



Student Assistant for the LLM-based Assembly Code Transfer

Large Language Models (LLMs), such as GPT, have demonstrated impressive capabilities in generating code for high-level programming languages. Recent research is now exploring the potential of LLMs in **low-level code generation and transfer**, particularly for assembly languages that are closer to hardware architecture. One of the most critical applications of this technology lies in transferring assembly code between different architectures—such as **x86 to RISC-V**—which involves translating low-level instructions designed for one architecture into equivalent instructions for another.

The x86 architecture has been the dominant instruction set for desktop and server processors for decades, while RISC-V is an emerging open-source instruction set architecture gaining widespread attention due to its simplicity, flexibility, and suitability for modern applications. Automating the transfer of assembly code between these architectures using LLMs could significantly reduce the complexity and time required for cross-platform software development, while also opening the door to more efficient system-level programming.

We seek excellent student assistants motivated to be part of ongoing research in these areas and investigate the application of Large Language Model-based Assembly Code Transfer. As a student assistant, you will gain hands-on experience with LLMs, assembly languages, and cross-platform code translation, providing valuable skills in AI-driven software engineering and system-level programming.

Your tasks include:

- Training and Fine-Tuning LLMs for Assembly Code Transfer.
- Cross-Architecture Assembly Code Comparison and Evaluation.
- Experimental Design and Performance Benchmarking.

Prerequisites

- Strong understanding of deep learning and generative AI.
- Prior experience with Deep Learning frameworks such as Pytorch or Tensorflow
- Prior knowledge with computer architecture and low-level hardware language (recommended)
- Ability to work independently and strong motivation
- Ability to collaborate effectively in a team

Contact

If you are intrigued by this cutting-edge subject, please get in touch with Dr. Lichao Wu and Mr. Mohamadreza Rostami at info@trust.tu-darmstadt.de to obtain further information. To facilitate the process, kindly include a summary of your academic background and a copy of your transcripts.