FEDERATED LEARNING PROJECT REPORT TEMPLATE

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ABSTRACT

This abstract provides a concise summary of the project, including the FL application, empirical graph modeling, variation minimization approach, and the FL algorithms used.

Keywords: Federated Learning, Networks, Personalized ML, Trustworthy AI

1. INTRODUCTION

Instructions (Remove before submission)

Introduce the background and motivation for your FL project:

- A real-life scenario motivating your FL application.

- Summary of state-of-the-art methods relevant to your project.

- Brief outline of the structure of your report.

2. PROBLEM FORMULATION

Instructions (Remove before submission)

Model your FL application as a FL network (see [1, Ch. 3]). In particular, clearly define and explain:

- Nodes: What real-world devices do they represent?

- Local Models: Describe the models used at each node.

- Loss Functions: Specify local loss functions for training.

- Edges: How are edges and their weights chosen?

3. METHODS

Instructions (Remove before submission)

The project requires you to apply GTVMin-based methods to the FL application modelled in Section 2. In this section you need to clearly state and explain:

- Your choice of variation measure.

- Your choice of FL algorithm and its message passing implementation.

4. NUMERICAL EXPERIMENTS

Instructions (Remove before submission)

Describe implementation details and analyze results:

- Data sources used.

- Model validation, selection, and diagnosis methods (see [2, Sec. 6.6]).

- Report training, validation, and test losses.

Important: Your report must include a zip archive containing a single Python script along with any necessary data files. Minimize the use of non-standard Python packages to ensure ease of execution and reproducibility.

5. CONCLUSION

Instructions (Remove before submission)

- Discuss whether the obtained results solve the problem satisfactorily.

- Identify limitations and suggest potential improvements.

6. REFERENCES

[1] A. Jung, *Federated Learning: From Theory to Practice*, Aalto, 2025. Available: `https://github.com/alexjungaalto/`

FederatedLearning/blob/main/
material/FLBook.pdf.

[2] A. Jung, *Machine Learning: The Basics*, Springer,
2022.