TECHNISCHE HOCHSCHULE ASCHAFFENBURG
UNIVERSITY OF APPLIED SCIENCES

Faculty of Business Administration and Law

The Impact of A.I. on Business and Society	
Course number	2524
Lecturer	Prof. Dr. Wang-Nastansky
ECTS	6
Number of semester hours	4
Type	Elective
Duration	1 Term
Prerequisites	None
Type of exam	Research / Working paper and presentation
Objectives	Through the discourse of learning, discussion, and exercises in the seminar, students shall: • Gain fundamentals of established AI concepts as well as the state-of-the-art AI technologies for business. Students reach the level of AI understanding as a "grey box" instead of seeing it as a "blackhole" • Recognize strength and weakness of AI research and applications related to different countries/regions • Identify risks and ethical issues related to AI applications in business and society • Draw connections between business objectives and AI technologies in different management and business scenarios. For example: in supporting customer services and point-of-sale experiences, decision making in management, automation in manufacturing and logistics, etc. • Practice critical thinking based on AI-cases from a variety of multinational corporations and industries worldwide • Develop ideas of how to explore and use AI-concepts, AI-technologies, and AI-applications for a holistic AI strategic initiative in a business setting
Content	Overview and Introduction • Highlights of AI history and AI progression • Survey of current AI-approaches: Machine Learning, Neural Networks and Deep Learning, Integrative Methods – combining Deep Learning and Rule-based Systems • Continuum of machine intelligence systems in business applications: Systems that act, predict, learn, create, relate, master, evolve Current IT-developments and IT-innovations as enablers and enactors for applying AI in business • The Macro Picture: Big Data, Data Centers, worldwide Cloud Services • The Micro Picture: Computers and Processors – from CPU over GPU, ... to dedicated AI system architectures AI concepts and methods (selection) • Deep Learning: artificial neural networks - structure principles, layers, learning in forward phases and backpropagation, learning vs. incidence phases, scaling and mass data • Visual recognition • Speech recognition • GPT3, Transformer Models, Generative Models

	AI applications and case studies in business • Services and Management: online shopping, marketing, sentiment analysis, customer services, fraud prevention • Industry: manufacturing, automotive, supply chains, logistics, product design, robotics, preventive maintenance • Medicine: diagnosis, medication, gene processing • Integration of AI in business applications • AI environments and ecosystems AI and society • Education, politics, ethics, sustainability, automation, and jobs Future of AI • Successful integration in business strategies • From "narrow" AI to Artificial General Intelligence (AGI)
International applicability	This course presents samples of the current international landscape of AI research, development, and business adaptations, mainly in three world regions, China/Japan, EU, and North America. Moreover, via international case studies, students learn how to incorporate AI technologies, platforms, and tools in building up competitive advantages in different countries/regions.
Bibliography	The AI/AI environment is currently undergoing extraordinarily intensive and rapid developments. Against this background, the list of references given below shows representative sources (as of 2022). The lecturer will make the essential teaching and learning materials of the seminar available to the students in a digital environment for interactive use on their own PC or tablet. Mandatory readings • Wang-Nastansky, Pei: The Impact of A.I. on Business and Society. Digital interactive materials (AI-B&S PREZI). TH-AB. Aschaffenburg 2022 • Lee, Kai-Fu, and Chen, Qiufan: AI 2041: Ten Visions for Our Future. Publisher: Currency, Redfern Sydney 2021 (Kindle version available) (A WALL STREET JOURNAL, WASHINGTON POST, AND FINANCIAL TIMES BEST BOOK OF THE YEAR) Suggested readings • Yao, Mriya, Jia, Marlene, and Zhou, Adelyn: Applied Artificial Intelligence. A Handbook for Business Leaders. Topbots Inc. 2018. ISBN 978-0-9982890-5-2 (Kindle) https://appliedaibook.com/ • Benaich, Nathan, and Ian Hogarth: State of AI Report. October 12, 2021 PDF 188 pages. https://www.stateof.ai/ • Taulli, Tom, Artificial Intelligence Basics: A Non-Technical Introduction. Apress Berkeley, CA 2019 (https://link.springer.com/book/10.1007/978-1-4842-5028-0) • Lee, Kai-Fu: AI Superpowers - China, Silicon Valley, and the New World Order. Houghton Mifflin Harcourt, Boston - New York 2018 (Kindle Version available) • Heaton, Jeff: Artificial Intelligence for Humans, Vol. 3: Deep Learning and Neural Networks. Heaton Research Inc., St. Louis MO/USA, 2015 • MatLab: Deep Learning and Machine Learning - Libraries, Case Studies, Use Cases. Mathworks 2022 In-depth literature /classic • Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, http://www.deeplearningbook.org, 2016 • Hinton, G. E. (1989), Connectionist learning procedures. Artificial intelligence, 40(1), 185–234 • Murphy, Kevin P., Machine Learning: A Probabilistic Perspective. The MIT Press, Cambridge Massachusetts 2012 • Schmidhuber, Jʊrgen, Deep Learning: An Overview. The Swiss AI Lab IDSIA, 6928 Manno-Lugano Switzerland, 8 October 2014 • 7 Classic Books To Deepen Your Understanding of (Artificial)

	Intelligence: Gödel, Escher, Bach; Douglas Hofstadter 1979 – Marvin Minsky 1986 – Jeff Hawkins 2004 – Alan Turing; Andrew Hodges 1983 – Ray Kurzweil 2005 – Descartes; Antonio Damasio 1994 - Douglas Hofstadter and Daniel Dennett 1981 Source: Forbes 2019 https://www.forbes.com/sites/robtoews/2019/12/23/7-classic-books-to-deepen-your-understanding-of-artificial-intelligence/?sh=4a2c41881f6b4
Forms of instruction	Seminar Research / Working paper / Private study
Workload	Contact time: 60 h Self-study: 120 h Workload: 180 h
Language of instruction	English
Availability	Every winter term