The Thalesians' Summer School in Artificial Intelligence & Machine Learning

Acquire a cutting edge machine learning experience in 4 days from leading experts in AI/ML and Finance

1-4 September, 2018

Oxford

ABOUT THALESIANS

The Thalesians are an Artificial Intelligence (AI) company specialising in digital economy, education, and consulting. The company was founded in 2009 by Dr. Paul Bilokon, Prof. Matthew Dixon, and Saeed Amen, leading experts in quantitative finance, machine learning, and AI.

Our trainings enable you to share your thoughts with and learn from industry leaders, 3,000 members of our global Association in Budapest, Frankfurt, Lisbon, London, New York, Paris, and Prague, and take advantage of our extensive pools of expert consultants all around the world.

YOUR COURSE

You are invited to join our unique Summer School in AI and ML. Following an introduction to data science and a refresher on Python programming on Level39, Canary Wharf, you will go up to Oxford to study the theory and practise machine learning on real financial examples. You will review, learn, and master:

- probability and statistics
- linear regression methods
- dimensionality reduction
- unsupervised machine learning
- bias-variance tradeoff
- model & feature selection
- classification
- neural nets
- deep learning
- recurrent neural networks, including LSTM
- reinforcement learning
- current fontiers in AI and machine learning (ML)

You will also network with other data scientists, fintech industry leaders and Oxford academics.

ONLY

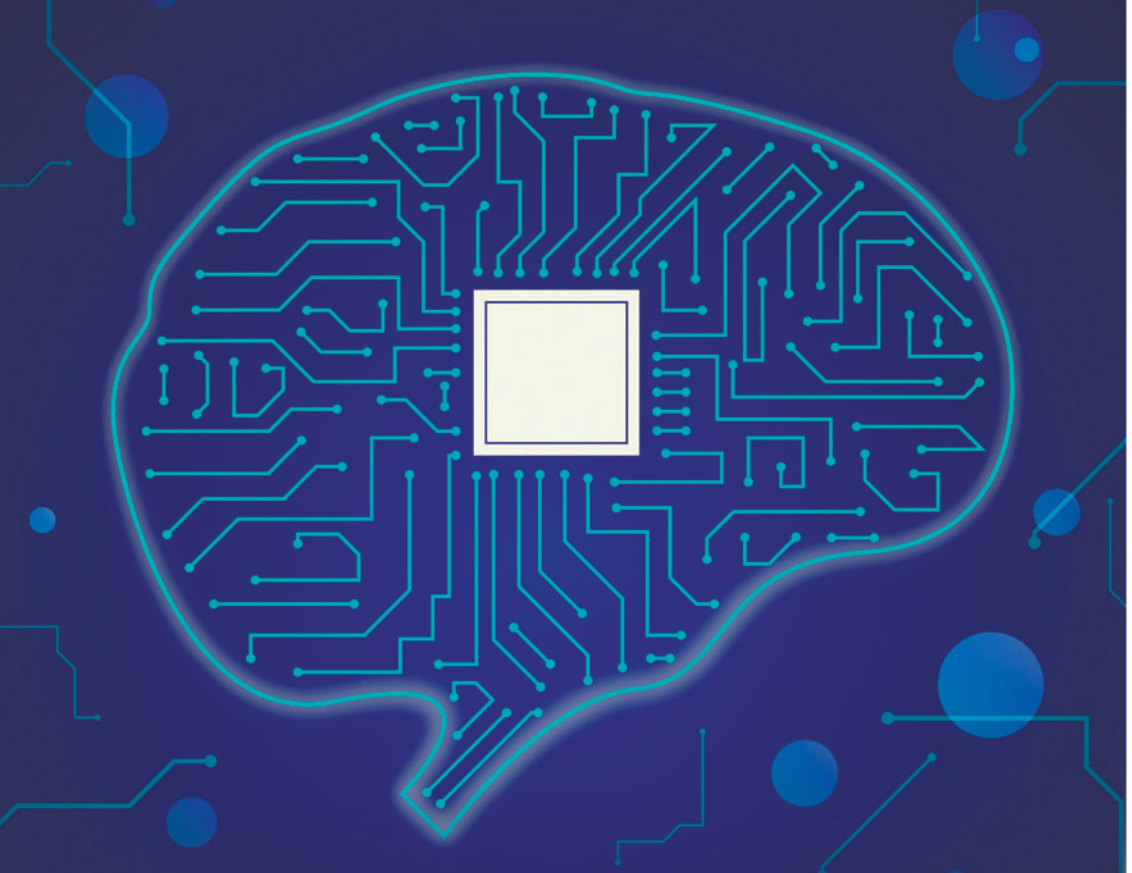
£2,000 + VAT

INCLUDING ACCOMMODATION AT OXFORD'S HISTORIC COLLEGES AND MEALS AT THE CELEBRATED DINING HALL!

