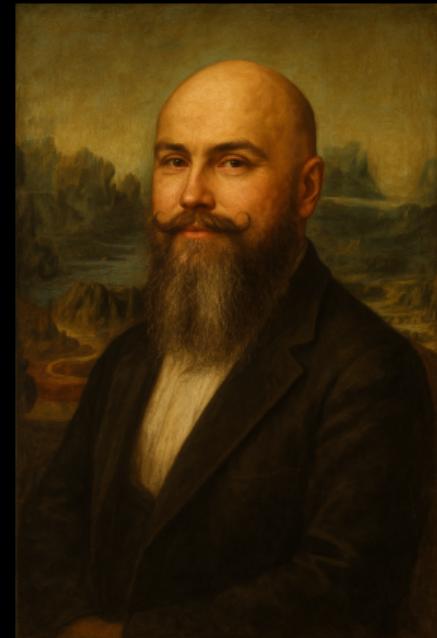


NAF

# Teaching “old” LLMs new tricks

Urs Baumann    30.05.2025





- Network Automation since 1503
- MSc Artificial Intelligence

ChatGPT

# What is fine-tuning

NAF

- Fine-tuning image generation with art style

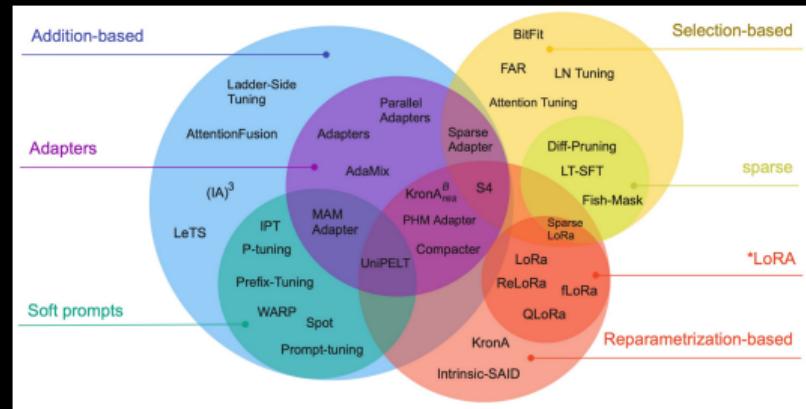


- <https://stabilityai.notion.site/Stable-Diffusion-3-Medium-Fine-tuning-Tutorial-17f90df74bce4c62a295849f0dc8fb7e>

# Fine-tuning Methods Taxonomy

NΛF

- arXiv:2303.15647
- Submitted on 28 Mar 2023 (v1), last revised 22 Nov 2024
- Addition-based
- Selection-based
- Reparametrisation-based



<https://arxiv.org/abs/2303.15647>

- **Low-Rank Adaptation of Large Language Models**
- arXiv:2106.09685, 2021, Microsoft
- <https://github.com/microsoft/LoRA>
- Freezes the pretrained model weights
- Adding low-rank matrices into each transformer layer

# Why LoRA?

NΛF

- Minimising memory consumption
- Enabling fine-tuning on hardware with limited resources
- Learning task-specific transformations without altering the original model structure

Once upon a time ...

# Preparing the stage

NAF

CLI Cowboys ran the network.



ChatGPT

# Preparing the stage

NAF

Shooting network configs  
from the hips.



ChatGPT

# Preparing the stage

NAF

Network engineers working  
on the neglected network  
dreamed about ...



ChatGPT

# Preparing the stage

NAF

...a modern declarative network.



ChatGPT

# Preparing the stage

NAF

And take time off.



ChatGPT

# Preparing the stage

NAF

However, they needed to extract the intent and resources from the inconsistent network configuration.

