

## **UNIVERSITY OF ESSEX**

### **PRIMERA OPCIÓN: 2 CURSOS**

#### **Course title: Encounters with Big Data: Using Big Data in Social Sciences**

Prerequisites/knowledge: Aimed at experienced researchers, statisticians, or data managers. Experience using quantitative research data in the social sciences, a good understanding of statistical methodology and concepts like standard error and standard deviation, competence in writing commands in a statistical computing environment like Stata, R or SPSS.

Will I be using particular software?

#### **Course title: Artificial Intelligence and Neural Networks in Analytics**

Level: Advanced, with a balance of theoretical and practical work

Course abstract:

A large part of the Mathematics behind Artificial Intelligence can be realized in form of Neural Networks. The course introduces in the neural network mathematics do perception, system identification and decision support/ control. We start with the learning of shallow feedforward neural nets, go on to deep feedforward nets for regression, classification and image processing. Then we will move on to small and large recurrent networks to identify open and closed dynamical systems. This is the basis for forecasting including uncertainty analysis. The applicability will be demonstrated in technical and economical industry examples.

## SEGUNDA OPCION: 3 CURSOS

### **Course title: Learning under different training and testing distributions**

Level: Intermediate, with a balance of theoretical and practical work

Course abstract:

Systems based on machine learning methods often suffer a major challenge when applied to the real-world datasets. The conditions under which the system was developed will differ from those in which we use the system. Few sophisticated examples could be email spam filtering, stock prediction, health diagnostic, and brain-computer interface (BCI) systems that took a few years to develop. Will this system be usable, or will it need to be adapted because the distribution has changed since the system was first built? Apparently, any form of real-world data analysis is cursed with such problems, which arise for reasons varying from the sample selection bias or operating in non-stationary environments. This talk will focus on the issues of dataset shifts (e.g. covariate shift, prior-probability shift, and concept shift) in machine learning and managing to learn a satisfactory model.

Prerequisites/knowledge:

A basic knowledge of Python and Statistics is useful.

### **Course title: Financial Analytics: From foundations to practice**

Level: Introductory, with a balance of theoretical and practical work

Course abstract:

This course teaches participants how to perform, interpret and apply financial analytics. Starting with fundamental ratios it progresses through to higher forms of analysis and visualisation. This journey will include how to use financial analytics for performance measurement, decision making (e.g. investment and performance), interpretation and visualisation.

The course assumes no initial knowledge of financial analytics and aims to equip the participant to be able to perform insightful and appropriate analytics for research or organisational decision making purposes.

There is a high degree of practical activity showing you how to perform financial analytics, starting with basics such as financial ratios. From basic ratios through to using machine learning techniques.

- Purpose of Financial Analytics
- Application of Financial Analytics

o Basic Financial Analytics: Understanding financial statements, key financial ratios and financial performance indicators

- Considerations when working with data: Ranging from common errors through to the temporal effects on financial data
- Simulation, classification and financial performance prediction. Looking at a selection of methods and when to use them.
- Finding Alpha with analytics: Understanding “Alpha”, using analytics for finding “Alpha”. Incorporating non-financial and cognitive data with financial data.
- Visualisation and interpreting financial data

Prerequisites/knowledge:

A familiarity with Python/R would be helpful, but is not required

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