



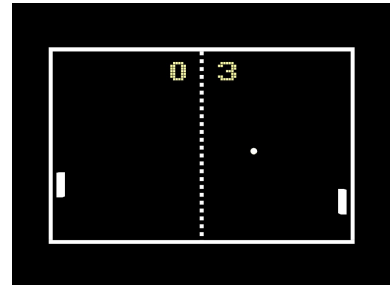
Semester Thesis:

Ultrasound Game

This document describes the subject and the general time schedule of the group thesis of Désirée Clausen, Jannik Schäfer, and Damian Scherrer, beginning in the autumn term 2012. Adaptations or changes can be agreed upon by the advisors.

Today's smartphones are packed with a variety of sensors such as an accelerometer, gyroscope or even a barometer. Despite this large amount of sensors smartphones still do not have a simple mean to measure mutual distances precisely. The only solutions for this problem so far are the coarse localization options it offers through GPS and signal strength of wireless LAN. As this offers only a precision of several meters it is not suited for a lot of applications.

Preliminary research in our group has indicated that it should be possible to measure mutual distances between phones using ultrasound time-of-flight measurements. The goal of this thesis is to implement a (ultra) sound based distance measurement between smartphones and demonstrate it in a simple multiplayer game. The main idea is that the sound based measurements will allow a localization that is precise enough to let two players play a real world pong against each other by moving the phones in the according directions.



Requirements: Good programming skills are required. Some creativity and Android experience 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):

- Design main concept and divide tasks (★★)
- Read about existing ultrasound TOF approaches (★)
- Programm sound based distance measurement (★★★)
- Implement automatic network connection and game protocol (★★)
- Implement simple game physics (★★)
- Programm augmented reality graphic (★★★)
- 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