

Universität Stuttgart

Institut für Steuerungstechnik
der Werkzeugmaschinen und
Fertigungseinrichtungen

Jun.-Prof. Dr. rer. nat. Andreas Wortmann

andreas.wortmann@isw.uni-stuttgart.de

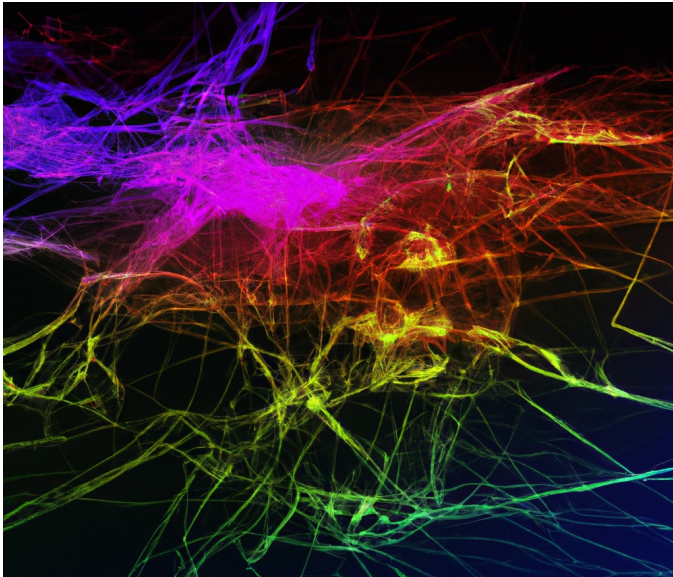
ISW • Seidenstr. 36 • 70174 Stuttgart

Bachelor / Master
Theses

Artificial Intelligence for Software Engineering (AI4SE)

Background

In the future, AI will transform software engineering through automation and optimization. Advanced AI models, such as GPT-4, can be used to create or understand complex source codes to reduce the manual labor required for coding and debugging, to automatically detect and fix bugs, and much more. AI will also play a critical role in understanding user behavior, thereby informing the design of more intuitive and user-friendly software interfaces. The marriage of AI and software engineering has the potential to not only drastically increase productivity, but also to fundamentally redefine what it means to engineer software.



Challenge

In the context of this thesis, methods and solutions are to be developed to transfer the latest findings from artificial intelligence into software tools that support developers in creating more efficient, better software. This ranges from better understanding requirements, to automatically improving designs and code, to optimizing deployments and operations of software.

Task

- Familiarization with selected methods of AI
- Analysis of their applicability to software engineering processes
- Development of tools to improve software engineering with selected methods
- Planning and execution of evaluation in real-world contexts

Requirements

- Ongoing studies in computer science, information systems, software engineering, or similar
- Understanding the basics of AI and software engineering
- Experience in object-oriented programming with Python, Java, C#, ...
- Independent working style
- Passion for development of complex applications
- Fluency in English

Knowledge Gain

- State-of-the-Art AI techniques
- Insights into automating software engineering
- Application to interesting domains
- Developing and deploying research software
- Methods of software evaluation
- Scientific writing

