



IMSE-CNM



Bayesian networks & Causal inference

The central aim of many studies in the social and medical sciences is the elucidation of cause-effect relationships among variables or events. While, the appropriate methodology for extracting such causal relationships from data is still an open question (and fiercely debated), graphical models provide a simple and convenient way of communicating causal claims. The causal diagram represents the investigator's understanding of the causal influences among measurable - but partially observed - quantities in the domain. In this talk, I review the basics of causal inference in graphical model and demonstrate, using simple examples, how non-trivial causal phenomena, paradoxes and controversies in causal analysis can be understood, exemplified and analysed using the do-calculus developed by Judea Pearl. I also show how selection bias and missing data mechanisms can be represented in the graph and discuss the conditions under which consistent causal (or probabilistic) inferences can be made from such corrupted data sets.

Instituto de Microelectrónica de Sevilla IMSE-CNM

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Introducción
Cómo llegar
Organización
Personal
Visitas al IMSE

RECURSOS

Laboratorios
Informática
Herramientas CAD

I+D+i

Unidades de investigación
Proyectos
Catálogo de ICs
Patentes

PUBLICACIONES

Publicaciones del IMSE
Biblioteca

EMPLEO Y FORMACIÓN

En el IMSE
En el CSIC

Lecture given by Dr. ALEXANDRE AUSSEM.

Professor in Computer Science CNRS, Université Lyon-1.

Our research group focuses on the development of principled approaches to machine learning, statistical analysis and pattern recognition and their application to diverse areas including bioinformatics (gene selection and gene network discovery), fault detection, forecasting, process monitoring, medical diagnosis etc. Our specific aim is to solve the variable subset selection problem using modern machine learning techniques. Our research also focuses on causal inference in the observational health and biomedical sciences. We investigate the circumstances under which non-experimental data can reveal causal effects. Current projects include puzzling patterns of old-age diseases (e.g. osteoporosis, Alzheimer); and the uses of graphical causal models for applied observational research.