Since the particularities and complexities of bicycling cannot be adequately addressed in car-centric routing and navigation applications ("machine perspective"), new approaches are required in order to provide relevant and suitable routing information to bicyclists.

Thus, a routing optimization model that is capable to represent user’s specific preferences as routing impedance needs to be developed.

Addressing the second drawback, ways to integrate dynamic information in route optimization are to be investigated. Additionally, methods to overlay routes with dynamic information need to be conceptualized.

We propose to expand an existing network assessment model (Loidl & Zagel 2014) with individual indicator weights, and use this model to calculate an user-specific impedance value for each road segment.

In order to adequately incorporate dynamic information in the route recommendation, calculated routes are overlayed. This overlay considers the spatial and temporal dynamics of the information (e.g. precipitation prognosis data) and the traveling bicyclist. This approach facilitates context-sensitive recommendations for the specific route and preferable departure time.

Routing and navigation applications are well established for automobiles. Although preferences of drivers (fastest, shortest or most scenic route, toll avoidance etc.) can vary, their individuality is levelled out to a certain degree by the fact that they drive a machine: driving up a mountain is equally possible for young and elderly, obese and impaired, sporty or risk-averse drivers.

The situation is different for bicyclists. Depending on capabilities, opportunities, preferences and trip purpose, optimal routes might differ significantly from each other. Nonetheless, many routing applications for bicyclists are designed from a "machine perspective." And even in cases, where routing criteria for bicyclists specifically exist, two major drawbacks remain:

1. Routes are optimized for an average bicyclist, who does not exist. Consequently, specific needs of individuals or user groups, such as school kids, elderly people or commuters, are widely ignored.

2. Time-sensitive, dynamic information, which is crucially important for bicyclists, is hardly ever considered in route recommendations. This holds especially true for precipitation prognosis and traffic volume.

Background

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Approach

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