

Software Engineering for AI-Based Systems

advanced master seminar for 6 to 12 people

Why SE for AI?

Research and practice for artificial intelligence (AI) / machine learning (ML) on the one hand and software engineering (SE) on the other hand are somewhat detached. Very few people excel in both domains, since the two fields have different focus points:

AI/ML focuses on:	SE focuses on:
<ul style="list-style-type: none">• Data and algorithms (models)• Accuracy (precision & recall)• Small incremental improvements• Exploratory data science• Notebooks (e.g. Jupyter, Rmarkdown)	<ul style="list-style-type: none">• Clear requirements specification• Numerous software qualities• Quality assurance, testing• More structured processes• Software architecture & design

Both perspectives are necessary for AI software, but the SE side is essential for a successful production system, especially at Internet-scale. While many parts of AI-based systems are “traditional” software, the properties of AI models may also require new or at least adapted SE practices. This seminar aims to introduce the general SE4AI topic and to dive deeper into selected SE activities and how they are influenced by adding AI functionality. No AI background is required.

Potential Subject Areas

- ★ AI and SE basics
- ★ Requirements engineering for AI-based systems
- ★ Development process models for AI-based systems
- ★ Testing AI-based systems
- ★ Software quality of AI-based systems (including new QAs like fairness or explainability)
- ★ Infrastructure and operations of AI-based systems (MLOps)
- ★ Tool support and AI frameworks
- ★ SE4AI in scientific publishing
- ★ ...

Procedure of the Seminar

Listed topics will be distributed among participants at the beginning, whereby everyone will be able to set their own focus and determine the specific question to be investigated (together with the supervisor). Each participant then writes a scientific paper to answer his or her question and gives a presentation at the end.

We are looking forward to your application!

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