

Conferencia invitada

Independent Component Analysis: Dependence Measures and Efficient Geometric Optimisation

por

Dr. Arthur Gretton

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Abstract:

The purpose of independent component analysis (ICA) is to separate linearly mixed sources based only on their mutual independence, while making minimal additional assumptions regarding the source distributions. This talk addresses two aspects of the ICA problem. First, we provide a tutorial introduction to the high order dependence measures between sources employed in classical ICA approaches, with descriptions of how these relate to each other, and the compromises required in their practical application. Second, we address the optimisation problem in ICA, using a geometric approach: we describe an approximate Newton-like method for optimising over the special orthogonal group, when minimising dependence between the demixed sources. Although it has previously been shown that Fast ICA uses this approach, we concentrate here on the case where kernel independence measures are minimised. We demonstrate that the resulting algorithm, Fast Kernel ICA, provides excellent unmixing performance, resistance to local minima, robustness to outliers, and reasonable computational cost.

Biography:

Arthur Gretton was born in Canberra (Australia) in 1976. He received the Bachelor of Science in Physics in 1996, and the Bachelor of Engineering with Honours in 1998. In 1996 he obtained the Shell Award for top aggregate score for third year units in Physics and Chemistry, in 1998 he was awarded the University Medal in Engineering and the ANU Honours Scholarship, and in he obtained the Australian Postgraduate Award for PhD studies. From 1999 to 2003 he undertook his PhD studies in Engineering at Cambridge University's Engineering Department. Since 2003 he is Research Scientist at the Max Planck Institute for Biological Cybernetics. His main research interest is in using kernel methods to reveal properties of probability distributions.

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Hora: 17:00

Lugar: Sala 4.3.A.05

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