Sensor Logging for Mobility

Linking Virtual and Real World through Android Applications

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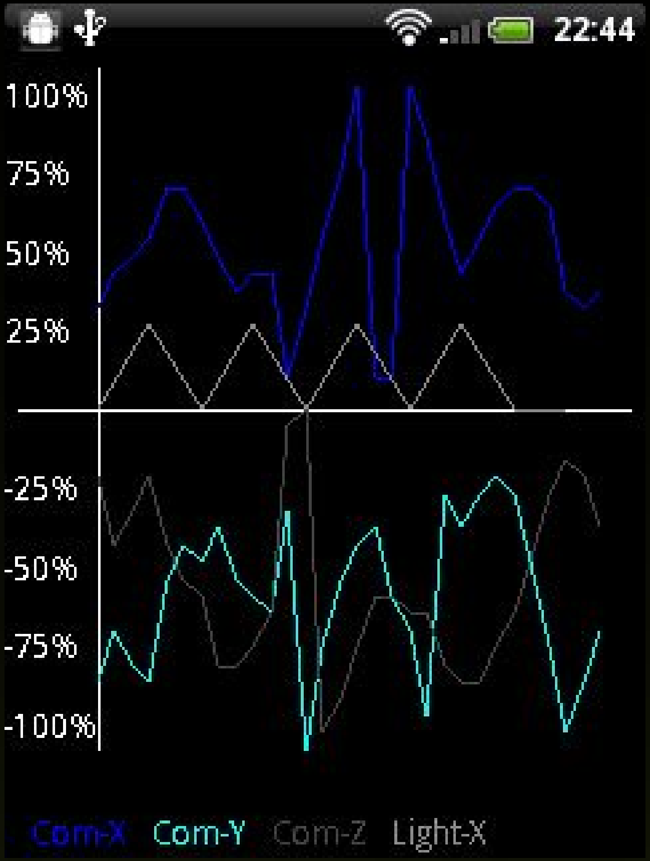
Features

- recording data from different sensors
- switch on/off arbitrary sensors
- display sensor data in a diagram
- tag recorded data to identify your activity
- delete recorded data
- send all the data to a database
- Web interface to get access to your activities

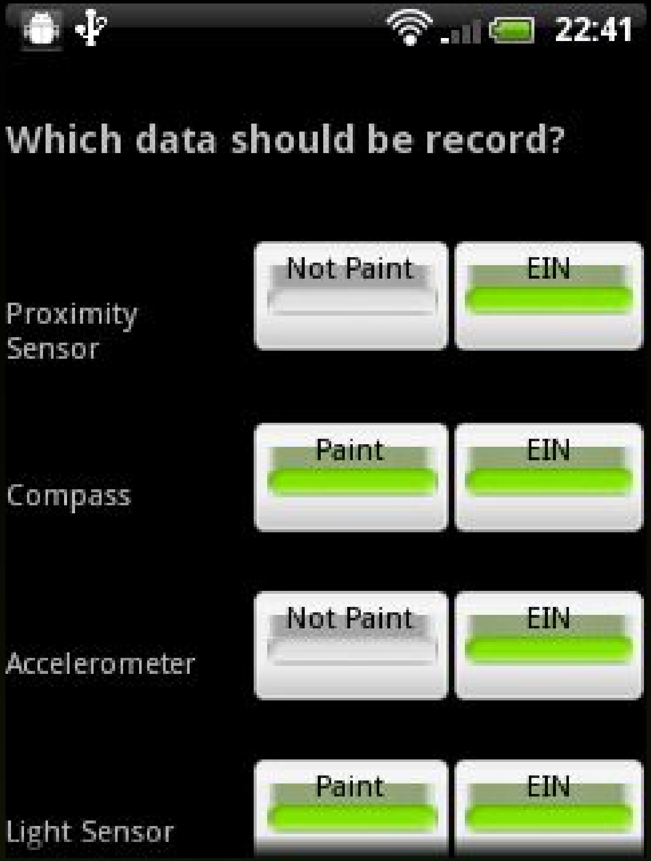
Views

- Main view (application's pivotal point)
- Properties view (adjust settings)
- Sending view (transfer data)
- Tagging view (tag activities)

Main View



Properties View



Which data should be record?

