

BA: Extending HikeDroid – Smart Features for Hikers

This document describes the subject and the general time schedule of the Bachelor thesis of *Dominik Landtwing* in the autumn term 2011. Adaptations or changes can be agreed upon by the advisors.

Motivation and Informal Description

Our application *HikeDroid* provides hikers with a convenient way to access hiking maps on Android phones and to display their current GPS position on the map. One of the goals during the development of HikeDroid was to design it modular to allow for easy extension of its features.

We think, for example, of integrating publicly available elevation data of the earth into HikeDroid to display elevation profiles for hiking trails before the actual hike. Another extension could enable HikeDroid users to share recorded GPS tracks with other users, possibly through integration with hiking communities like www.gipfelbuch.ch or www.hikr.org. Hikers could assign tags to GPS positions such as animal sightings, nice viewpoints or other points of interests, and exchange this information with other users, it could warn users of incoming thunderstorms, ...



We expect you to develop new features for our Android application HikeDroid that enrich the user's experience significantly. Above we have mentioned a few ideas for possible extensions, but of course you are welcome to throw in your own ideas on how to further improve HikeDroid.

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Detailed Project Outline

We denote the following primary tasks mandatory (on the right side you find a rough estimate for the time that we allocate to the respective task):

- Get familiar with the Android platform (**)
- Get familiar with the existing *HikeDroid* source code and amend it to be suitable for the implementation of extensions (***)
- Implement facilities to manage *trails*, that can be either obtained from external or GPS (**)
- Extend *HikeDroid* to be able to display altitude profiles for trails using Digital Elevation Data for example from <http://srtm.csi.cgiar.org/> (***)
- Process the pixel-based hiking trail map data to obtain a logical representation of the hiking trail graph (**)
- Based on this graph, implement basic hiking navigation (“find shortest/less exhausting/most interesting route from *A* to *B*”) (***)
- Write a report documenting the design and development process as well as the final status of the project and prepare final presentation (***)

Extensions

Apart from these requirements, we can think of plenty of ways to extend *HikeDroid* with cool features. Of course, you may add your own ideas to this non-exhaustive enumeration:

- Develop and implement a model to judge the fitness requirements for a given route
- Implement an extension to display weather information and warn of thunderstorms or the like
- Implement a point-of-interest system that allows *HikeDroid* users to tag locations with information (“beautiful view”, “nice restaurant”, etc.), fotos, etc., which are supposed to be synched with other users
- Integrate other map data, for example OpenStreetMap, into *HikeDroid*
- Allow users to locate other hikers nearby
- ...

The Students’ Duties

- One meeting per week with the advisors to discuss current matters
- Regular check-ins into the provided *revision control system* (Subversion)
- A final presentation (15 min) of the work and results obtained in the semester thesis
- A final report (English or German), presenting work and results