

Design and implementation of a Fall Detection System

Introduction

People can nowadays be recognized by the way they walk (see for example <http://www1.nrk.no/nett-tv/indeks/184742>). Accelerometers can measure acceleration of specific body parts and this information can be analyzed for recognition purposes. Research so far has concentrated on specialized equipment for measurement of this acceleration data. Nowadays phones also contain accelerometers, which are used for simple applications like turning the screen when the user turns the phone or simple games. We can however also use the acceleration data collected on the phone to identify the person carrying the phone. This information can then be used to protect the phone against thieves stealing it.

Another application that can be build using the acceleration data of the phone is a fall detection system. Elderly people can have both stability problems and have more fragile bones. This might lead to a situation where an elderly falls down and cannot get up anymore due to for example a broken hip or being unconscious. If they would carry a small device that was capable of detecting a fall, then that device could automatically send a warning message to a relevant organization that could send help to the person that fell down.

Project description

In this project we will first of all make a fall detection system on a mobile phone. Such a system should be able to detect a fall of a person, followed by “not getting up”. Obviously if the person would stand up after a fall, then the system should not automatically send out a warning. Furthermore, in order to build a fully working system, the next task is to send out a warning message (SMS) automatically to a fixed phone number.

This will be a 2-3 person project. Tasks in this project include literature study on existing fall detection systems, collecting and analyzing acceleration data from “falling down” on the mobile phone, building a fall detection mechanism based upon acceleration data, building a mechanism for automatic SMS sending, and combining all of the above in a fully functional system. It should be possible to use such a system in a real life environment after the project.

Contact data:

Norwegian Information Security Laboratory

Contact persons:

Patrick Bours, room: A124-B, email: patrick.bours@hig.no, phone: 611 35 250

Mohammad Derawi, room: A106-B, email: mohammad.derawi@hig.no