



SCHOOL OF COMPUTATION,
INFORMATION AND TECHNOLOGY —
INFORMATICS

TECHNISCHE UNIVERSITÄT MÜNCHEN

Bachelor's Thesis, Master's Thesis, ... in Informatics

Thesis title

Author





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Titel der Abschlussarbeit

Author:	Author
Examiner:	Supervisor
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I confirm that this bachelor's thesis, master's thesis, ... is my own work and I have documented all sources and material used.

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Acknowledgments

Abstract

Applying techniques from Neural Architecture Search (NAS) to Federated Learning (FL) has been fruitful in recent years. The combination was identified as a promising research direction by [Kai+21]. It has yielded methods for finding architectures that deal with the challenges imposed by the FL setting.

Research into NAS has grown rapidly [Whi+23] since it was popularized by [ZL17]; consequently, literature on its application to FL has grown. The last survey on NAS applied to FL compared approaches of four papers [ZZJ21]. Since then, we have identified approximately 50 new papers. This motivates a new systematic survey of the landscape to identify progress and gaps in the literature.

In this thesis, we propose a map of the literature landscape based on the FL challenges they address. We achieve this by systematically evaluating the literature and identifying which challenge it solves.

We refer to the FL challenges described in [McM+17], i.e., non-IID data, limited communication, client heterogeneity, privacy of client data, and break them down into smaller subchallenges — each subchallenge being associated with a pattern in the literature. We include personalized FL [Tan+23] as an additional subchallenge that was not originally posited, but has since drawn the community’s attention.

We then analyze how the subchallenges are addressed and focus on the contribution of the used NAS method towards overcoming the subchallenge. For each subchallenge, we keep track of the NAS types used (following [Whi+23], [Avv+25]) and assess whether the underexplored methods are candidates for future research.

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1 Introduction

Abbreviations

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