

SCHOOL OF COMPUTATION,
INFORMATION AND TECHNOLOGY —
INFORMATICS

TECHNISCHE UNIVERSITÄT MÜNCHEN

Master's Thesis in Informatics

**FLOps: Practical Federated Learning via
Automated Orchestration (on the Edge)**

Alexander Malyuk

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TODO

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I confirm that this master's thesis is my own work and I have documented all sources and material used.

Munich, 15.09.2024

Alexander Malyuk

Acknowledgments

Abstract

Kurzfassung

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1 Introduction

1.1 Section

Citation test [Lam94].

Acronyms must be added in `main.tex` and are referenced using macros. The first occurrence is automatically replaced with the long version of the acronym, while all subsequent usages use the abbreviation.

E.g. `\ac{TUM}`, `\ac{TUM}` \Rightarrow Technical University of Munich (TUM), TUM

For more details, see the documentation of the acronym package¹.

1.1.1 Subsection

See Table 1.1, Figure 1.1, Figure 1.2, Figure 1.3.

Table 1.1: An example for a simple table.

A	B	C	D
1	2	1	2
2	3	2	3

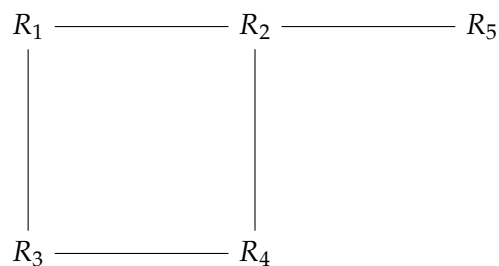


Figure 1.1: An example for a simple drawing.

¹<https://ctan.org/pkg/acronym>

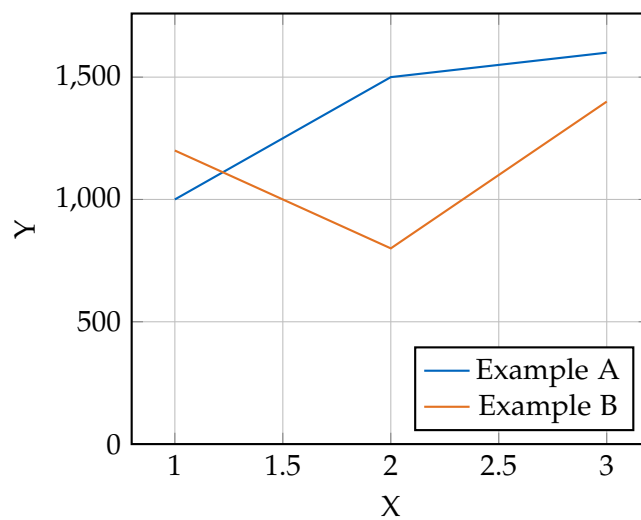


Figure 1.2: An example for a simple plot.

```
SELECT * FROM tbl WHERE tbl.str = "str"
```

Figure 1.3: An example for a source code listing.

2 Background

2.1 Federated Learning

2.2 MLOps

2.2.1 DevOps

2.3 Orchestration

2.3.1 Oakestra

3 FLOps

3.1 Requirements

3.2 System Architecture

4 Evaluation

4.1 Evaluation Rationale

4.2 Experimental Setup

4.2.1 Monolith/DevMachine

4.2.2 Multi-Cluster

4.3 Evaluation Results

4.3.1 Basics

4.3.2 Image Builder

4.3.3 Different ML Frameworks & Datasets

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5 Conclusion

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Abbreviations

TUM Technical University of Munich

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Bibliography

- [Lam94] L. Lamport. *LaTeX : A Documentation Preparation System User's Guide and Reference Manual*. Addison-Wesley Professional, 1994.