Institute of Acoustics and Speech Technology – Chair of Speech Technology and Cognitive Systems

## Introduction to Machine Learning

The Workshop on "Introduction to Machine Learning" provides participants with a comprehensive understanding of the fundamental concepts and practical applications of machine learning. The workshop focuses on utilizing popular tools and libraries, including PyTorch and scikit-learn, to explore key aspects of machine learning such as data visualization, data preprocessing, model selection, model optimization, and result discussion. The MedMNIST dataset, a collection of medical images, serves as the foundation for hands-on exercises and demonstrations throughout the workshop.

Participants will begin by gaining insights into data visualization techniques, enabling them to effectively analyze and interpret complex datasets. Next, they will delve into the critical stage of data preprocessing, learning how to clean, transform, and normalize data for optimal model performance. By utilizing the MedMNIST dataset, participants will become familiar with common preprocessing techniques specific to medical imaging data.

The workshop then transitions to the core concepts of model selection, where participants will explore different machine learning algorithms and their suitability for various tasks. They will employ scikit-learn's vast array of models and evaluation metrics to assess and compare the performance of different algorithms. They will learn to apply hyperparameter tuning and cross-validation methods to optimize model performance on the MedMNIST dataset. Finally, the workshop emphasizes the importance of result discussion. Participants will learn how to interpret and evaluate model outputs, gaining insights into evaluating model.

Throughout the workshop, hands-on exercises and interactive demonstrations will empower participants to apply the concepts they learn to real-world scenarios using PyTorch and scikit-learn. By the end of the workshop, participants will have gained a solid foundation in machine learning and be equipped with practical skills to tackle diverse machine learning challenges in their respective fields.

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