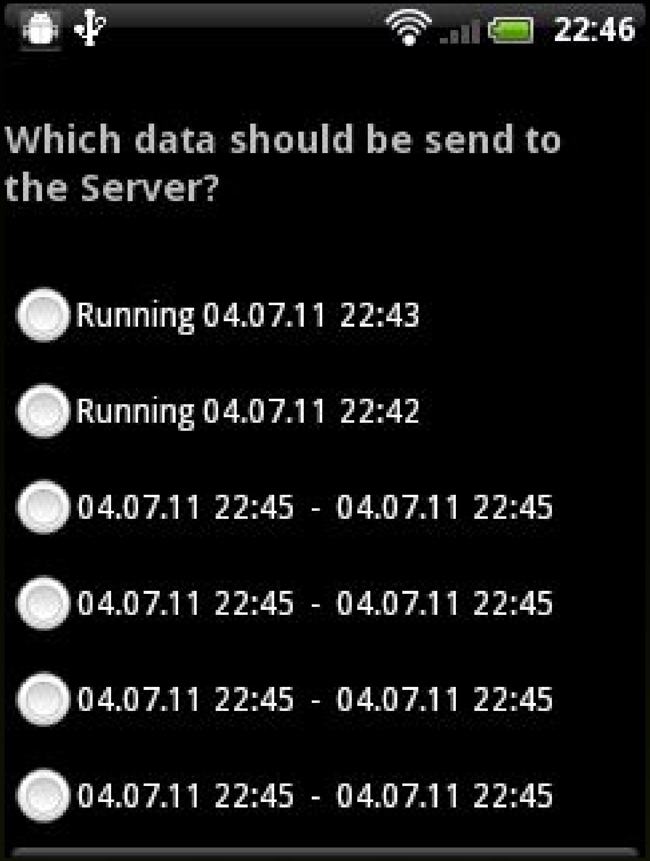
Proximity Sensor — Not Paint — EIN

Compass — Paint — EIN

Accelerometer — Not Paint — EIN

Light Sensor — Paint — EIN

Sending View



22:46

Which data should be send to the Server?

○ Running 04.07.11 22:43

○ Running 04.07.11 22:42

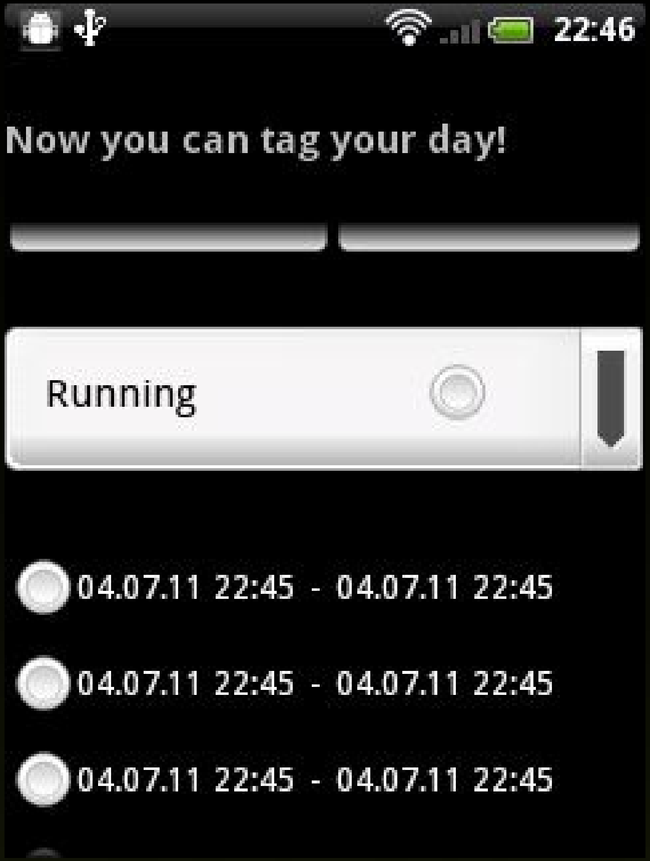
○ 04.07.11 22:45 - 04.07.11 22:45

○ 04.07.11 22:45 - 04.07.11 22:45

○ 04.07.11 22:45 - 04.07.11 22:45

○ 04.07.11 22:45 - 04.07.11 22:45

Tagging View



22:46

Now you can tag your day!

