



Prototype of a Mobile Application for the Improvement of OSM Data Quality

Sven Leitinger
salzburg|research

Motivation





Research Objectives

- | a framework for mobile data acquisition and improvement
- | for different domains
- | as simple as possible
- | for GPS-based smartphones

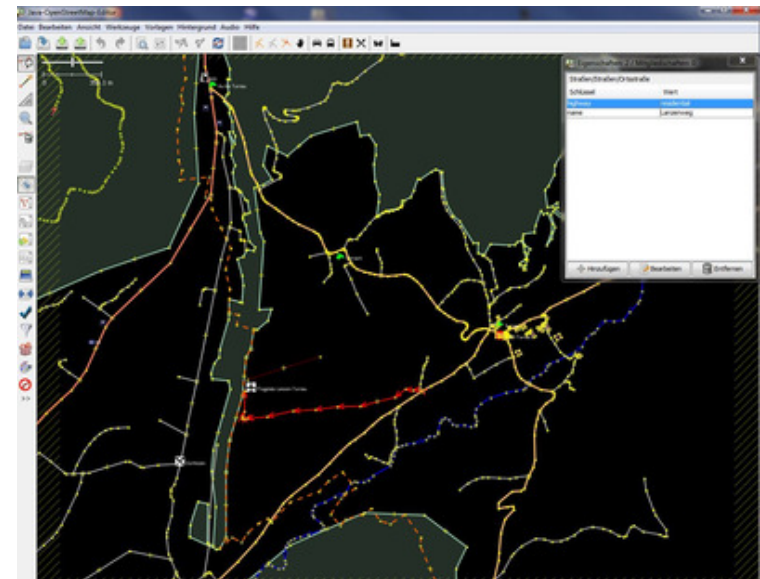
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- | First User Tests
- | Future Work



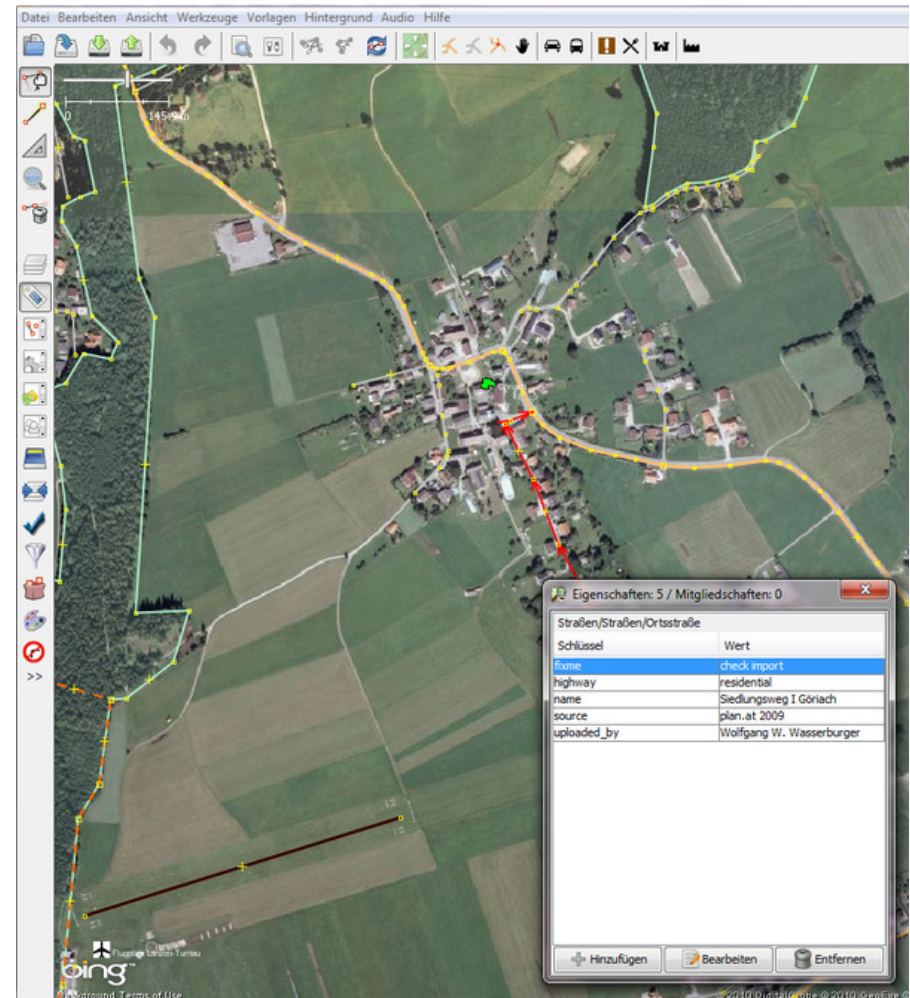
Why Mobile Data Improvement for OSM?

