Public Abstract

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Graduation Term:SS 2009

Department:Electrical Engineering

Degree:MS

Title:**Fall Detection Using Acoustic Features and One Class Classifiers**

An elderly person is defined as the person above the age of 65. This is the fastest growing population in United States and Europe. An investigation shows many elderly people get injures or trigger more serious health problems due to falling on the floor at their home or hospitals without artificial monitoring.There are many techniques to monitor the fall remotely and provide assistance as soon as possible. For these purposes video cameras are deployed at the place of living of an elderly but this might lead to an uncomfortable feeling of being spied on. Hence in our research we try to use just the sound (mainly frequency domain features) instead of video to detect a fall remotely. Sound signals have the added advantage that they require significantly less bandwidth to transmit. Moreover, microphones used to record sound are more nearly omnidirectional than even wide-angle cameras. All these advantages encouraged us to use sound to do fall detection remotely.

First, sound signals are collected for a falling person along with normal everyday sounds following this, various *classifiers* are trained using these sound samples and finally using these classifiers we try to do the classification of an unknown sound as fall or non-fall. Another problem we encounter is that we can not collect real sound of an elderly person falling to train our classifiers as stated above because we cannot ask an elderly person to fall so that we can collect sound samples as this is the first thing we want to avoid. In this research, therefore we try to train our classifiers using only one kind of sound which is non fall to do the classification of an unknown sound as fall or non-fall. These classifiers are called One Class Classifiers and are derived from conventional two class classifiers. The results of two types of classifiers were close, especially for boundary based methods.