

Opportunities and Challenges of Generative AI

ANNUAL CONFERENCE 2023 OF EFL – THE DATA SCIENCE INSTITUTE

efl – the Data Science Institute

November 15, 2023 at the Casino Building of the Goethe University Frankfurt

- 12:00 PRE-CONFERENCE WORKSHOP ON GENERATIVE AI
TechAcademy e.V.
- 14:00 REGISTRATION & COFFEE
- 14:30 WELCOME & INTRODUCTION TO GENERATIVE AI
Prof. Dr. Bernd Skiera, efl – the Data Science Institute
- 14:45 WELCOME & FUTURE PLANS OF DEUTSCHE BUNDESBANK WITH
GENERATIVE AI
Prof. Stefan Bender, Deutsche Bundesbank
- 14:55 AI IN FINANCE: OPPORTUNITIES AND CHALLENGES (IN GERMAN)
Dr. Andreas Totok, Finanz Informatik Solutions Plus
- 15:25 HARNESSING THE POWER OF LANGUAGE MODELS IN HIGHER
EDUCATION: TEACHING, RESEARCH, AND ADMINISTRATION
Prof. Dr. Frauke Kreuter, LMU Munich, University of Maryland
- 15:55 REFRESHMENT BREAK
- 16:25 CREATING SYNTHETIC EXPERTS WITH GENERATIVE AI
Prof. Dr. Daniel Ringel, University of North Carolina at Chapel Hill
- 16:55 PRIVACY IN GENERATIVE AI: A MYTH OR JUST HARD?
Prof. Dr. Ivan Habernal, Paderborn University, TU Darmstadt
- 17:25 REFRESHMENT BREAK
- 17:55 CHALLENGES OF GENERATIVE AI WHEN DEALING WITH BIG TECH
Prof. Dr. Thomas Höppner, Hausfeld
- 18:25 HARNESSING AI TO RESHAPE THE SUSTAINABILITY DATA LANDSCAPE
Prof. Dr. Gabriela Alves Werb, Deutsche Bundesbank
- 18:40 GENERATIVE AI ACTIVITIES OF THE EFL – THE DATA SCIENCE INSTITUTE
Prof. Dr. Oliver Hinz, efl – the Data Science Institute
- 19:00 GET TOGETHER



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WELCOME & INTRODUCTION TO GENERATIVE AI

Prof. Dr. Bernd Skiera

efl – the Data Science Institute, Goethe-University Frankfurt

This talk explains what Generative AI is, which role encoding and decoding models play and why Generative AI has been growing so rapidly. It also presents a project that provides automatic feedback to students' solutions of exercises.



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WELCOME & FUTURE PLANS OF DEUTSCHE BUNDESBANK WITH GENERATIVE AI

Prof. Dr. Stefan Bender

Head of Research Data and Service Center, Deutsche Bundesbank

This presentation will highlight two applications of Generative AI at Bundesbank. Stefan Bender will first outline the challenges empirical researchers and research data centers (RDCs) face in categorizing data from scholarly papers. Then, he will discuss using Large Language Models (LLMs), specifically GPT-3.5, to automate the identification and categorization of research data sources, offering a guide for future implementation at research institutions worldwide.

Additionally, the talk will discuss Bundesbank's high demand for generative solutions, primarily in text transformation tasks such as summaries, document searches, and text generation from specific data. The Bundesbank's SCAI team has developed a modular framework for Text-based Intelligent Assistants (TIA), aiming to enable all employees to use generative models in their work. This framework is set to integrate AI into tools that support daily tasks, moving beyond chat applications.



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AI IN FINANCE: OPPORTUNITIES AND CHALLENGES (IN GERMAN)

Dr. Andreas Totok

Finanz Informatik Solutions Plus

Artificial Intelligence (AI) is increasingly intersecting with the world of finance, introducing both exciting possibilities and complex challenges. While AI tools like ChatGPT captivate general audiences, the financial domain demands AI that prioritizes accuracy, security, transparency, and robust data protection. The shift towards embracing AI in finance seems to be a gradual evolution rather than a sudden upheaval.

To truly integrate AI into financial systems, a safe and rule-compliant environment is indispensable, particularly in banking contexts. Institutions such as the Sparkassen Finanzgruppe are exemplifying this balance. They're consolidating AI expertise and fine-tuning infrastructure to ensure that AI applications not only enhance financial operations but also align with regulatory requirements and safeguard data. The journey underscores the need for a tailored approach, blending technological prowess with industry-specific insights.



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HARNESSING THE POWER OF LANGUAGE MODELS IN HIGHER EDUCATION: TEACHING, RESEARCH, AND ADMINISTRATION

Prof. Dr. Frauke Kreuter

LMU Munich, University of Maryland

The fusion of Artificial Intelligence (AI) and Large Language Models (LLMs) is reshaping higher education's conventional methods. This transformation touches upon teaching, research, and administration. In teaching, the days of generic feedback are over. Today, AI and LLMs enable tailor-made critiques for students, making feedback more aligned with specific curriculums and enhancing the overall learning experience. Examples from the "Data Science for the Social Good Program" will illustrate this transformation.