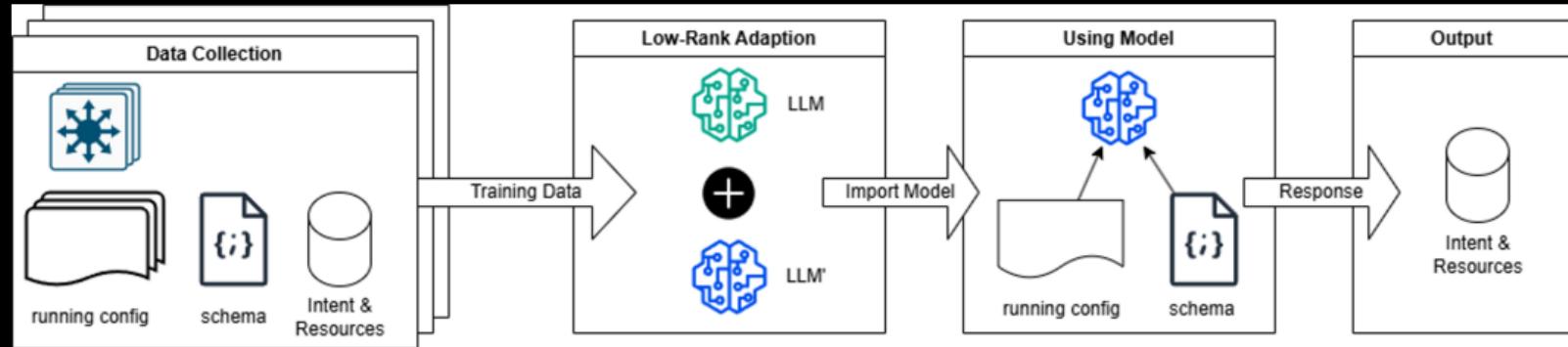


ChatGPT

# Intent and Resource Extraction from Network Device Configuration

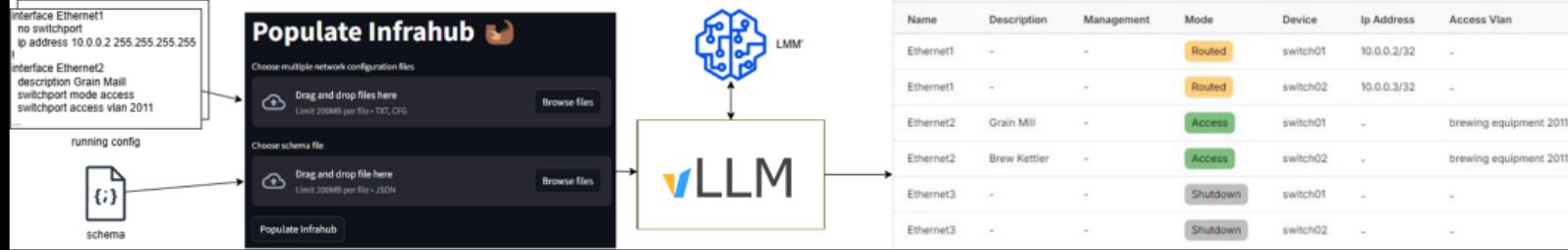
# Fine-tuning Pipeline

NAF



# Using new model

NAF



## Qwen2.5-Coder-32B-Instruct

- Data Extraction Match: 0.86
- JSON Validity: 1.0

## OpenAI GPT-4.0

- Data Extraction Match: 0.09
- JSON Validity: 0.98

# Challenges

NAF

- Confusion between similar schemas
- IP Address + mask to CIDR
- Dataset quality

# Possible Improvements

NAF

- Fine-tune for a specific schema and platform
- Enhance the quality of training data
- Generate parser templates
- Recruit interns to support development

# Tool Stack Fine-tuning Pipeline

NΛF

- unsloth
- vLLM
- MLflow

Thank you!

# What is missing?

NAF

- Training data sets
- Benchmarks
- Real-world showcases

[Runs](#)   [Evaluation](#)   [Experimental](#)   [Traces](#)