Conferencia invitada

Probabilistic Inference for Modelling of Transcription Factor Activity

por

Dr. Neil Lawrence
Senior Research Fellow, University of Manchester

Abstract:

Accurate modelling of transcriptional processes in the cell requires the knowledge of a number of key biological quantities. In practice many of them are difficult to measure in vivo. For example, it is very hard to measure the active concentration levels of the transcription factor proteins that drive the process.

In this talk we will show how, by making use of structural information about the interaction network (e.g. arising form ChIP-chip data), transcription factor activities can estimated using probabilistic inference. We propose two different probabilistic models: a simple linear model with Kalman filter based dynamics for genome/transcriptome wide studies and a differential equation based Gaussian process model with a more physically realistic parameterisation for smaller interaction networks.

Related papers:

[1] N. D. Lawrence, G. Sanguinetti and M. Rattray. (2007) "Modelling transcriptional regulation using Gaussian processes" in B. Schölkopf, J. C. Platt and T. Hofmann (eds) Advances in Neural Information Processing Systems, MIT Press, Cambridge, MA.

[2] G. Sanguinetti, N. D. Lawrence and M. Rattray. (2006) "Probabilistic inference of transcription factor concentrations and gene-specific regulatory activities" in Bioinformatics 22 (22), pp 2275—2281.

[3] G. Sanguinetti, M. Rattray and N. D. Lawrence. (2006) "A probabilistic dynamical model for quantitative inference of the regulatory mechanism of transcription" in Bioinformatics 22 (14), pp 1753—1759.

Biography:

Neil Lawrence is a Senior Research Fellow in the School of Computer Science at the University of Manchester, U.K.. Previous to this appointment he was a Senior Lecturer in the Department of Computer Science at the University of Sheffield, U.K. where he was head of the Machine Learning Research Group. His main research interest is machine learning through probabilistic models. He is interested in both the algorithmic side of these models and their application in areas such as bioinformatics, speech, vision and graphics.

His PhD was awarded in 2000 from the Computer Lab at the University of Cambridge. He then spent a year at Microsoft Research, Cambridge before moving to Sheffield in 2001 and then to Manchester in 2007.

Día: 4 de julio de 2007
Hora: 16:00
Lugar: Sala 4.3.A.05
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