Bayesian Data and Image Fusion (I)

A. Mohammad-Djafari
Laboratoire des Signaux et Systèmes
Ecole Supérieure d́ Eléctricitee (Supélec)
France

This presentation is a tutorial on the Bayesian inference approach to multi-sensor data and image fusion. First a few examples of simple image fusion problems are presented. Then, the simple case of registered image fusion problem is considered to show the basics of the Bayesian estimation approach and its link to classical data fusion methods such as Principal Component Analysis (PCA), Factor Analysis (FA) and Independent Component Analysis (ICA). Then, the case of simultaneous registration and fusion of images is considered. Finally, the problem of fusion of really heterogeneous data such as X-ray radiographic and ultrasound echo-graphic data for computed tomography image reconstruction of 2D or 3D objects are considered. For each of the mentioned data fusion problems, a basic method is presented and illustrated through some simulation results.