INTERNATIONAL
UNIVERSITY OF
APPLIED SCIENCES

ORAL ASSIGNMENT

Tasks for Course: DLMDSDL01– Deep Learning

CONTENT

1. TASKS

There are different topic options to choose from for the oral assignment. Please select only one to cover in your presentation.

Note on copyright

1.1 Task 1: Making use of Unlabeled Data by Semi-Supervised Learning

Based on the research paper in the literature list,

1. Explain the notion of semi-supervised learning and give an overview on common ways to implement this principle.

2. Describe requirements for a realistic assessment of the performance of semi-supervised learning methods.

3. Delineate likely areas of successful application of this approach.

Introductory literature:

Oliver, A., Odena, A., Raffel, C., Cubuk, E. D., & Goodfellow, I. J. (2019). *Realistic Evaluation of Deep Semi-Supervised Learning Algorithms*. ArXiv:1804.09170 [Cs, Stat]. http://arxiv.org/abs/1804.09170

1.2 Task 2: Efficient Training of Deep Learning Models

Based on the research paper in the literature list,

1. Motivate the rationale and use of pruning techniques in the context of Deep Learning model training.

2. Explain the "Lottery Ticket Hypothesis" and the associated "Lottery Ticket Conjecture".

3. Summarize the identification of so-called "winning lottery tickets" in fully connected and convolutional Deep Learning models.

Introductory literature:

Frankle, J., & Carbin, M. (2019). *The Lottery Ticket Hypothesis: Finding Sparse, Trainable Neural Networks.* ArXiv:1803.03635 [Cs]. http://arxiv.org/abs/1803.03635

1.3 Task 3: Generalization Ability of Deep Learning Models

Based on the research paper in the literature list,

1. Describe the notion of short-cut learning and how it affects the performance of Deep Learning models.

2. Explain common sources of short-cuts.

3. Outline effective strategies for detecting and countering short-cut learning.

Introductory literature:

Geirhos, R., Jacobsen, J.-H., Michaelis, C., Zemel, R., Brendel, W., Bethge, M., & Wichmann, F. A. (2020). *Shortcut Learning in Deep Neural Networks.* ArXiv:2004.07780 [Cs, q-Bio]. http://arxiv.org/abs/2004.07780

2. ADDITIONAL INFORMATION FOR THE EVALUATION OF THE ORAL ASSIGNMENT

When conceptualizing the oral assignment, the evaluation criteria and explanations given in the writing guidelines should be considered.

3. TUTORIAL SUPPORT

Several options are available for support with presentations. The student is responsible for making use of these resources. Tutors are available for subject consultation on the choice of topic as well as for specific and general questions on academic work. There is no provision for the tutor to confirm acceptable outlines, parts of the content, or presentation drafts, since independent preparation is part of the examination. However, hints may be given on rough drafts to facilitate the creation of academic work.