THOMAS MORE

Martin Zhelyazkov
Student Bachelor Applied Computer Science

2025 – 2026

# Table of contents

1. Inleiding 3

2. Inhoudelijke reflectie 4

3. Persoonlijke reflectie 5

# 1. Introduction

This reflection document describes my internship at Thomas Bata University in Zlin, Czech Republic. It reflects on the work I carried out, the challenges I faced, and the knowledge and experience I gained during the internship.

The internship focused on comparing different self-evolving algorithm design frameworks. More specifically, I investigated how the locally developed framework EASE performs in comparison with LLM4AD and LLAMEA, two frameworks developed by larger research teams and supported by more resources.

This document is divided into two main sections. The first section contains a substantive reflection on the project, including what was accomplished, what the results can mean for the university, and what could still be improved in the future. The second section focuses on my personal development, including the challenges I encountered, the skills I strengthened, and the lessons I will take with me into future projects.

# 2. Substantive reflection

During my internship at Thomas Bata University in Zlin, Czech Republic, I was tasked with comparing the locally developed framework EASE with two other self-evolving algorithm design frameworks: LLM4AD, developed in China, and LLAMEA, developed in Leiden in the Netherlands. The purpose of this comparison was to understand how EASE performs in practice when it is evaluated next to frameworks that were created by larger teams and with more available resources. This made the assignment interesting, because it was not only a technical comparison, but also a way to see whether a smaller, university-driven project could compete with more established alternatives.

A large part of my work consisted of researching the frameworks, understanding how they were meant to run, and finding a way to make the comparison fair. One of the main difficulties was that this exact comparison had not been done before, or at least not in a way that was publicly available. This meant that there was no clear guide I could follow when I got stuck. I first spent several weeks studying the available documentation, reading about the frameworks, and thinking about possible approaches for testing them. After this research phase, I started building the code needed to run the frameworks and collect results. I also used AI tools to help me understand unfamiliar code, debug problems, and speed up the development process, but the main decisions about the setup and interpretation still had to be made carefully.

The technical setup was the most challenging part of the project. At first, one of the frameworks did not run correctly on the machine I was using. After that, I had problems connecting to the Ollama server hosted on the university network while I was waiting for Claude or OpenAI tokens that I could use. The server was not configured for the network I needed, which made the setup more complicated than expected. Later, I discovered that the AI model hosted over the network was rejecting prompts from frameworks other than EASE. After investigating this issue, I found out that the other frameworks were configured incorrectly. I also had trouble running EASE because of an authentication error, since I originally thought I needed to log in through the frontend to be authorized. This issue became much easier to solve after the EASE developers explained that I could access the required endpoints directly through the backend of the application.

Another important limitation was the set of tests I could run. I initially wanted to run six different tests, but in the end I only managed to run three of them. The main reason was that only EASE supported all the tests I had planned, such as the 2048 game benchmark, programming-related tasks, and mathematical optimisation problems. This limitation affected the final comparison, because the results could not cover every scenario I originally wanted to investigate. However, it also provided useful information for the university. It showed that EASE has support for a broader range of benchmark tasks in some areas, while the other frameworks required more adaptation before they could be compared in the same way.

After the main technical issues were solved, I let the frameworks run for about a week so that enough data could be collected for analysis. The result of my work was a working comparison setup and a clearer view of the practical differences between EASE, LLM4AD, and LLAMEA. For the university, this is useful because it gives the developers of EASE a starting point for understanding where their framework is already strong and where it still needs improvement. It also provides evidence that can support future development, research papers, and decisions about which features should be prioritized.

The project is not completely finished yet. The most important next step would be to extend the benchmark set and make the comparison more complete. More tests should be added, and the frameworks should be configured in a more standardized way so that the results are even more reliable. I would also recommend improving the documentation of EASE and making the backend access and authentication process clearer for future students or researchers. If the setup is easier to reproduce, the university can continue building on this work instead of spending time solving the same technical problems again. My advice for the future is to keep expanding EASE with compatibility in mind, so that it can be tested more easily against other frameworks and used in broader research contexts.

# 3. Personal reflection

This internship was one of the most valuable experiences for my professional career so far. It gave me a better understanding of how research institutions work, how real-life technical projects are developed, and how practical development work can later become part of a research paper. Before this internship, I mostly saw projects from a student perspective, where the goal is usually to complete an assignment and make the result work. During the internship, I experienced a different environment, where the goal was not only to build something, but also to understand it, compare it, document it, and produce results that could be useful for other people.

I learned a lot about working independently. Because the topic was new and there was not much public information available, I often had to solve problems without a clear example to follow. This forced me to become more patient and structured in the way I work. Instead of immediately trying random solutions, I learned to investigate the problem, check the configuration, test one thing at a time, and document what changed. This helped me improve my problem-solving skills and made me more confident when working with unfamiliar systems.

On a technical level, I improved my understanding of AI-assisted development, framework configuration, backend access, API endpoints, authentication issues, and the process of setting up experiments for comparison. I also gained more experience with debugging, reading other people's code, and using AI tools in a responsible way. I realized that AI can be very helpful when exploring possible solutions, but it does not replace the need to understand the project myself. In many cases, the AI could suggest ideas, but I still had to decide which suggestions made sense and test whether they worked in the specific environment of the university.

The internship also helped me grow personally. Moving to a new country, meeting new people, and adapting to the culture of the Czech Republic was an important part of the experience. At the beginning, everything was new: the city, the university, the people, and the way of working. Over time, I became more comfortable and learned to communicate better with the people around me. I made friends and connections that I believe will be valuable for both my professional and personal life. This made the internship more than only a technical assignment; it also became a life experience.

I faced several problems that were not only technical. One challenge was dealing with uncertainty. There were moments when I was stuck for a long time and did not know whether the issue was caused by my code, the framework, the network, or the server configuration. This could be frustrating, especially because progress was sometimes slower than I expected. I addressed this by asking for help when necessary, communicating with the EASE developers, and breaking large problems into smaller parts. Another challenge was managing my own expectations. I wanted to complete all six planned tests, but I had to accept that some things were not possible within the time and technical limitations of the internship.

Overall, this internship helped me become more independent, more confident, and more realistic as a future IT professional. I learned that real projects are rarely perfectly structured from the beginning, and that a big part of professional work is finding a way forward even when the path is unclear. The experience confirmed that I enjoy working on technical research-related projects, especially when they combine programming, AI, and analysis. I will take the lessons from this internship with me into future studies, projects, and professional opportunities.