

Josiane ZERUBIA
INRIA, Sophia-Antipolis, France

Cascade Model for Hierarchical Joint Classification

Abstract:

Nowadays the capabilities to monitor the Earth's surface, notably agricultural, urban and built-up areas are becoming more and more important for both civilian and military applications. Within this framework, accurate and time-efficient classification methods are crucial tools required to support the rapid and reliable assessment of ground changes and damages induced for example by a natural disaster, in particular when an extensive area has been affected. Given the substantial amount and variety of data currently available from the last generation of very-high resolution (VHR) satellite missions, the main methodological difficulty is to develop classifiers that are powerful and flexible enough to utilize the benefits of multi-band, multi-resolution, multi-date, and possibly multi-sensor imagery.

In this talk, first a brief introduction to MRF will be done, and then a family of novel cascade techniques based on the marginal posterior modes (MPM) criterion will be described. The developed cascade methods have been experimentally validated with complex optical multi-spectral (Pleiades), X-band SAR (COSMO-SkyMed), and C-band SAR (RadarSat-2) data after Haiti earthquake. The experimental results show that the cascade methods are able to provide accurate classification maps from heterogeneous remote sensing data.

Biosketch

Josiane Zerubia has been a permanent research scientist at INRIA since 1989 and director of research since July 1995. She was successively head of 3 laboratories in remote sensing from 1995 to 2016. She has been professor at ISAE-SUPAERO in Toulouse since 1999.

Her main research interest is in signal and image processing using probabilistic models. She also works on parameter estimation, statistical learning, optimization techniques and neural networks (in particular cellular NN). In terms of applications, she worked on speech processing (1982-1988), biological image processing (2001-2011), skin imaging (2009-2018) and remote sensing (1988-).

She published nearly 100 journal papers and more than 250 papers in international conferences. She published a book on Markov random fields in image segmentation in 2012 (Now pub.), co-authored with Prof. Zoltan Kato. She was co-editor with Prof. Gabriele Moser of a book on mathematical models for remote sensing image processing in 2018 (Springer pub.). Currently her hindex is 53 and i10 is 184 on Google Scholar, her RG score is 40.03.

She has been nominated EURASIP Fellow in 2019. She is also a Fellow of the IEEE (2003) and was IEEE SP Society Distinguished Lecturer (2016-2017). She received the excellency award from Université Cote d'Azur (UCA) in 2016, several best paper awards with her students and collaborators, and was made "Chevalier de l'Ordre National du Mérite" by the President of the French Republic in 2002 for an exemplary career in research.