ETH
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Distributed Computing

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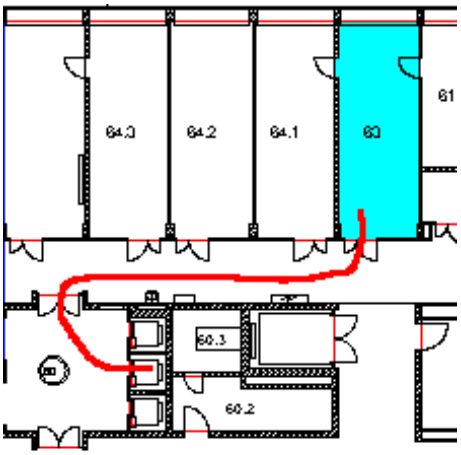
Path Tracking – Guiding Smartphones Based on Recorded Tracks

This document describes the subject and the general time schedule of the group thesis of *Martin Ambühl* and *Nils Reinthaler* in the autumn term 2011. Adaptations or changes can be agreed upon by the advisors.

Motivation and Informal Description

Modern smartphones rely on the Global Positioning System (GPS) and map data to support outdoor navigation. In an indoor setting the signals transmitted by GPS satellites usually cannot be received. Furthermore, floor plans of buildings are often not readily available or outdated.

The *Path Tracking* project thus aims to support indoor navigation without the aid of accurate position information or explicit map data. To that end, available sensory information like WLAN access points in range or acceleration measurements (caused by steps, elevators, stairs, etc.) shall be used to record the path taken through a building by an individual carrying a mobile phone (recording phase). This information may then be provided to others as navigation guide to find the way from one specific location to another, e.g. from the main entrance of building ETZ to office 63 on the G floor (navigation phase).



In both phases, orientation and location of the mobile device can vary, because the phone may be carried in the pocket, be held horizontally or vertically etc. This affects sensor readings like direction of acceleration and therefore must be detected and compensated. To compensate for errors in the recorded sensor data, merging information from multiple walks of a path may be required in the recording phase. During the navigation phase, different methods to guide the user (e.g. visually via the display, audible via speech synthesis) can be provided.

Goals

The goal is to develop an Android application that is able to record the data of a well-defined walk and then navigate a user along this pre-recorded path to the endpoint.

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