Conferencia invitada

TURBO-LIKE CODES FOR SOURCE AND JOINT SOURCE-CHANNEL CODING OF CORRELATED SOURCES

por

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Abstract:

We demostrate the application of turbo-like codes and iterative decoding schemes for source and joint source-channel coding of correlated sources. After considering the case of data compression, we investigate the problem of transmission of correlated sources over noisy channels, considering it from a joint source-channel coding perspective. Instead of first compressing the data and then introducing redundancy, each source is directly channel encoded with an independent turbo-like channel code. At the receiver, the correlation existing between sources is exploited in the decoding process. Two channel scenarios are studied. In the first one, each source is transmitted through a separated channel, while in the second scenario we consider a multiple access channel. In the former case, where separation between source and channel coding is optimal, the proposed framework leads to reliable communications at signal to noise ratios very close to the theoretical limits established by the combination of Shannon and Slepian-Wolf theorems. In the latter, where separation does not hold, we present results outperforming this bound.

Biography:

Javier Garcia-Frias received the Ingeniero de Telecomunicacion degree from Universidad Politecnica de Madrid, Spain, in 1992, the Licenciado en Ciencias Matematicas degree from UNED, Madrid, in 1995, and the Ph.D. degree in Electrical Engineering from UCLA, in 1999. In 1993, he was awarded the National Prize from the Spanish government for his studies in Electrical Engineering.

In 1992 and from 1994 to 1996 he was with Telefonica I+D in Madrid. In 1993 he was awarded an FPU fellowship from the Spanish government to pursue doctoral studies at Escuela Tecnica Superior de Ingenieros de Telecomunicacion, Universidad Politecnica de Madrid. From September 1999 to August 2003 he was an Assistant Professor in the Department of Electrical and Computer Engineering at the University of Delaware, where he is currently an Associate Professor. His research interests are in the area of information processing in communications and biological systems, with a focus on wireless communications, iterative decoding schemes for source and channel coding, coding for multiterminal sources, joint source-channel coding, sensor networks, and cellular regulatory networks.

Javier Garcia-Frias is a recipient of a 2001 NSF CAREER award and of a 2001 Presidential Early Career Award (PECASE) in support of his communications

program. He has been a member of the Signal Processing for Communications Technical Committee (SPCOM-TC) of the IEEE Signal Processing Society (2004-2006), and has served as editor and guest editor of several journals of the IEEE and EURASIP, including IEEE Signal Processing Magazine (2007), IEEE Transactions on Wireless Communications (2003-2007), IEEE Transactions on Signal Processing (2004-2006), Signal Processing (2006), and EURASIP Journal on Bioinformatics and Systems Biology (2005-present).

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