- | quantity of data vs. quality of data
 - | urban areas vs. rural areas
 - | white places vs. detailed map features
- | tools for experts
- | new applications demonstrate missing tags



Data Acquisition with Satellite and Aerial Images

- | data acquisition at home
- | good for basic data structures
 - | streets
 - | buildings
 - | land cover
- | no detailed map features



| GPS-Logger, digital photos, pencil and paper



| GPS-Logger, digital photos, pencil and paper



| smartphone apps for data improvement

Smartphone Apps for OSM (OSM-Wiki 08-07-2011)

| Android

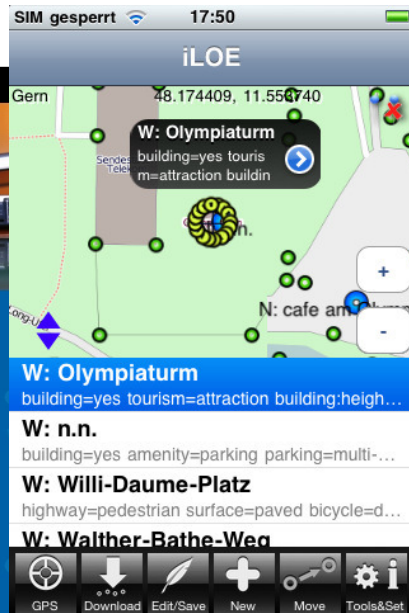
OpenStreetMap editing features

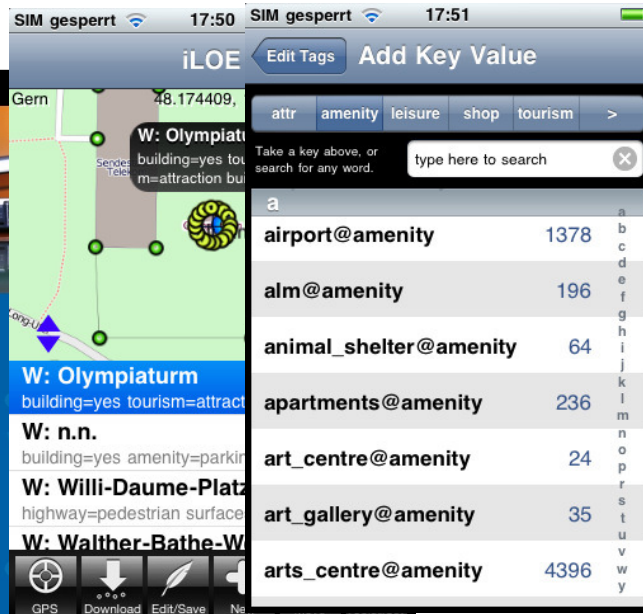
Name	Add POIs	Edit / Delete POIs	Edit arbitrary tags of existing OSM objects	Edit geometries	Edit relations	Upload to OSM
GpsMid	Yes	yes (starting from nightly 2011-05-30)	Yes	No	No	Yes
KeypadMapper	?	?	?	?	?	?
Mapzen POI Collector	Yes	Yes	Yes	No	No	Yes
OSMTracker for Android	Yes	?	?	?	?	?
Vespucci	Yes	Yes	Yes	Yes	No	Yes

