

UCLA Electrical Engineering ARR 2011

Session 12. Next-Generation Communications West Coast Room

3:15-3:40

"Detecting Stumbles Using Accelerometers"

Nabil Hajj Chehade and Gregory Pottie

Abstract:

Falls are a major health problem for the elderly, and stumbles are good indicators for a fall. In this talk, we describe an approach for the detection of stumbles with a new personal activity monitoring system. Our system consists of low cost triaxial accelerometers that may be worn by patients and are convenient for a wide range of subjects. We use machine learning and data mining techniques to detect and count the stumbles in the acceleration data. We also validate our system with data collected from 10 subjects.

3:40-4:05

"Cyclostationary Feature Detection from Sub-Nyquist Samples"

Eric Rebeiz and Danijela Cabric

Abstract:

Wideband spectrum sensing which requires detecting the presence or absence of signals in a wideband channel faces multiple practical issues. Current bandwidth limitations of state-of-the-art analog to digital converters require alternative approaches to be considered for wideband sensing. Cyclostationary feature detection is a promising sensing tool which is robust to noise, and takes advantage of the noise stationarity. In this talk, we propose a cyclostationary feature detector that operates on sub-Nyquist samples obtained via either multicorset sampling or the modulated wideband converter analog front-end, and present the receiver.

4:05-4:30

"A practical approach to interference suppression using multiple antennas"

Gaelen Pereira and Babak Daneshrad

Abstract:

Interference suppression has been the subject of extensive research in multi-user communication, with several strategies having emerged to address this issue. However, most multi-antenna based approaches assume knowledge of channel estimates, which are hard to obtain in practice. We propose a practical two step solution that consists of a spatial filter applied directly to the incoming signal, followed by an MMSE decoder, and thus does not require channel estimates or changes to the existing receiver in order to suppress interference. The talk will also cover implementation challenges such as AGC control in a MIMO OFDM radio prototype, and we show through experimental results robust performance at a SIR of -10dB.