CISE lecture
UPRM R&D Center (CID-123)
Tuesday February 3, 9:30am-10:30am

Computer vision for wearable video sensors: From stochastic filtering theory to applications in activity monitoring

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Abstract

In this talk, I will provide an overview of my recent research activities in the context of Computer Vision. In a first part, I will tackle the problem of parameter estimation in presence of noise, with application in the tracking of the 3D trajectory and orientation of a camera with uncertainty. Our recent theoretical work has proposed new solutions for Bayesian filtering, under the form of a generic Extended Kalman Filter on Lie Groups, where both state and observations belong to a matrix Lie Group manifold. This has general applicability to representations of rigid motion, similarity, semi-definite positive matrix, homography, etc. In a second part, I will demonstrate how this can be used in the context wearable video analysis. I will also discuss other tools developed for this application within the projects IMMED and Dem@Care, such as location and object recognition and how these methods can be integrated to help in the monitoring of activities from wearable sensors.

Bio

Dr Rémi MEGRET received his MSc in Computer Science from Ecole Normale Supérieure de Lyon in 2000 and his PhD degree in Computer Science from Institut National des Sciences Appliquées de Lyon, France, in 2003. He stayed during 6 months with University of Maryland. In 2004 he joined the Signal and Image Processing Group of Laboratoire de l'Intégration, du Matériau au Système, UMR 5218, Université Bordeaux 1/CNRS/Institut Polytechnique de Bordeaux as Maitre de Conférences. Since July 2014, he is Assistant Professor at the Mathematical Sciences Department of the University of Puerto-Rico at Mayaguez.

His main research activities concern computer vision, image and video processing, modeling and inference of geometry and motion. Most recent works involve the usage of vision for location and motion estimation and classification using embedded cameras. Applications include remote sensing using Unmanned Aerial Vehicles and using wearable cameras as an aid for activity analysis in the context of dementia monitoring (IMMED and Dem@Care projects).