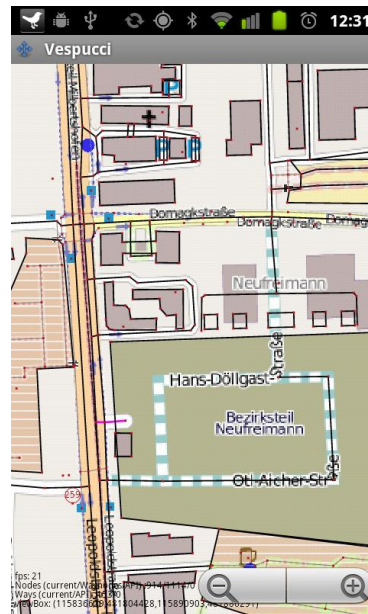
| iPhone

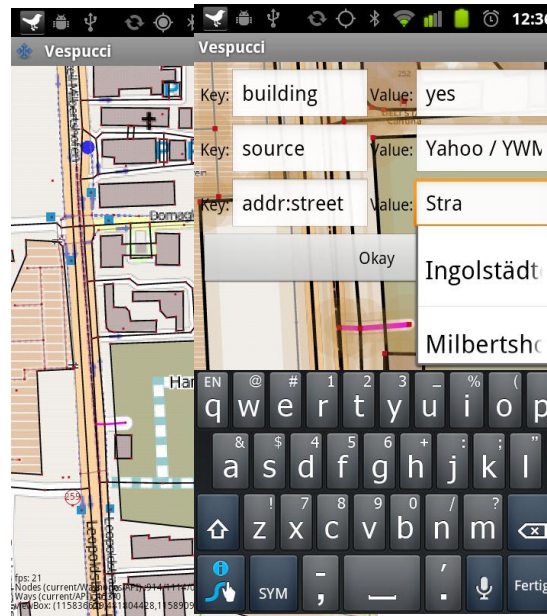
OpenStreetMap editing features

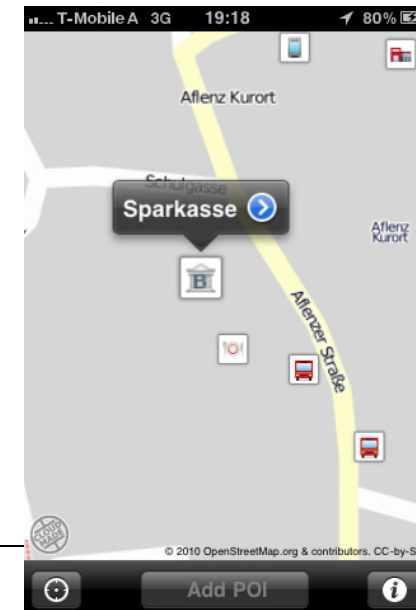
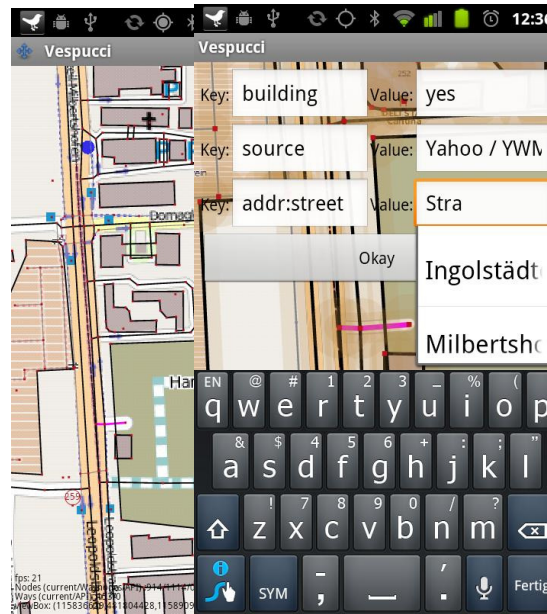
Name	Add POIs	Edit / Delete POIs	Edit arbitrary tags of existing OSM objects	Edit geometries	Edit relations	Upload to OSM
Blumapia	Yes	?	?	?	?	Yes
Cycle Hire	?	?	?	?	?	?
iLOE	Yes	Yes	Yes	No	No	Yes
Mapzen POI Collector	Yes	Yes	Yes	No	No	Yes
Osmeditor	?	?	?	?	?	?

