Universität Stuttgart

Institut für Steuerungstechnik
der Werkzeugmaschinen und
Fertigungseinrichtungen

Master

Theses

Extensible Agent-Based Software Frameworks

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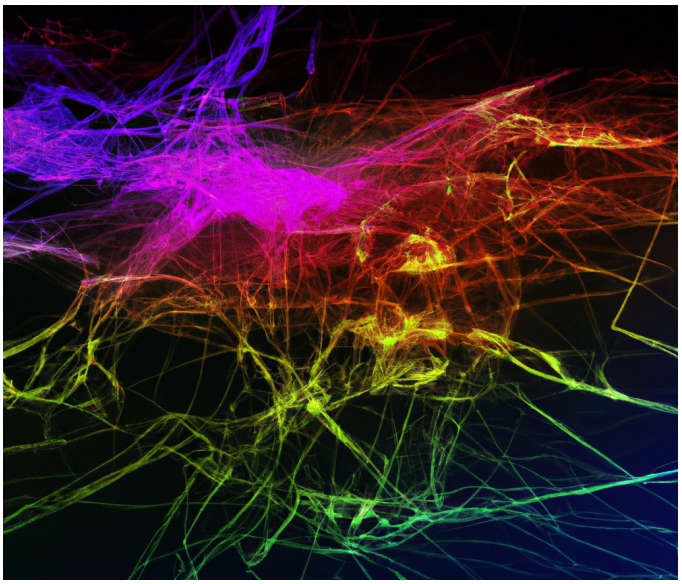
Background

Agents are appearing everywhere to support various kinds of digital activities. These range from retrieving information, to producing software, to conducting research. There are various patterns (e.g., regarding communication, memory) and technology stacks to realize such agent-based systems. Most of these systems constructed ad-hoc with little regard for systematic extensibility and reuse. This prevents their adoption in contexts, which are long-living (such industrial applications).



Challenge

In the context of this thesis, methods and solutions are to be conceived for a systematic engineering of extensible agent-based software solutions. This includes investigating their state-of-the-art, identifying requirements for †their extensibility, devise a reference architecture, and systematic methods to instantiate and extend it. Ideally, the extensibility of the resulting framework shall be evaluated empirically.

Task

- Familiarization with selected methods of agent-based AI
- Systematic analysis of their extensibility
- Development of a reference architecture for this kind of systems
- Devising a method for its instantiation and extension
- 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

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