SUCCESSFUL DELEGATES WILL OBTAIN THE **THALESIANS' CERTIFICATE IN AI AND ML**

OPEN AI-AT-OXFORD-2018.EVENTBRITE.COM
TO RESERVE YOUR PLACE TODAY!

	Day 1: Saturday, 1 September, 2018	Day 2: Sunday, 2 September, 2018	Day 3: Monday, 3 September, 2018	Day 4: Tuesday, 4 September, 2018
Location	Level39, Canary Wharf, London	Christ Church, Oxford	Christ Church, Oxford	Christ Church, Oxford
08:30 - 09:00		Registration and welcome	Registration and welcome	Registration and welcome
09:00 - 10:00		**Lecture 1:** Probability and statistics • Interpretation of probability—classical, frequentist, Bayesian, axiomatic • Statistical inference and estimation theory	**Lecture 1:** From statistics to supervised machine learning • Bias-variance tradeoff • Under- and overfitting	**Lecture 1:** Prediction from financial time series • Time series cross validation • Sequence classification • Diagnostics
10:00 - 10:30		**Tutorial 1:** Statistical inference and estimation theory	**Tutorial 1:** Demo of bias-variance tradeoff	**Tutorial 1:** Prediction from financial time series
10:30 - 11:00		Coffee break	Coffee break	Coffee break
11:00 - 12:00		**Lecture 2:** Linear regression • A geometric perspective • Interpreting the linear regression, multicollinearity	**Lecture 2:** Model and feature selection • Cross-validation • Bootstrap • Regularisation: shrinkage methods	**Lecture 2:** Recurrent Neural Networks • Autoregressive neural networks • Long-Short Term Memory networks • Semi-parametric neural networks for panel data
		Tutorial 2: Linear regression	**Tutorial 2:** Demo of model selection for market impact assessment	**Tutorial 2:** Recurrent Neural Networks
12:30 - 13:30	Registration and welcome	Lunch	Lunch	Lunch
13:30 - 14:30	**Lecture 0:** Introduction to data science and machine learning **Lecture 1:** An introduction to Python • Duck typing • Objects, functions as first-class citizens • Data structures (lists, dicts, sets)	**Lecture 3:** PCA and dimensionality reduction • The geometry of eigenvectors and eigenvalues, covariance and correlation matrices PCA and dimensionality reduction	**Lecture 3:** Classification methods • Logistic regression • Decision trees and random forests	**Lecture 3:** Applications of neural networks in finance • Algorithmic trading • High-frequency trading • Backtesting
14:30 - 15:00	**Tutorial 1:** An introduction to Python	**Tutorial 3:** Demo of PCA	**Tutorial 3:** Solving classification problems and feature selection by random forests	**Tutorial 3:** Applications of neural networks in finance
15:00 - 15:30	Coffee break	Coffee break	Coffee break	Coffee break
15:30 - 16:30	**Lecture 2:** Dealing with time series data, Pandas • Peculiarities of time series data • Pandas DataFrame • Visualisation	**Lecture 4:** Unsupervised machine learning • Anomaly detection • Clustering	**Lecture 4:** Deep learning • Optimisation, gradient descent • Inference with Neural Networks: the theory • Feed-forward neural networks and backpropagation	**Lecture 4:** Frontiers of machine learning • Perception-action cycles • Reinforcement learning
16:30 - 17:00	**Tutorial 2:** Dealing with time series data, Pandas	**Tutorial 4:** Demo of clustering analysis	**Tutorial 4:** Construction of NN and backpropagation algorithm	**Tutorial 4:** Frontiers of machine learning
17:00 - 18:00	**Entertainment:** A tour of Level39 and Canary Wharf	Lab	Lab	**Entertainment:** Graduation and leaving drinks
18:00 - 20:00	**Entertainment:** Dinner at the City University Club	**Entertainment:** A tour of Christ Church followed by dinner at the Dining Hall	**Entertainment:** A tour of Oxford followed by dinner at Eagle and Child, one of Oxford's historic pubs	



ABOUT THE COURSE

Your course has been designed **for practitioners by practitioners** with a mathematical and computational background. You will build a **solid theoretical foundation**, which is vital for understanding data science and machine learning.

The emphasis, however, is not on theory but on getting results in **practice**. As George Pólya put it, mathematics is not a spectator sport!

For this very reason, we use **active learning**. Practical exercises will be provided in unassessed tutorials, and **Jupyter-based laboratory sessions**.