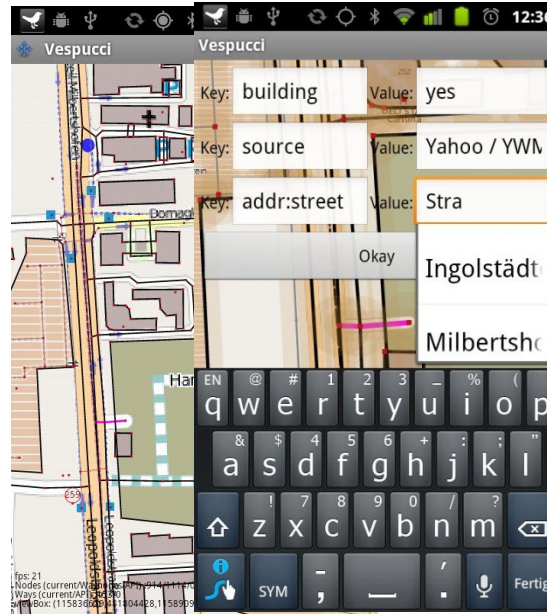












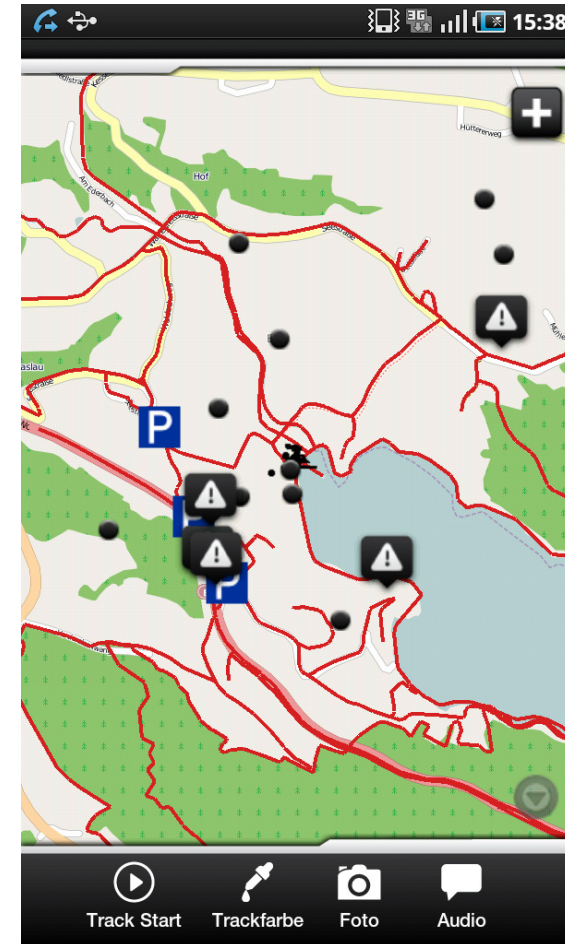


Requirements

- | a app for everybody
- | user interface for small touchable displays
- | in addition to desktop based editors
 - | no functions for editing/deleting features
 - | functions for the data improvement
- | visualisation of missing tags in the OSM data set
- | use of map features from the OSM-Wiki

Prototype

- | for Android smartphones
- | central element is the map interface
- | optional functions for
 - | track recording
 - | pictures and voice memos
- | visualisation of features with missing tags



Automatic Detection of Missing Tags

- | map features
 - | POI's
 - | streets

- | detection of completeness of features
 - | definition of an ontology with the default preset from JOSM
 - | classification in mandatory and optional tags

15:46

Fuel

Pflichtfelder

Typ
Transport/Car/Fuel

Operator
Unbekannt

Position
47.7957805, 13.3049102

Optionale Felder

Name
Unbekannt

Opening Hours
Unbekannt

Diesel ☒

Bio Diesel ☒

Diesel (Gas To Liquid - ultimate diesel) ☒

Speichern Abbrechen

Improvement of Point-of-Interest

The screenshot shows a mobile application interface for entering fuel data. At the top, there is a status bar with icons for connectivity and the time 15:46. Below this is a header bar with the title 'Fuel'. The main content area is divided into two sections: 'Pflichtfelder' (Mandatory Fields) and 'Optionale Felder' (Optional Fields). Under 'Pflichtfelder', there are three fields: 'Typ' (Type) with the value 'Transport/Car/Fuel', 'Operator' with the value 'Unbekannt', and 'Position' with the value '47.7957805, 13.3049102'. Under 'Optionale Felder', there are three fields: 'Name' with the value 'Unbekannt', 'Opening Hours' with the value 'Unbekannt', and a section for fuel types. The fuel types section has three rows: 'Diesel' with a green checkmark icon, 'Bio Diesel' with a grey checkmark icon, and 'Diesel (Gas To Liquid - ultimate diesel)' with a grey checkmark icon. At the bottom of the form, there are two buttons: 'Speichern' (Save) and 'Abbrechen' (Cancel).

