The Artificial Intelligence Revolution

Prof. Pierre-Alexandre Balland

Course description

The AI revolution is rapidly taking the world by storm. We can only be mesmerized by how quickly intelligent machines have learned to drive cars, read lung scans, or predict what we will want to listen, watch, or buy better than any human. This extraordinary technology is still in its very infancy but has already driven most of recent stock market growth while disrupting entire industries and rendering high-status skills and occupations completely obsolete. In this class, Professor Balland provides an entry point for students to understand and thrive in this new AI world. It addresses the macro-level impact of AI on the economy, introduces the technical principles of modern AI algorithms, and invites students to critically think about the skills and values they need for a world so different from the ones our education system was designed for.

Meet the instructor

Pierre-Alexandre Balland is a French economist and one of Europe's leading experts on complex systems, the future of cities, artificial intelligence and blockchain technologies. He is a Professor at Utrecht University and previously held positions at MIT and UCLA. He is a Visiting Professor at the Center for Collective Learning of the Artificial and Natural Intelligence Toulouse Institute and a research fellow at the Center for Complex Systems Studies. Prof. Balland is also a high-level policy expert that currently serves in the ESIR group to advise the European Commission on innovation policy.

What students will learn

1. The real-world problems AI is solving
2. How AI creates a monopoly and a winner-takes-all society
3. What AI cannot predict - and the increasing importance of human wisdom
4. High-level understanding of machine learning, deep learning & network science
5. The building blocks of AI systems: network data structures
6. How to transform data into meaningful, actionable insights
7. How to build an AI recommendation system to solve a real-world problem

Structure of the class

The class consists of four teaching moments: two lectures, one tutorial, and one final pitch deck presentation. The first lecture introduces the impact of AI on our society and allows students to understand the business and societal problems that AI can solve. The second lecture is more technical in nature and discusses the underlying principles of modern AI algorithms. The tutorial connects the first and second lectures by inviting

students to build a recommendation system to solve a real-world problem of their choice. During the last class, students will have the opportunity to present their big idea and receive feedback.

Course Schedule

Week	Day	Date	Time	Location	Activity	Lecturer
1	Tuesday	08/10	09:00-10:00	Online	Lecture 1	Balland
2	Tuesday	08/17	09:00-10:00	Online	Lecture 2	Balland
3	Sunday	08/29	09:00-10:00	Online	Tutorial	Balland
4	Sunday	09/12	09:00-10:00	Online	Presentations	Balland

Readings

There is no mandatory reading for these class but the following books, papers, and newspapers make excellent companions:

- The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies by Erik Brynjolfsson & Andrew McAfee
- Prediction Machines: The Simple Economics of Artificial Intelligence by Ajay Agrawal, Joshua Gans & Avi Goldfarb
- AI Superpowers: China, Silicon Valley, And The New World Order by Kai-Fu Lee
- LeCun, Yann, Yoshua Bengio, and Geoffrey Hinton (2015) Deep learning, *Nature* (you don't have to understand it all - just skim through it)
- Pierre-Alexandre Balland, Cristian Jara-Figueroa, Sergio G. Petralia, Mathieu P. A. Steijn, David L. Rigby & César A. Hidalgo (2020) Complex economic activities concentrate in large cities, *Nature Human Behavior*
- Amazon's description of their collaborative filtering AI system
- Why data is the most valuable resource according to *The Economist*