Personal Networks on Mobile Devices
bachelor/master project

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A personal network consists of a focal person (ego), persons known to ego (alters), and ties between ego and alters and between pairs of alters.

Ties might encode relations such as family ties, friendship, like/dislike or relational events such as emails, phone calls, or meetings.

Ego, alters, and ties can have associated attributes.
Personal networks in empirical research.

Personal networks

- are complex variables characterizing individuals;
- supplement traditional variables such as gender, age, nationality, education, . . .
- might explain individual outcome such as job performance, health, smoking behavior, longevity, delinquency, social or cultural integration, etc.

Personal network research claims that what matters is not only
- network composition (who is in the network), but also
- network structure (how are they connected).

Collecting personal networks entails a high respondent burden.
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General topic of this project.

Design and implement a software for mobile devices (smartphones, tablets) enabling users to collect, map, browse, view, analyze their personal network keeping data on the user’s own device.

Potential advantages of a personal network app:

- allows permanent update of personal networks;
- allows to automatically collect some parts of the data (interaction events, data from online social networks, etc).
Organizational points.
Project webpage: 
http://www.inf.uni-konstanz.de/algo/lehre/ss13/projekte/

Implementation is done for the Android platform. Software can be tested on a real Android device or on an emulator.

Every participant has his/her own topic; individual projects do not depend on the success of other projects (but may enhance each other).

Participants can get a very basic implementation of a personal network app—to be extended dependent on the topic.
Requirements and timeline.

Credit requirements: implementation, documentation (detailed comments in the java code), and presentation (slides).

Approximate schedule:

- **(by 24 April)** topic selection;
- **(3 – 7 June)** individual meeting (preliminary results and stable work plan);
- **(8 – 12 July)** individual meeting (results and plan for presentation);
- **(15 – 19 July)** presentation in a plenary session (≈ 15 minutes plus 5 minutes discussion).
Topics.
Network datastructures.

Implementation of a (non-abstract) subclass of the abstract class `PersonalNetwork` (provided in the basic code); testing runtime efficiency.

Implementation via

- an **SQLite database** (preliminary code provided);
- the library **yFiles for Android**
- the java library **JUNG** (Java Universal Network/Graph Framework)
- own implementation.

Evaluating runtime of access and update operations as well as saving to and reading from permanent storage.
Network layout algorithms.


Computing coordinates of nodes dependent on specified pairwise distances in a two-step process:

- Classical scaling to compute an initial layout;
- followed by stress minimization with node-by-node updates.

Varying the initial target distances and associated weights might enhance readability of the network layout.
User-interaction with a network layout.

Using touch-events and motion-events for
▶ zooming and panning the network;
▶ selecting elements and modifying the network layout;
▶ editing network structure.

Requires access to a real Android device with a (multi-)touch screen.
Collecting social data.

Gathering data from
- Android content providers (contacts, calendar, phone, etc)
- using Google services to get data from Google+ (*Requires access to a real Android device.*)
Interfaces to specific hardware.

- GPS sensors to store coordinates of interaction events;
- bluetooth to connect to other users running the same app;
- voice-based data entry;

 Requires access to a real Android device having such hardware.