THE THALESIANS' ARTIFICIAL INTELLIGENCE / MACHINE LEARNING COURSE

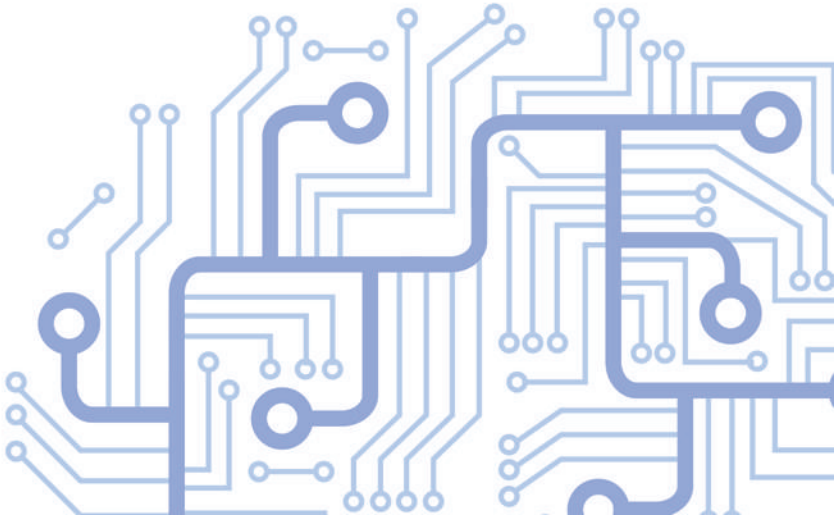
There are no formal prerequisites for the course, although some familiarity with **linear algebra**, **probability**, and **optimisation theory** is a plus. We will refresh your memory, should you need a refresher.

Should you wish to read up on AI/ML before starting the course, we recommend ***Intelligent Data Analysis*** by Berthold and Hand, ***The Elements of Statistical Learning: Data Mining, Inference, and Prediction*** by Hastie, Tibshirani, and Friedman, and ***Deep Learning*** by Goodfellow, Bengio, and Courville. Some of these books are freely available online.

The course begins with a review of **Python** programming, visualisation, and libraries.

We will review the **probability** and **statistics** needed for machine learning, examine **linear regression** methods as a basic example of a supervised machine learning technique, consider **dimensionality reduction**, unsupervised machine learning, **bias-variance tradeoff**, **model** and **feature selection**, **classification**, until focussing on **neural nets** and **deep learning** — the emphasis of this course.

Deep learning architectures such as **deep neural networks**, **deep belief networks** and **recurrent neural networks** have been applied to many fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design and board game programmes, where they have produced results **comparable** to and, in some cases, **superior** to human experts.



OUR VENUES & ACCOMMODATION
LEVEL39

Situated in the heart of Canary Wharf, Level39 is home to more than 200 startups, ranging from small operations to teams of 30-plus. It is the **biggest hub of fintech talent** in London and, possibly, in the world.

In addition to hosting The Thalesians, Level39 is home to BABB, Cuemacro, Draper&Dash, eToro, Maxeler, mongoDB, Revolut, Tesla, Upslide, and many other established and up-and-coming companies.

When you come to our events, we take you on a **tour of Level39** and introduce you to the **members of Level39, their co-founders and potential investors**.

Included in the price, non-Londoners can spend a night in one of Canary Wharf's hotels, close to Level39.

OUR VENUES & ACCOMMODATION
THE UNIVERSITY OF OXFORD

Our trainings take place at one of the constituent colleges of the University of Oxford, the **oldest university in the English-speaking world** and the world's second-oldest university in continuous operation. Teaching at Oxford goes back as far as 1096.

There are 38 constituent colleges at Oxford and a full range of academic departments organised into four divisions. Christ Church, or Ædes Christi in Latin, is a constituent college of the University of Oxford. It is colloquially known as The House. The college, especially its dining hall, have been **featured in the Harry Potter movies**.

Sixty-nine Nobel Prize winners, four Fields Medalists, and six Turing Award winners have studied, worked, or held visiting fellowships at the University of Oxford.

For all participants, accommodation on Oxford's campus will be provided. You join a **distinguished company of scholars** who lived in **these very rooms**: Lewis Carroll, Albert Einstein, William Ewart Gladstone, Robert Hooke, John Locke, Sir Robert Peel, and others.

PEOPLE SAY ABOUT US

Dr. Mauricio Alvarez-Manilla
Director at Mitsubishi UFJ Securities International, Front Office solutions

"...The workshop was intellectually stimulating. The learnings from the workshop will be usefull in my work. I especially liked the length of the material covered and the Python tutorials. Speakers have a good sense of humour, they present the material with entertaining background and historical data…"

Emre Ozcan
Director at Finstrategy

"...I really liked the choice of topics. I especially liked the theoretical foundations of machine learning. Speakers have explained the mathematical concepts of ML very well. I would definitely recommend attending the workshop to my colleagues and friends…"

Stefan Turalski
FX Software Developer at BNP Paribas

"...The instructors demonstrated breadth of knowledge and expertise and were keeping us engaged for the whole training. For me, the most valuable takeaway was the understanding of the link between maths and data science…"

