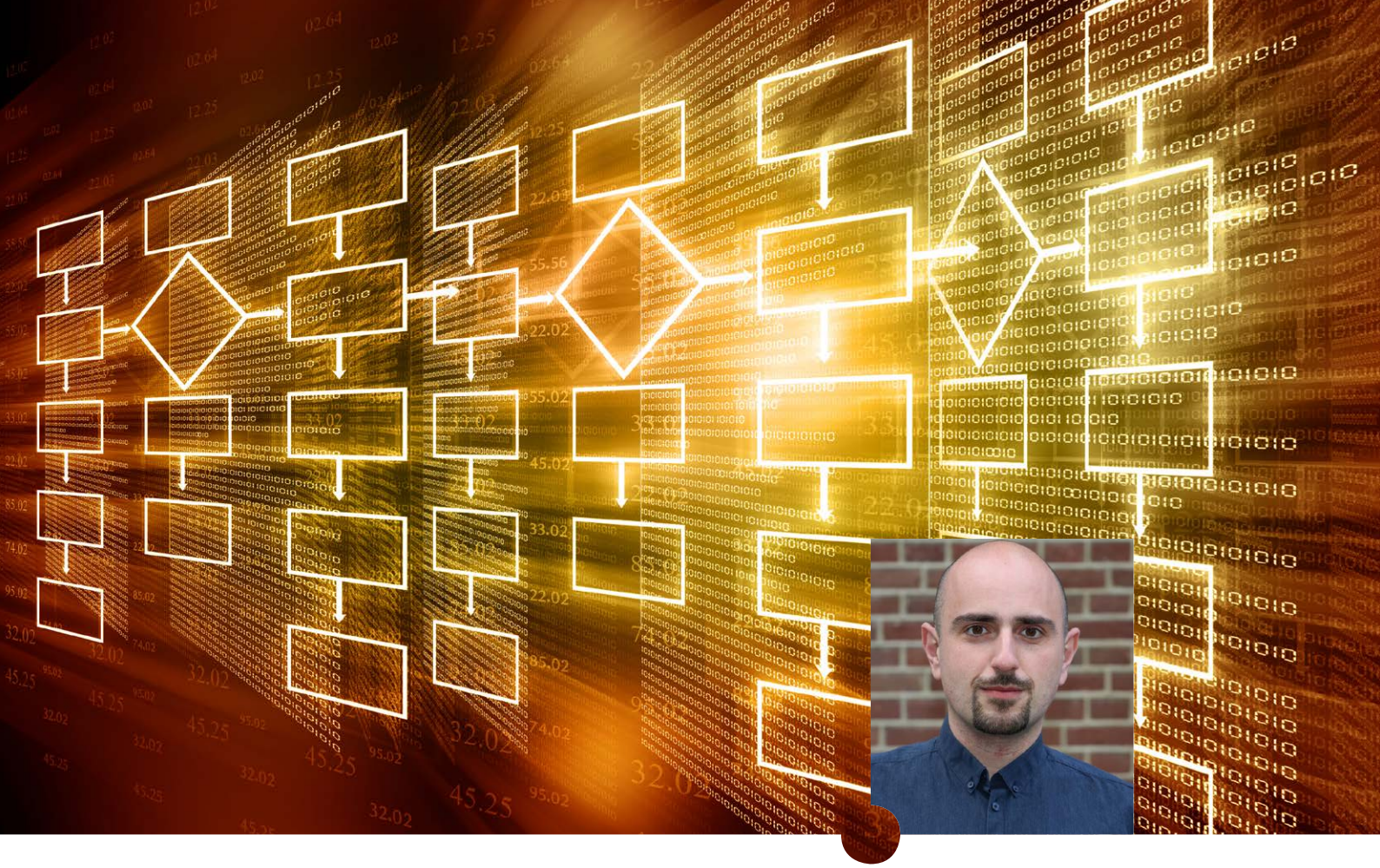

Transforming Data to Intelligence with Knowledge Graphs and Large Language Models

Empower Your Data Modeling and Analytics with AI-Driven Contextual Intelligence

Two day workshop by Panos Alexopoulos

///AdeptEvents

- **Decide whether a knowledge graph is a proper solution for your data challenges**
- **Design a knowledge graph's schema**
- **Apply state-of-the-art tools and methods to (semi-) automatically populate a knowledge graph**
- **Use LLMs to enhance all the steps of developing a knowledge graph**
- **Use knowledge graphs to ground LLMs and make them more accurate and reliable**

LANGUAGE
English

VENUE
Utrecht / Hilversum

TIME
9:00 – 17:00 hours

REGISTRATION
www.adeptevents.nl

Transforming Data to Intelligence with Knowledge Graphs and Large Language Models

Empower Your Data Modeling and Analytics with AI-Driven Contextual Intelligence

In today's data-driven world, the ability to extract meaningful insights from interconnected information is critical. Over the past decade, knowledge graphs have emerged as the foundational framework for managing complex networks of data, helping organizations connect entities and concepts to unlock deeper insights. For data modelers, BI analysts, and data scientists, knowledge graphs provide a structured approach to semantic data integration and enable better decision-making through connected data.

