DOCTORADO EN CIENCIAS DE LA INGENIERÍA

Conferencias Magistrales

El Doctorado en Ciencias de la Ingeniería del ITESO, Universidad Jesuita de Guadalajara, en colaboración con la Sección Guadalajara del IEEE y el Capítulo Guadalajara de la Sociedad de Procesamiento de Señal, invitan cordialmente a la conferencia magistral:

Graph Signal Processing: Distributed Graph Filters

by Prof. Geert Leus

SYNOPSIS

Graph signal processing extends the field of classical signal processing to data with an irregular structure, which can be characterized by means of a graph. Such data appears for instance in sensor, social, traffic, and brain networks, to name a few. One of the cornerstones of the field of graph signal processing are graph filters, direct analogues of time-domain filters, but intended for signals defined on graphs.

In this talk, we first introduce the frequency domain related to a graph. This gives rise to a so-called graph Fourier transform, which allows us to define graph filters. We give an overview of the graph filtering problem and specify a number of interesting applications, such as denoising, interpolating, analyzing and classifying signals over a graph. Further, we look at the family of finite impulse response (FIR) and infinite impulse response (IIR) graph filters and show how they can be implemented in a distributed manner.

To further limit the communication and computational complexity, we also generalize the state-of-the-art distributed graph filters to filters whose weights show a dependency on the nodes sharing information. These so-called edge-variant graph filters yield significant benefits in terms of filter order reduction, thereby leading to amenable communication and complexity savings. The analytical and numerical results presented in this talk illustrate the potential and benefits of this general family of edge-variant graph filters.

Prof. Geert Leus received the M.Sc. and Ph.D. degree in Electrical Engineering from the KU Leuven, Belgium, in June 1996 and May 2000, respectively. Geert Leus is now an "Antoni van Leeuwenhoek" Full Professor at the Faculty of Electrical Engineering, Mathematics and Computer Science of the Delft University of Technology, The Netherlands. His research interests are in the broad area of signal processing, with a specific focus on wireless communications, array processing, sensor networks, and graph signal processing. Geert Leus received a 2002 IEEE Signal Processing Society Young Author Best Paper Award and a 2005 IEEE Signal Processing Society Best Paper Award. He is a Fellow of the IEEE and a Fellow of EURASIP. Geert Leus was a Member-at-Large of the Board of Governors of the IEEE Signal Processing Society, the Chair of the IEEE Signal Processing for Communications and Networking Technical Committee, a Member of the IEEE Sensor Array and Multichannel Technical Committee, and the Editor in Chief of the EURASIP Journal on Advances in Signal Processing. He was also on the Editorial Boards of the IEEE Transactions on Signal Processing, the IEEE Transactions on Wireless Communications, the IEEE Signal Processing Letters, and the EURASIP Journal on Advances in Signal Processing. Currently, he is the Chair of the EURASIP Special Area Team on Signal Processing for Multisensor Systems, a Member of the IEEE Signal Processing Theory and Methods Technical Committee, a Member of the IEEE Big Data Special Interest Group, an Associate Editor of Foundations and Trends in Signal Processing, and the Editor in Chief of EURASIP Signal Processing.

Martes 19 de Febrero 2019, 18:30 a 20:00 horas. ITESO, Auditorio D-2 (Edificio D, Planta Alta).
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