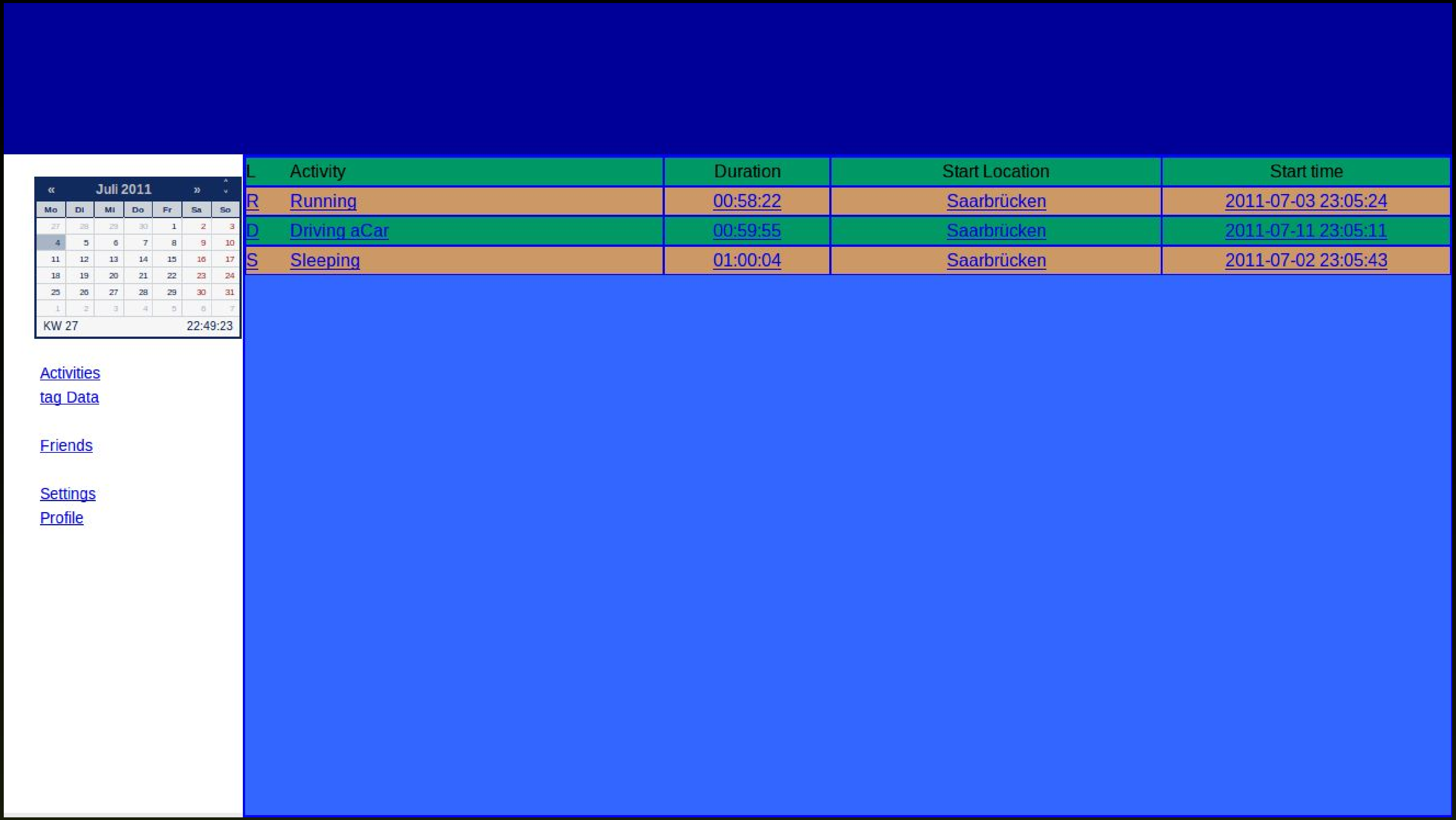
Running ○

○ 04.07.11 22:45 - 04.07.11 22:45

○ 04.07.11 22:45 - 04.07.11 22:45

○ 04.07.11 22:45 - 04.07.11 22:45

Webinterface



« Juli 2011 »

Mo	Di	Mi	Do	Fr	Sa	So
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

KW 27 22:49:23

Activities
tag Data

Friends

Settings
Profile

L	Activity	Duration	Start Location	Start time
R	Running	00:58:22	Saarbrücken	2011-07-03 23:05:24
D	Driving aCar	00:59:55	Saarbrücken	2011-07-11 23:05:11
S	Sleeping	01:00:04	Saarbrücken	2011-07-02 23:05:43