Fuel

Pflichtfelder

Typ
Transport/Car/Fuel

Operator
Unbekannt

Position
47.7957805, 13.3049102

Optionale Felder

Name
Unbekannt

Opening Hours
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Diesel (Gas To Liquid - ultimate diesel) ☐

Speichern Abbrechen

Improvement of Point-of-Interest

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Speichern Abbrechen

15:46

Operator

Betreiber

Agip

Aral

Avia

BP

Esso

OMV

Q8

Repsol

Shell

Statoil

Tamoil

Texaco

Total

Indipend.

Abbrechen

Improvement of Point-of-Interest

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Ok Abbrechen

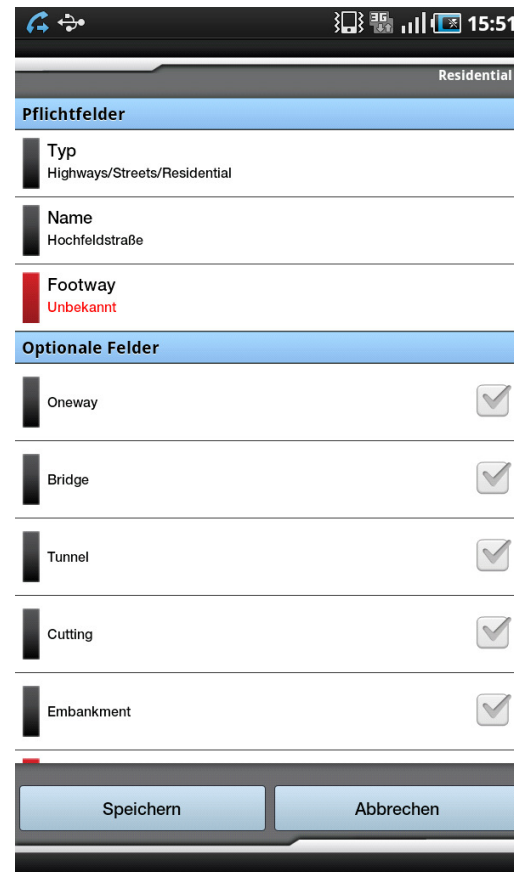
q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

123 _ ./? !@# \$%^ &* '() ~

Improvement of Street Segments



The image shows a mobile application interface for editing street segments. At the top, there is a status bar with icons for connectivity, battery, and the time 15:51. Below this is a header bar with the word "Residential". The main content area is divided into two sections: "Pflichtfelder" (Mandatory Fields) and "Optionale Felder" (Optional Fields). The "Pflichtfelder" section contains three fields: "Typ" (Type) with the value "Highways/Streets/Residential", "Name" with the value "Hochfeldstraße", and "Footway" with the value "Unbekannt". The "Optionale Felder" section contains five fields, each with a checkbox: "Oneway", "Bridge", "Tunnel", "Cutting", and "Embankment". All checkboxes are checked. At the bottom, there are two buttons: "Speichern" (Save) and "Abbrechen" (Cancel).

Residential	
Pflichtfelder	
Typ	Highways/Streets/Residential
Name	Hochfeldstraße
Footway	Unbekannt
Optionale Felder	
Oneway	☒
Bridge	☒
Tunnel	☒
Cutting	☒
Embankment	☒

Speichern Abbrechen

Improvement of Street Segments

Residential

Pflichtfelder

Typ
Highways/Streets/Residential

Name
Hochfeldstraße

Footway
Unbekannt

Optionale Felder

Oneway ☒

Bridge ☒

Tunnel ☒

Cutting ☒

Embankment ☒

Speichern Abbrechen

Footway

both

left

right

none

Abbrechen

Feedback from User Tests

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 - | *It is good, that there are predefined tags at the different map features.*
- | Constructive
 - | *The zoom levels in the mobile application are too low.*
 - | *The visualisation of many nearby POI's with missing tags is problematic.*

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- | Constructive
 - | *The zoom levels in the mobile application are too low.*
 - | *The visualisation of many nearby POI's with missing tags is problematic.*
- | Negative
 - | *Sometimes the application is very slow.*

Future Work

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 - | tools for data acquisition
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 - | gestures for collecting emotional parameters (EmoMap)
- | adapting the prototype for blind users

*ways*4*all*

Future Work

- | user interaction with touch displays, for example
 - | tools for data acquisition
 - | gestures for collecting emotional parameters (EmoMap)
- | adapting the prototype for blind users 
- | an operable app for the improvement of OpenStreetMap data