In academic research, LLMs accelerate the writing process by assisting with draft structures and refining coding tasks. Moreover, administrative processes are seeing a shift with AI's inclusion. Tools like chatbots, when trained adequately, can streamline routine tasks, and when paired with secure cloud environments, they allow administrations to make data-informed decisions more efficiently. This talk delves into these pivotal changes, spotlighting the innovative ways AI and LLMs are being harnessed in academia.



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CREATING SYNTHETIC EXPERTS WITH GENERATIVE ARTIFICIAL INTELLIGENCE

Prof. Dr. Daniel Ringel

University of North Carolina at Chapel Hill

In the modern digital landscape, the challenge lies not just in gathering unstructured text, such as news articles and social media content, but in its effective analysis. Classification has become paramount in today's data-rich environment as firms increasingly depend on machine learning to distill intelligence from vast amounts of data. Modern classification models swiftly identify constructs of interest, such as sentiment or product categorizations, to inform research and managerial decision-making. Training an effective classification model requires many correctly labeled examples. While simple constructs can be labeled via crowdsourcing, more abstract constructs necessitate expert labelers — a scarce resource. Daniel Ringel shows how generative AI, specifically ChatGPT4, can replace domain experts for identifying complex constructs in text. To overcome ChatGPT4's proprietary nature, slow speed, high cost, and limited reproducibility, he approximates it with an open-source model that is fine-tuned on ChatGPT4's labels. The created Synthetic Expert is highly scalable, free from third-party constraints, and produces perfectly replicable results. He complements his Synthetic Expert with "Synthetic Twins" — an approach that mitigates data privacy and copyright issues in model deployment and data sharing.

To academic researchers, Synthetic Experts offer a streamlined model for deciphering unstructured data. Institutions and policymakers can more effectively harness their data assets and mitigate their dependence on third-party models while emphasizing data privacy. For marketing researchers, synthetic experts refine aggregate variables such as consumer sentiment, shedding light on the more intricate aspects of brand strategy.



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PRIVACY IN GENERATIVE AI: A MYTH OR JUST HARD?

Prof. Dr. Ivan Habernal

Paderborn University, TU Darmstadt

Generative AI, and large language models in particular, learn an incredible amount of information about language and our world. But sometimes they learn "too much", so that they tend to remember things we would like them to never learn in the first place — personal names, addresses of people, their credit card numbers, social security numbers, and so on.

Despite the efforts in the AI community to put privacy protecting methods in place, ranging from plain anonymization to formal differential privacy, we are far cry from calling it a success yet.

In this talk, I will highlight our recent efforts in this research direction and will try to address a broader question: Is protecting privacy in large language models and generative AI just a myth or maybe only very hard?



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CHALLENGES OF GENERATIVE AI WHEN DEALING WITH BIG TECH

Prof. Dr. Thomas Höppner

Competition Lawyer and Partner, Hausfeld

Several sections of the value chain for the provision and subsequent marketing of generative AI services are controlled by a few large digital companies. Such market concentration can quickly lead to unilateral dependencies and abuses thereof.

In particular, digital gatekeepers providing AI services can have strong incentives to exploit any business partners that cooperate with them at any level of the AI stack they control.

I will demonstrate which AI-related services are subject to high barriers to entry, which risks this poses for businesses dependent on such services, and what they may do, technically, strategically, and legally, to address such challenges.



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HARNESSING ARTIFICIAL INTELLIGENCE TO RESHAPE THE SUSTAINABILITY DATA LANDSCAPE

Prof. Dr. Gabriela Alves Werb

Deutsche Bundesbank, Frankfurt University of Applied Sciences

In assessing a firm's sustainability performance, stakeholders face the challenge of navigating information scattered across various sources — from annual reports to social media. These often combine text, tables, and visual charts in diverse formats. Particularly, many firm disclosures come in non-machine-readable PDFs, varying in layout and sequence.

This presentation discusses the growing need for high-quality sustainability information and the challenges in adopting a standard approach to leverage publicly available data sources. Furthermore, it showcases the role of computer vision and large language models (LLM) as game-changers to extract and process data from text, in-document tables, and graphs, transforming them into structured sustainability information for informed decisions.



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GENERATIVE AI ACTIVITIES OF THE EFL – THE DATA SCIENCE INSTITUTE

Prof. Dr. Oliver Hinz

efl – the Data Science Institute, Goethe University Frankfurt

Generative AI has hit research and business practice like a hammer with the advent of ChatGPT in November last year. Although many incremental and important developments have been made in this area during the last few years, Generative AI has become an omnipresent topic in media and our society with the proof-of-concept and hands-on example tool ChatGPT.

Oliver Hinz will conclude the conference with a short overview of activities at the efl –The Data Science Institute in the area of Generative AI and will present one study on the impact of Generative AI that illustrates the research capabilities of efl – the Data Science Institute.