Implementation Details

Application Backend

Jonas Scheer

Application Backend - Sensor Controller

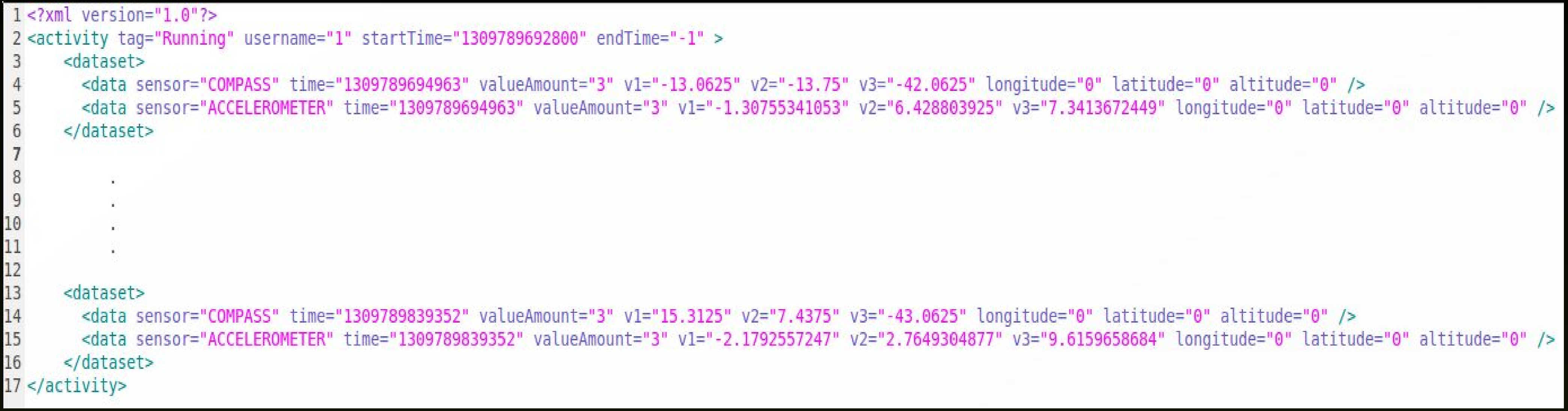
Interface to access & control the sensors:

- enable/disable single sensors
- retrieving all sensors of a device
- obtain a single data set from a sensor
- obtain many buffered data from a sensor

Application Backend - XmlCreator

Class to create xml files:

- each activity is stored in it's own xml file



```xml
<?xml version="1.0"?>
<activity tag="Running" username="1" startTime="1309789692800" endTime="-1" >
    <dataset>
      <data sensor="COMPASS" time="1309789694963" valueAmount="3" v1="-13.0625" v2="-13.75" v3="-42.0625" longitude="0" latitude="0" altitude="0" />
      <data sensor="ACCELEROMETER" time="1309789694963" valueAmount="3" v1="-1.30755341053" v2="6.428803925" v3="7.3413672449" longitude="0" latitude="0" altitude="0" />
    </dataset>

         .
         .
         .
         .

    <dataset>
      <data sensor="COMPASS" time="1309789839352" valueAmount="3" v1="15.3125" v2="7.4375" v3="-43.0625" longitude="0" latitude="0" altitude="0" />
      <data sensor="ACCELEROMETER" time="1309789839352" valueAmount="3" v1="-2.1792557247" v2="2.7649304877" v3="9.6159658684" longitude="0" latitude="0" altitude="0" />
    </dataset>
</activity>
```

Application Backend - XmlCreator

Class to create xml files:

- each activity is stored in it's own xml file
- tag xml files afterwards
- retrieve all tagged xml files
- retrieve all untagged xml files (raw data)
- running in own thread

Application Backend - FileTransmitter

Class to transmit data:

- parse data from xml file
- send data to web server
- php-files inserts data into mySQL database
- deleting transferred files
- running in own thread

Application Backend - SensorDataRecorder

Superclass of each instantiated sensor:

- data buffer to store sensor data (adjustable size)
- SensorData object to handle arbitrary sensor data
- 4 different sample Rates
- memory efficient data storage (initializing all needed data at start - no garbage collector invocation)

Implementation Details

GUI & Controlling

Kai-Dominik Kuhn

GUI - Views

- designing the different views
- Properties View:
  - enable/disable sensors
  - activate/deactivate drawing for sensors
  - settings will be saved automatically
- Recording View:
  - pop-up with activity tag proposal
  - displaying data

GUI - Views

- designing the different views

- Tagging View:

  - choose a predefined tag
  - enter time

- Transmitting View:

  - transmit a certain xml file
  - delete a xml file

GUI - Visualisation system

- display sensor data
- different colors for different data streams
- Bitmap/Canvas to draw
- draw array of data in each step
- cleaning screen afterwards
- own thread for drawing

Web server

- web interface
- overview of all activities
- creating database schema
- setup of database
- database also can be used for analyzing

Thank you for your attention

Questions ???