

A Process to fuse Bicycle Tracks automatically

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Abstract

The global positioning system (GPS) is a device applied in road navigation. In this context digital maps and mobile GPS-receivers are used. In general, these maps have been elaborated by professional cartographers and can only be updated from one release to the next. In times of web 2.0, however, dynamic content can be contributed by every single user. We explain a process which makes it possible for internet users to modify a map. The piece of research described here is part of a project called NAVIKI – a compound of "Navigation" and "Wiki".

1. Results

Internet users can apply the NAVIKI system by processing the following five steps:

1. *Recording*: A user walks or drives along some road or path and logs the track with the NAVIKI-mobile-client.
2. *Transfer*: This user publishes the logged track at the NAVIKI-Server.
3. *Integration*: Inside the web-portal the track is automatically integrated into the map.
4. *Query*: The quantitatively and qualitatively growing map can be used to query a route.
5. *Navigation*: The result of the query can be used for satellite navigation.

The items one and two have been completed.

For *recording*, users can apply a special GPS-hardware or mobile phones with an internal GPS receiver. NAVIKI provides a mobile application which records the track and stores an exchange file so that users can upload the track log.

For *transfer*, NAVIKI offers a portal solution to upload logged tracks. The portal displays the tracks with an underlying map and shows an elevation profile for every route.

2. Future Work

One main scientific and technical challenge is to design and realize the third step – a fully automated integration of tracks into the map. For this purpose the algorithm must identify new paths, which have been recorded never before, and it also must recognize old paths, which are already part of the map. The algorithm must add the new paths to the base map, using the sections that match old paths to upgrade the old paths with regard to their correctness and accuracy.

3. Discussion

NAVIKI allows the skills of a professional cartographer to be fused with those of a common internet user. The cartographer contributes his professional skills in creating a balanced and readable map, the internet user contributes his special knowledge of, and experience with a limited environment.

4. Acknowledgements

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