



**Signal Processing and Speech
Communication Laboratory**

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PhD Position in Applied Machine Learning

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The focus of this position is on data-driven machine condition monitoring. The aim is to work on the following three research areas to make significant progress in data-driven condition monitoring:

(i) Robust Representation: The aim is to exploit deep neural networks (DNNs) for learning representations to avoid manual feature engineering. Furthermore, DNNs should be used for outlier detection, data augmentation, and semi-supervised learning to counteract limited, unlabeled, and noisy data and to improve the generalization ability of the models.

(ii) Model Learning and Uncertainty Estimation: The aim is to introduce Bayesian models to provide uncertainty estimates for the predictions. Furthermore, methods will be developed to prepare the models against domain shifts, e.g. sensor drifts or miss-calibration. Transfer learning for knowledge exploitation across related applications is considered as well.

(iii) Explainability and Process Optimization: Explainable AI techniques will be developed to understand the underlying reason for the prediction of the black-box ML models. Furthermore, model adaptation and continual learning over the model exploitation phase is considered.

Our models will be evaluated on two application tasks: (i) Condition monitoring of refractories during its production, and (ii) the application of refractories in the steelmaking process. To successfully approach this cross-disciplinary research we have established a collaboration with RHI Magnesita.

Required skills

- M.Sc. degree in a relevant field (Computer Science, Information and Computer Engineering, Physics, Electrical Engineering, or similar)
- Strong background in machine learning, pattern recognition, good programming skills
- Excellent communication skills, fluency in English

How to apply?

Please send your application (CV, motivation letter, list of grades) to pernkopf@tugraz.at. The position is filled as soon as a suitable candidate is found.