At the same time, Large Language Models (LLMs) like OpenAI's GPT have revolutionized natural language processing and AI-powered analytics. These models excel in understanding and generating human-like text, automating tasks such as language translation, text summarization, and even semantic search. As such, for data scientists and analysts, LLMs can be a powerful tool for advanced analytics, enabling better insights through their deep understanding of context and language.

When combined, knowledge graphs and LLMs can create a synergistic effect that improves the way data is modeled, analyzed, and utilized. This course will show you how to leverage knowledge graphs to enhance the accuracy, reliability, and explainability of LLM outputs, while also showing how LLMs can improve the schema design, knowledge acquisition, and quality control aspects of knowledge graphs. This 2-day course is designed to equip data professionals with the knowledge and practical skills needed to integrate Knowledge Graphs and Large Language Models (LLMs) into their data modeling and analytics workflows. Combining theory with hands-on practice, students will learn every essential step for launching and managing a knowledge graph development project, with practical guidance on leveraging LLMs effectively at each stage. They will also learn how to combine knowledge graphs within LLM-based applications to enhance the latter's performance and reliability.

TECHNOLOGIES AND TOOLS

In this course, we will explore a range of cutting-edge technologies and tools essential for working with knowledge

graphs and large language models. For knowledge graphs, we will focus on industry-standard frameworks such as RDF/OWL and querying with SPARQL, alongside practical tools like Protege for ontology development and GraphDB for graph storage and querying. Participants will also gain hands-on experience with Neo4j and Cypher. On the LLM side, we'll be leveraging OpenAI's GPT models, exploring how they can enhance the accuracy and usability of knowledge graphs. Finally, we will introduce Langchain, a robust framework designed to simplify the integration of language models with external data sources, making it easier to orchestrate complex workflows and automate processes.

Learning Objectives

- Decide whether a knowledge graph is a proper solution for your data challenges, and specify its desired characteristics.
- Understand the key factors determining the feasibility and viability of implementing a knowledge graph in an organization, and craft a proper development strategy
- Design a knowledge graph's schema in a way that makes the rest of its development much easier
- Apply state-of-the-art tools and methods to (semi-) automatically populate a knowledge graph from diverse data sources.
- Implement mechanisms to assess and improve the quality of a knowledge graph.
- Design and implement a knowledge graph evolution and governance strategy.
- Use LLMs to enhance all the steps of developing a knowledge graph
- Use knowledge graphs to ground LLMs and make them more accurate and reliable

Who is it for?

- Data Modelers: Professionals focused on designing and building data structures who want to leverage cutting-edge AI for more dynamic and context-aware data modeling.
- Business Intelligence Analysts: Analysts seeking to enhance their ability to interpret and complex data by incorporating semantic relationships and AI-driven insights.
- Data Scientists: Practitioners looking to integrate knowledge graphs and language models into their workflows to improve predictive analytics and decision-making.
- Enterprise Data Professionals: Those working in enterprise environments who want to stay ahead by integrating the latest AI tools to solve complex organizational challenges.
- Technology Leaders: Architects, CTOs , and IT professionals exploring or leading initiatives involving data integration, semantic technologies, and generative AI.

PANOS ALEXOPOULOS

Panos Alexopoulos has been working since 2006 at the intersection of data, semantics and software, contributing in building intelligent systems that deliver value to business and society. Born and raised in Athens, Greece, he currently works as Head of Ontology at Textkernel BV, in Amsterdam, Netherlands, leading a team of data professionals in developing and delivering a large cross-lingual Knowledge Graph in the HR and Recruitment domain. In addition, he is develops and delivers training workshops for practitioners in the fields of Data Semantics, Natural Language Processing, and Artificial Intelligence.
Panos has published several papers at international conferences, journals and books, and he is a regular speaker in both academic and industry venues, striving to bridge the gap between academia and industry so that they can benefit from each other. He is also the author of the O'Reilly book "Semantic Modeling for Data – Avoiding Pitfalls and Dilemmas", a practical and pragmatic field guide for data practitioners that want to learn how semantic data modeling is applied in the real world.

