



SDSU
presents
MS Computer Science
THESIS DEFENSE

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Using Smartphone Sensors for Robotic Person Following

Abstract

This project is the latest generation of robotic person following robots that have been performed at the Intelligent Machines and Robots Laboratory. The goal of the thesis is for a robot to follow a person using a cellphone carried by the person. In this work we use the accelerometer and gyroscope data of the cellphone device to estimate the distance of the person to the robot. The accelerometer signal transmitted from the cellphone to the robot provides an indication of the movements of the person. We have made a number of preliminary experiments that show the amplitude of the acceleration signal and periods between signal peaks are related to the speed of the person's walk and the traveled distance. However, the accelerometer signal is extremely noisy. As a result we use first Kalman filtering to reduce the noise. Several signal processing techniques such as peak detection and Fourier transform are then applied to extract useful information for estimating the distance traveled by the person. This information is used in a fuzzy expert system to estimate the distance. Experimental results are provided and discussed.

Thesis Committee

Mahmoud Tarokh, Thesis Chair, Department of Computer Science
Marie Roch, Department of Computer Science
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