Controlling Web Applications with Chat Interfaces

LLMs like ChatGPT, LLama2, and Mistral are getting more and more powerful. They are highly capable in various NLP Tasks, including Summarization, Translation, Rephrasing, Question Answering, and many more. Most importantly, they are very accessible by offering a chat interface to solve users' tasks.
In this thesis, you will integrate a chat interface into an existing web application in order to offer a natural language-based interface, in addition to the existing traditional web user interface. Through the chat interface, users shall be able to perform the same actions as with the existing UI.
This task raises two interesting research questions. In web applications, most actions that can be performed by a user are implemented by calling various API routes offered by the backend or 3rd-party services. Thus, an LLM needs to understand how to map the action as described by the user to the corresponding API route.

RQ1: How can we teach an LLM to understand and use APIs?

Further, the action described and requested by the user is most probably dependent on the current state of the application. Requests may have different meanings when e.g. browsing YouTube vs. watching a video on YouTube. Thus, an LLM needs to be aware of and understand the current context of the user.

RQ2: How can we teach an LLM about the context of a web application?

In particular, you will be working with the Discourse Analysis Tool Suite, an open-source web application developed by the Language Technology group to perform qualitative data analysis. The application offers various features, including searching for documents, tagging documents with categories, adding metadata to documents, and highlighting/annotating text passages in a document, …

Consequently, the tasks of this thesis may include:

- Research on LLMs and API usage
- Research on LLMs and understanding the current context of a web application
- Development of a prototypical system
- Evaluation of the prototype, e.g. with a user study

Please note, this is just a very rough outline to give you an idea. It may change during the course of the thesis and we can discuss both details and scope.

This topic is only suitable for a Master's thesis. The following skills are highly beneficial for this work.

- Python
- Javascript
- Linux CLI
- Experience with NLP, ML
- Experience with developing full-stack web applications

If you are interested in this topic, please contact Tim Fischer (tim.fischer@uni-hamburg.de).