprietary systems and data collections that are updated slowly and include few alternative modes for limited areas. These services are not positioned to take advantage of user communities that can contribute and update large amounts of data or to respond to the needs of individual communities. Implementing a new proprietary multimodal trip planner in a city can be cost-prohibitive for many communities, as demonstrated by GoRoo.com in Chicago, which cost more than $1.2 million to implement.

In this project, University of South Florida researchers examined the feasibility of building less expensive multimodal navigation systems using publicly available data and open-source trip planning software.

The researchers identified basic requirements for how a multimodal trip planner should work, considering the unique needs of walkers, cyclists, and persons with disabilities. For example, most navigation systems are concerned with finding the shortest or quickest route, but a walker or cyclist may be most concerned with a route's safety. Disabled travelers may want to know about impediments or support, like stairs or curb cuts.

The researchers identified the open multimodal data at OpenStreetMap.org and the open-source trip planner at OpenTripPlanner as useful to software developers implementing a multimodal navigation system. They described in detail how to



The identities and locations of many features of a single intersection must be encoded in a mapping system to plan a multimodal trip.

acquire data from public sources, including transit agency General Transit Feed Specification (GTFS) datasets, to expand the multimodal information that drives the system. Because OpenStreetMap (OSM) is user-extensible, as the researchers reviewed data from OpenStreetMap they also proposed several changes to OpenStreetMap coding conventions to improve its ability to meet the needs of a multimodal trip planner.

To add transit data to OpenStreetMap more easily, an open-source software tool, GTFS-OSM Sync (GO-Sync), was developed that synchronizes bus stop data between transit agencies and OpenStreetMap. GO-Sync allows transit agencies to benefit from crowd-sourced improvements to their bus stop inventory. Researchers also deployed a working OpenTripPlanner website prototype (opentripplanner.usf.edu) that uses data conforming to the conventions outlined in the project. Users of this website were able to compute routes between points, with links between walking, bicycling, and transit as needed to accomplish desired trips.

This project allows local transit services to develop practical, cost-effective multimodal trip planners drawing on local data interests. The next logical step for this work is full-scale deployment for a Florida community.

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For more information, visit http://www.dot.state.fl.us/research-center