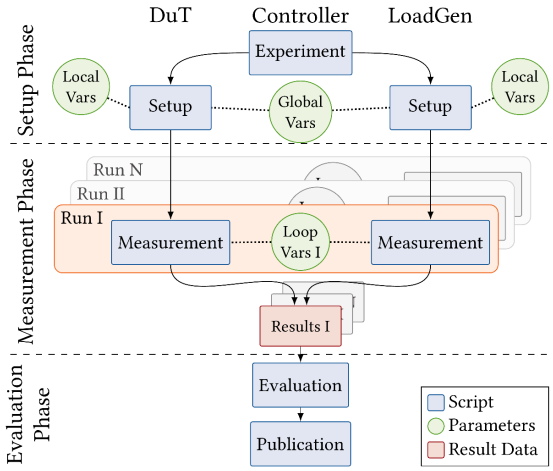
Chair of Network Architectures and Services
School of Computation, Information, and Technology
Technical University of Munich

Thesis B.Sc. Thesis M.Sc. IDP

pos + GPT-4: A Natural Language Interface to Reproducible Testbed Experiments

Motivation

The plain orchestrating service (pos) [1] is a testbed orchestration framework developed at the Chair of Network Architectures and Services. It allows users to create automated, distributed, and reproducible experiments, which is a crucial aspect for scientific research.
By providing a simple command line interface (CLI), pos facilitates the process of designing and conducting experiments. However, many parts of setting up such an experiment still require high expertise, like knowledge about the Linux command line, tools to use for a certain measurement, the capabilities of the available testbed, and also about the pos CLI itself.



The pos workflow.

Large language models (LLMs) like GPT-4 by OpenAI [2] are able to understand and generate natural language, and they can also perform tasks like code generation. When trained with knowledge about pos and the available testbed, they could be used to provide an interface to pos for users that lack the above mentioned expertise and enable them to perform reproducible experiments.

Your Task

- Familiarize yourself with pos, our testbed, and GPT-4
- Identify relevant knowledge the LLM needs to be trained with
- Train GPT-4 and enable it to perform pos experiments on our testbed
- Evaluate the results of experiments conducted using the GPT-4 interface and compare them to manually designed pos experiments

References

- [1] Sebastian Gallenmüller*, Dominik Scholz*, Henning Stubbe, Georg Carle, "The pos Framework: A Methodology and Toolchain for Reproducible Network Experiments", in The 17th International Conference on emerging Networking EXperiments and Technologies (CoNEXT '21), Munich, Germany (Virtual Event), Dec. 2021, https://dl.acm.org/doi/10.1145/3485983.3494841.
- [2] https://openai.com/gpt-4

Contact

Johannes Späth spaethj@net.in.tum.de
Sebastian Gallenmüller gallenmu@net.in.tum.de

https://go.tum.de/971327