



BA: HikeDroid – GPS Navigation for Hikers on Android Phones

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

Subject

The vast majority of hikers have already been in this situation: One is out in the wild at a junction of hiking trails but one does not know for sure at which particular point on the map one is presently located and further, which trail to take to get to the desired destination. The rise of omnipresent GPS devices in the form of modern smart phones opens completely new perspectives for this “problem”. How nice would it be just to take out your smart phone, obtain a GPS signal to display your current location and orientation on a high resolution hiking map? The development of *HikeDroid*, an application fulfilling this aim, is the goal of this project proposal.



HikeDroid shall make use of the hiking maps VECTOR25 that have been released (among other maps) by the Swiss government at 1 July 2008 (by means of adopting the *Geoinformationsgesetz*, GeoIG). The maps are available through a web application on www.geo.admin.ch down to a scale of 1:10'000 and can be printed for further use.

Goals

The goal is to develop an Android application that retrieves the VECTOR25 hiking map data from the aforementioned website and displays it intuitively and appropriately in combination with the current location and orientation of the mobile phone (similar to the GoogleMaps Android app). The extensibility of the underlying framework is of particular importance in order to allow advanced features to be implemented later on.

Supervisors

- Tobias Langner: tobias.langner@tik.ee.ethz.ch, ETZ G61.1
- Samuel Welten: samuel.welten@tik.ee.ethz.ch, ETZ G61.4
- Roger Wattenhofer: wattenhofer@tik.ee.ethz.ch, ETZ G63

Detailed Project Outline (Total: 300 h)

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 (30 h)
- Investigate access to the map data on `www.geo.admin.ch` (50 h)
- Develop adapter to retrieve map data from `www.geo.admin.ch` (30 h)
- Design of modular HikeDroid API by state-of-the-art modeling tools (such as UML) to allow for easy extension of the functionality through plug-ins (20 h)
- Design/development of user interface to conveniently display and handle map data and display the current GPS position on the map (60 h)
- Develop an extension for HikeDroid (40 h)
- Test the application in a realistic environment (20 h)
- Write the report (50 h)

Extensions

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:

- Implement a waypoint system that allows HikeDroid users to tag locations (“beautiful view”, “nice restaurant”, etc.) which are supposed to be synched with other users
- Process the map data to extract trail information
- Develop hiking route planner using the trail information
- Process the map data to retrieve altitude information in order to generate altitude profiles for a given trail
- Integration with *GoogleMaps* to obtain altitude information

The Student's Duties

- One meeting per week with the advisors to discuss current matters
- A final presentation (15 min) of the work and results obtained in the semester thesis
- A final report (20 to 40 pages, English or German), presenting work and results
- Two copies of the report, each containing a CD with a digital copy of the report and other relevant digital resources