

## I. IDENTIFICATION DATA

<b>Thesis name:</b>	Optimizing LLM-Powered Agents for Tabular Data Analytics: Integrating LoRA for Enhanced Quality
<b>Author's name:</b>	<b>Mikhail Poludin</b>
<b>Type of thesis:</b>	master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Computer Science
<b>Thesis supervisor:</b>	Ing. Jan Šedivý, CSc.
<b>Supervisor's department:</b>	CIIRC

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>extraordinarily challenging</b>
<i>Evaluation of thesis difficulty of assignment.</i>	
<p>The thesis is focusing on the latest development in the field of AI. The study specifically reviews generative Large Language Models (LLMs) with an ability to generate Python code for analytical tasks. The goal was to select the most suitable LLM and fine-tune it for a specific tabular data analytics task. The suggested algorithm was the LoRA (Leveraging Pre-trained Representations for Domain Adaptation) or QLoRA fine-tuning techniques to enhance accuracy.</p>	

<b>Satisfaction of assignment</b>	<b>fulfilled</b>
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
<p>The student has delivered a comprehensive study of the task at hand. He reviewed a significant amount of literature and summarized it in the initial sections of the thesis. He then tested several large language models (LLMs), selecting the most promising ones to apply the LoRA algorithms. All training and experiments are documented in detail in the results section.</p>	

<b>Activity and independence when creating final thesis</b>	<b>A - excellent.</b>
<i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i>	
<p>Mikhail had a very positive and enthusiastic approach. We met weekly to discuss further steps and potential problems. Our discussions were always fast-paced and on topic, as Mikhail consistently came well-prepared with numerous new suggestions. During the preparation of the thesis, he worked very independently.</p>	

<b>Technical level</b>	<b>A - excellent.</b>
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
<p>The development of large language models (LLMs) for generating Python code is one of the latest trends in AI. Solving this problem required learning many new technologies that are not part of the regular curriculum. Mikhail proved to be very quick in grasping even the finest details from the literature. He also demonstrated significant skill in using cloud GPU-equipped infrastructure to run experiments, and he effectively utilized many open-source code bases.</p>	

<b>Formal and language level, scope of thesis</b>	<b>A - excellent.</b>
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
<p>The thesis is written with attention to every important detail. It is aesthetically pleasing and uses the recommended LaTeX template. It is written in clear and understandable English, conforming to standard notations and other formal requirements.</p>	

<b>Selection of sources, citation correctness</b>	<b>A - excellent.</b>
---	-----------------------

*Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.*

Mikhail meticulously collected and studied a vast array of internet and literature resources. Through this ongoing process, he was steadily discovering the field's newest and most sophisticated papers. Notably, he maintained deep attention to detail, ensuring all statements were properly referenced in accordance with ethical citation practices. His citations adhere to the standard format.

### **Additional commentary and evaluation**

*Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.*

### **III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION**

*Summarize thesis aspects that swayed your final evaluation.*

Mikhail's thesis is a significant contribution to the field. It provides a comprehensive overview of the current state of the art, enriched by the inclusion of numerous, well-documented experimental results. Congratulations!!

I evaluate handed thesis with classification grade **A - excellent**.

Date: **31.5.2024**

Signature: