



Adam Mickiewicz University in Poznań

Doctoral School of Exact Sciences AMU

Machine Learning in Finance and Economics

dr Aleksandra Rutkowska

Scientific lectures, workshops

Field of science	Computer Science/Mathematics
Teaching method	Lectures
Language	English/Polish
Numbers of hours	20
Aims of the course	<ul style="list-style-type: none"> • understanding of key machine learning methods and algorithms used in finance and economics. • practical skills in using ML tools to analyze financial markets, manage risk and detect fraud. • ability to create predictive models and apply advanced techniques to make investment decisions
Course contents	<ul style="list-style-type: none"> • Basic concepts in finance and economics, a review of the elements of machine learning • Supervised techniques and their applications: forecasting share prices, inflation, etc. • The problem of unbalanced data: detecting anomalies in financial transactions • Unsupervised techniques Reinforcement learning: recommendation systems • Investment strategies: using AI to make investment decisions, algorithmic trading • Problem of interpretability of models: how to justify an economic decision
Prerequisites and co-requisites	Python programming, fundamentals of financial mathematics, linear algebra

Learning outcomes

On completion of the course PhD candidates will be able to:	Assessment mode
<ul style="list-style-type: none"> • know the practical aspects of various machine learning techniques specific to the analysis of financial markets, risk management, forecasting and the detection of financial anomalies and fraud • build a machine learning system to support economic decisions • explain and interpret the results 	E_W01 E_W02 E_U01 E_U02 E_U05

Literature	Dixon, M. F., Halperin, I., & Bilokon, P. (2020). <i>Machine learning in finance</i> (Vol. 1170). New York, NY, USA: Springer International Publishing.
-------------------	---

	<p>Capponi, A., & Lehalle, C. A. (Eds.). (2023). <i>Machine Learning and Data Sciences for Financial Markets: A Guide to Contemporary Practices</i>. Cambridge University Press.</p> <p>Moloi, T., & Marwala, T. (2020). <i>Artificial intelligence in economics and finance theories</i>. Berlin/Heidelberg, Germany: Springer.</p> <p>Kanungo, D. K. (2023). <i>Probabilistic Machine Learning for Finance and Investing</i>. " O'Reilly Media, Inc."</p>
Additional information	