Detailed Course Outline

THE COURSE CONSISTS OF 5 MODULES:

Module 1: Understanding knowledge graphs and their relation with large language models

- What are knowledge graphs and why we build them
- Key factors influencing the ease or difficulty of building a knowledge graph
- Large Language Models (LLMs) and their interplay with knowledge graphs
- Knowledge graph development lifecycle
- How to craft a knowledge graph development strategy
- Group Activity: Explore 5 key questions that are essential to answer before initiating knowledge graph development

Module 2 – Designing the knowledge graph schema

- Building elements of a knowledge graph
- Eliciting schema requirements through competency questions
- Group Exercise: Derive knowledge graph competency questions for a business process scenario
- Knowledge graph schema design using Semantic Web languages (RDF, OWL) and Labeled Property Graphs (Neo4j).
- Conceptual modeling best practices, dilemmas, and pitfalls
- Using LLMs in schema design: what works and what doesn't

- Group Exercise: Design a knowledge graph schema for a given set of competency questions

Module 3: Populating the knowledge graph

- Understanding and defining knowledge graph population tasks
- Evaluating and selecting data sources and population tools
- Designing population strategies and pipelines.
- LLMs as knowledge providers and knowledge miners - what works and what doesn't
- Hands-on exercise: Mining entity relations from texts with LLMs

Module 4: Applying knowledge graphs

- Typical knowledge graph applications
- Entity linking and disambiguation
- Using knowledge graphs to ground Large Language Models
- Hands-on exercise: Building a question answering system over knowledge graphs.

Module 5 – Managing knowledge graph quality:

- Knowledge graph quality dimensions, metrics, and trade-offs.
- Typical quality problems and debugging methods
- Detecting and correcting quality problems in knowledge graphs
- Hands-on exercise: Automatically debugging a knowledge graph
- Addressing dilemmas of knowledge graph maintenance and evolution
- Crafting a knowledge graph evolution strategy.

Information

DATE AND TIME

The workshop will take place once or twice a year with the exact date and time available on our website. The programme starts at 9:30 am and ends at 5:00 pm on both days. Registration commences at 8:30 am and we recommend that you arrive early.

VENUE

Adept Events works with several venues in and near Amersfoort and Utrecht. We strive to provide you with the location details as soon as possible. The exact venue will be on our website and in the confirmation e-mail that you will receive one week prior to the event. Always check our website prior to your departure to ensure you have the exact location and directions.

HOW TO REGISTER

Please register online at **www.adeptevents.nl**. For registering by print, please scan the completed registration form and send this or your Purchase Order to **seminars@adeptevents.nl**. We will confirm your registration and invoice your company by e-mail therefore please do not omit your e-mail address when registering.
In completing your registration form you declare that you agree with our **Terms and Conditions**.

REGISTRATION FEE & DISCOUNTS

Please find the registration fee and Early Bird discount terms **on this page** on our website. Discounts are also available for group bookings of two or more delegates representing the same organization made at the same time. Ten percent off for the second and third delegate and fifteen percent off for all delegates when registering four or more delegates (all delegates must be listed on the same invoice).
This cannot be used in conjunction with other discounts.

All prices are VAT excluded.

PAYMENT

Full payment is due prior to the workshop. An invoice will be sent to you containing our full bank details including BIC and IBAN. Your payment should always include the invoice number as well as the name of your company and the delegate name.

Payment by credit card is also available. Please mention this in the Comment-field upon registration and find further instructions for credit card payment on our **customer service page**.

Cancellation Policy

Cancellations must be received in writing at least three weeks before the commencement of the workshop and will be subject to a € 75,- administration fee. It is regretted that cancellations received within three weeks of the workshop date will be liable for the full workshop fee. Substitutions can be made at any time and at no extra charge.

Cancellation Liability
In the unlikely event of cancellation of the workshop for any reason, Adept Events' liability is limited to the return of the registration fee only. Adept Events will not reimburse delegates for any travel or hotel cancellation fees or penalties. It may be necessary, for reasons beyond the control of Adept Events, to change the content, timings, speakers, date and venue of the workshop.

MORE INFORMATION

+31 (0)172 742680

adeptevents.nl/kgl-en

seminars@adeptevents.nl

X.com/AdeptEventsNL

linkedin.com/company/adept-events

facebook.com/AdeptEventsNL

Visit our Business Intelligence and Data Warehousing website **biplatform.nl** and download the App

Visit our website on Software Engineering, **release.nl** and download the App

IN-HOUSE TRAINING

Would you like to run this course in-company for a group of persons? We can provide a quote for running an in-house course, if you offer the following details. Estimated number of delegates, location (town, country), number of days required (if different from the public course) and the preferred date/period (month). Please find more info on the **In-house page on our website**.