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Context-Based Customization of Routing Functions for Web GIS Applications

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ABSTRACT

This poster presentation features three route planning applications developed by the Florida International University GIS Center and the Geomatics program at the University of Florida, and outlines their context based differences. The first route planner has been developed for cyclists in three Florida counties, i.e. Miami-Dade County, Broward County, and Palm Beach County. The second route planner computes safe pedestrian routes to schools and has been developed for Miami-Dade County. The third route planner combines pre-compiled cultural/eco routes and point-to-point route planning for the City of Coral Gables. This poster highlights the differences in design (user interface) and implementation (routing options) between the three route planners as a result of a different application context and target audience.

SCENIC ROUTING AND ECO-CULTURAL TOURS

Project URL: http://maps.fiu.edu/cgm (City of Coral Gables)

Users:
- Pedestrians and cyclists interested in scenic/tours of the city

3D-historic landmarks

Routing criteria offered:
- A selected of pre-compiled tours to e.g. fountains, landmarks, canopies, churches put together by local historians to be followed in 3D
- Five routing criteria from bicycle route planner for selected origin/destination

User interface:
- A dropdown menu shows historic landmarks that can also be chosen as waypoints, besides address/location search and map pin

Data preparation:
- Create 3D models of historic landmarks
- Digitize suggested thematic routes

SAFE ROUTES TO SCHOOLS

Project URL: http://bikebroward.fiu.edu/mpobike/ (Broward County)

Users:
- Walking elementary and middle-school students and their parents

Routing criteria offered:
- Safest route

User interface:
- Desktop browser: User inputs home location through left panel. Mobile device browser: User can hole panel to view map. Panel is subdivided into several screens; facilitates GPS real-time routing

Routing:
- Least cost path with linear weight combination from linear segments and turns.

Attributes considered in different criteria:
- (1) Distance
- (2) Cycling speed (10mph/20mph)
- (3) Number of turns
- (4) Presence of traffic signal
- (5) Presence of off-road bicycle track
- (6) Lakes, ocean, canals, parks

Example: Results for different optimization criteria:

<table>
<thead>
<tr>
<th>Optimization criteria</th>
<th>Distance [km]</th>
<th>Time [min]</th>
<th>Traffic [min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortest</td>
<td>7804</td>
<td>36.7</td>
<td>21.9</td>
</tr>
<tr>
<td>Least Cost (10mph)</td>
<td>6572</td>
<td>38.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Least Cost (20mph)</td>
<td>6572</td>
<td>38.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Most Safe</td>
<td>6988</td>
<td>36.4</td>
<td>20.3</td>
</tr>
<tr>
<td>Best Location</td>
<td>7967</td>
<td>38.1</td>
<td>23.3</td>
</tr>
</tbody>
</table>

SUMMARY

Conclusions:
The three web-based routing applications presented three groups of users (e.g. cyclists, school children, and recreational citizens or tourists) and two modes of transportation (e.g. walking, cycling). Criteria of users and modes of transportation determine the data collection, user interface, as well as the routing algorithm.

Future work:
Development of crowd-sourcing functions for users to input qualitative data for eco-cultural tours
Creation of mobile tools to collect user feedback relating to safe routes to school
Completion of all 8-k schools in Miami Dade County, Florida

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