Lorenzo Ravagli
Executive Director, Quant, Derivatives Strategist at J.P. Morgan

"...I liked especially the final part investigating neural networks. It was clear that the instructors are very knowledgeable on a vast variety of topics and know exactly what they are talking about. The speakers are very technical, with hands-on experience in complex modelling. They did a good job explaining complex concepts…"

Zuzana Roskova
Analyst at London Borough of Camden

"...Rotating between theoretical and practical parts, all questions were answered, the pace was excellent - not one bit was boring. Plus the venue and customer service was 5-star. I liked the personal approach and provided explanations to the questions…"

OUR TRAINING TEAM

Dr. Paul A. Bilokon

CEO and Founder of Thalesians Ltd. Previously served as Director and Head of global credit and core e-trading quants at Deutsche Bank, the **teams that he helped set up** with Jason Batt and Martin Zinkin. Having also worked at Morgan Stanley, Lehman Brothers, and Nomura, Paul **pioneered electronic trading in credit** with Rob Smith and Wiliam Osborn.

Paul has graduated from Christ Church, University of Oxford, with a **distinction and Best Overall Performance prize**. He has also graduated twice from Imperial College London.

Paul's lectures at Imperial College London in machine learning for MSc students in mathematics and finance and **his courses consistently achieve top rankings among the students**.

Paul has made **contributions to mathematical logic, domain theory, and stochastic filtering theory**, and, with Abbas Edalat, has published a prestigious LICS paper. Paul's books are being published by Wiley and Springer.

Dr. Bilokon is a Member of the British Computer Society, Institution of Engineering and Technology, and European Complex Systems Society.

Paul is a **frequent speaker at premier conferences** such as Global Derivatives/QuantMinds, WBS QuanTech, AI, and Quantitative Finance conferences, alphascope, LICS, and Domains.

Ivan Zhdankin

Quantitative researcher with experience in diverse areas of quantitative finance, including risk modelling, xVA, and electronic trading across asset classes. Ivan has consulted at many different banks in London, including JP Morgan, Citigroup, Jefferies, Nomura, HSBC, and BNP Paribas.

Ivan **has generated convincing results in electronic trading alpha with neural nets**. Ivan has **developed a trading platform for the cryptocurrency for electronic market making**.

Ivan is an author of several machine learning articles and appears regularly in QuantNews. Ivan regularly delivers guest lectures on artificial intelligence and machine learning at Imperial College and at Thalesians' seminars.

Ivan has graduated from New Economic School with a Masters degree in economics He has a solid mathematical background from Moscow State University, where he **studied under the celebrated Albert Shiryaev, one of the developers of modern probability theory**.

Ivan is an accomplished sportsman.

Prof. Matthew Dixon

Assistant Professor in the Applied Math Department at the Illinois Institute of Technology. **His research in computational methods for finance is funded by Intel**.

Matthew began his career in structured credit trading at Lehman Brothers in London before pursuing academics and consulting for financial institutions in quantitative trading and risk modeling.

He holds a Ph.D. in Applied Mathematics from Imperial College (2007) and has held postdoctoral and visiting professor appointments at Stanford University and UC Davis respectively.

He has published **over 20 peer reviewed publications on machine learning and financial modeling**, has been **cited in Bloomberg Markets and the Financial Times as an AI in fintech expert**.

Ed Silantyev

Hands-on data scientist with a **wealth of expertise in machine learning libraries, such as Keras and TensorFlow**.

Ed has also been a **cryptocurrency trader** for the last three years. During this time, he has **developed a software system that trades cryptocurrencies on several exchanges algorithmically**.

Ed's interests in quantitative modelling include alpha generation in cryptocurrencies.

He is also an **accomplished developer and system architect** in Java and Python, and holds advanced certifications from Oracle.

Ed has presented his work at top industry conferences, including WBS QuanTech and at Thalesian seminars.

THE THALESIAN ASSOCIATION

Founded on 11th March, 2009, The Thalesians have hosted more than **250 seminars and workshops around the globe**. Through the efforts of Attila Agod, Saeed Amen, Paul Bilokon, Matthew Dixon, Swati Mital, Pavel Motuzenko, Jan Novotny, Joerg Osterieder, Jochen Papenbrock, Hans-Peter Schrei, Peter Schwender, Harvey Stein, Richard Warnung, Adrian Zymolka and others, the Association has reached a truly global scale, counting over **3,000 members** in Budapest, Frankfurt, Lisbon, London, New York, Paris, and Prague.

The Thalesians' seminar speakers have included some of the **most famous names** in machine learning, electronic trading, quantitative finance, and more broadly, mathematics, computer science, engineering, finance, economics, and psychology.

We **trade, consult and educate**. We are looking for new collaborations and projects; feel free to reach out and discuss any ideas.

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