



Bachelor Thesis:

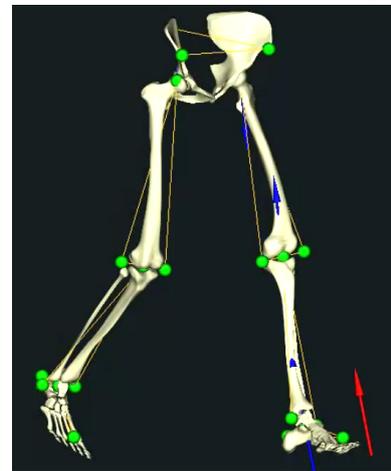
Gait Recognition in Your Pocket

This document describes the subject and the general time schedule of the bachelor thesis of Marcel Bertsch, beginning in the autumn term 2012. Adaptations or changes can be agreed upon by the advisors.

The way people walk is individual for each person. This biometric property has been used in a variety of security systems. However, the application range of most systems is limited by the technology, as the recognition is done using an external camera and image processing.

Preliminary research with gait data collected with a smartphone in the pocket of trousers of different people has indicated that gait recognition might work comparably well on smartphones using integrated sensors as on visual systems. Having a reliable gait recognition on smartphones leads to interesting applications, such as smart lock screens that disable the unlock pattern if the previously measured gait belongs to the owner of the phone with high probability. Another application could be a silent alarm that detects if the phone is carried by another person and sends an email to a previously defined address.

The goal of this thesis is to implement a gait recognition algorithm for Android smartphones that uses the integrated sensors (gyroscope and accelerometer) and provides a useful application (e.g. lock screen). Towards the end, Marcel will conduct a user study that evaluates the algorithm and sheds a light on different factors that influence the recognition rate, such as different shoes or cloths.



Requirements: Good programming skills and some creativity are advantageous. The student(s) should be able to work independently on this topic.

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Detailed Project Outline

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):

- Literature research about existing gait recognition algorithms (★★)
- Get familiar with gait data and data collection (★)
- Implement a basic recognition algorithm (★★★)
- Improve and tune algorithm (★★)
- Evaluate performance in user study (★★)
- Develop useful app based on gait recognition (★★)
- Write a report documenting the development process and the final status of the application and discuss the findings. (★★★)
- Prepare a presentation about the results of your work (★★)

The Students' Duties

- One meeting per week with the advisors to discuss current matters
- Regular check-ins into the provided *revision control system* (Subversion)
- A final presentation (15 min) of the work and results obtained in the semester thesis
- A final report (English or German), presenting work and results