NATIONAL ICT AUSTRALIA LIMITED

Advances in Inverse Synthetic Aperture Radar

By
Dr Marco Martorella
University of Pisa (Italy)

Monday 6th February 9:00am
Tutorial Room MC 1-21
Mawson Lakes Library
Mawson Centre
MAWSON LAKES, SA

Abstract

Inverse Synthetic Aperture Radar (ISAR) is commonly used in radar target classification and recognition. The two-dimensional distribution of the signal echo, which is the result of the projection and mapping of the three-dimensional scattering centres onto an image plane, carries extra information about the target with respect to conventional and High Resolution (HR) radar. Feature extraction based or template matching techniques result in a more accurate classification when more information is contained in the input data. Radar images provided by common ISAR processors are generally plotted in the slant range – Doppler domain and represent the signal echo intensity in the two-dimensional domain. The scattering centre location is of fundamental importance when a target has to be classified or even recognised. The slant range – Doppler representation and the energy spread due to the imaging system point spread function characteristics do not facilitate the target classification process. Such issues are known in the literature as the *image scaling* and the *scattering centre extraction* problems.

In this seminar a few novel techniques will be presented that solve such problems. Specifically, the image scaling problem is tackled by directly solving the problem of estimating the target *effective rotation vector*, whereas the scattering centre extraction is carried out by means of a *CLEAN* technique. Moreover, the use of bistatic/multistatic radar configurations enables full target rotation vector estimation, from which both the image scale factor and image plane orientation may be estimated.

Theoretical approaches and solutions of the problems will be shown in the presentation along with simulated and real data results.

About the Speaker

Marco Martorella received the Telecommunication Engineering Laurea and Ph.D. degrees from the University of Pisa (Italy) in 1999 and 2003, respectively. He becomes a post-doc researcher in 2003 and a permanent researcher/lecturer in 2005 at the Dept. of Information Engineering of the University of Pisa. He joined the Dept. of Electrical and Electronic Engineering (EEE) of the University of Melbourne during his Ph.D., the Dept. of Electrical and Electronic Engineering (EEE) of the University of Adelaide under a post-doc contract and the Dept. of Information Technology and Electrical Engineering (ITEE) of the University of Queensland as a visiting researcher between 2001 and 2006. His research interests are in the field of Synthetic Aperture Radar (SAR) and Inverse Synthetic Aperture Radar (ISAR). He is an IEEE member since 1999.

Morning tea will be served

Bookings Essential

Please **RSVP** to Anne-Marie Eliseo, Industry Education Manager, by no later than Wednesday, 1st February, 2006:

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Seminar Venue:

Monday, 6th February, 2006 9:00am
Followed by morning tea at 10:00am

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