



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

**Belief condensation filtering:
Framework and algorithms**

by

Professor Moe Win

**Laboratory for Information and Decision Systems (LIDS)
Massachusetts Institute of Technology
U.S.A.**

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Abstract

Inferring a sequence of variables from observations is a prevalent task in a multitude of applications. However, traditional techniques such as Kalman filters (KFs) and particle filters (PFs) are often either inaccurate or too complex. Moreover, there is a lack of a unifying framework for the analysis and development of different filtering techniques. This talk presents a brief technical overview of our recent activities in nonlinear/non-Gaussian filtering, with an emphasis on the new methodology of belief condensation (BC) filtering from both theory and algorithm design perspectives. The theoretical framework allows the formulation of an optimality criterion leading to BC filtering. Algorithms for BC can accurately approximate complex distributions by tractable ones, and provide new filtering techniques with high accuracies and affordable complexities. Finally, simulation results are presented to evaluate the performance of the proposed BC filters for navigation/tracking applications as well as for a highly nonlinear problem widely explored in the literature. Our results show that the proposed BC filters can have accuracies approaching the theoretical bounds with complexities much smaller than PFs.

Biography

Moe Win is an Associate Professor at the Massachusetts Institute of Technology (MIT). Prior to joining MIT, he was at AT&T Research Laboratories for five years and at the Jet Propulsion Laboratory for seven years. His research encompasses fundamental theories, algorithm design, and experimentation for a broad range of real-world problems. His current research topics include network localization and navigation, network interference exploitation, intrinsic wireless secrecy, adaptive diversity techniques, and ultra-wide bandwidth systems. Professor Win is a Fellow of the AAAS, the IEEE, and the IET, and was an IEEE Distinguished Lecturer. He is an elected Member-at-Large on the IEEE Communications Society Board of Governors (2011–2013). He was the chair (2004–2006) and secretary (2002–2004) for the Radio Communications Committee of the IEEE Communications Society. He was honored with two IEEE Technical Field Awards: the IEEE Kiyo Tomiyasu Award and the IEEE Eric E. Sumner Award (jointly with R. A. Scholtz). He received the Copernicus Fellowship, the Royal Academy of Engineering Distinguished Visiting Fellowship, the Fulbright Fellowship, the Laurea Honoris Causa from the University of Ferrara, and the U.S. Presidential Early Career Award for Scientists and Engineers.

**** ALL ARE WELCOME ****