Karlson **Pfannschmidt**

Machine Learning Researcher

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Experience

Smart-GM, Software Innovation Campus Paderborn — *Paderborn*

Research Assistant — *2020–present*

- Development of an assistance system for the recommendation of business models.
- Design of machine learning techniques applicable for learning from business model data.

Intelligent Systems and Machine Learning Group, Prof. Hüllermeier — *Paderborn*

Research Assistant — *2015–2020*

- Development and evaluation of new neural network architectures capable of modelling preferences (choices and rankings).
  - Implementation of a simulation pipeline to compare a variety of machine learning models in a cluster computing environment.
  - Establish the expressiveness of the proposed approaches by theoretical analysis.
- Work on an algorithm for multi-label classification in a large-scale environment.
- Devising a method of evaluating the importance of laboratory tests in medicine using game-theoretical concepts.

Distributed Systems Group, Prof. Scheideler — *Paderborn*

Student Research Assistant — *2011–2015*

- Empirical analysis of bandit trust algorithms.
- Development of a robust Bayesian bandit algorithm.

Skills

Machine Learning	Neural Networks, Gaussian Processes, Bayesian Optimization, Reinforcement Learning, Preference Learning
MLOps	PyTorch, TensorFlow, scikit-learn, MLFlow, SQLAlchemy
DevOps	Docker, Git, GitHub Actions, Singularity, TravisCI
Programming	Python, R, SQL, C++, JAVA, LaTeX
Languages	German (native), English (fluent), French (basic), Spanish (basic)

Open-Source Projects

CS-Rank — *github.com/kiudee/cs-ranking*

Creator/Maintainer — *Feb. 2018–present*

- Implements state-of-the-art context-dependent ranking and choice algorithms in Python.
- Modular architecture available in TensorFlow and PyTorch.

Bayes-skopt — *github.com/kiudee/bayes-skopt*

Creator/Maintainer — *Sep. 2019–present*

- General purpose hyperparameter optimization library specifically geared towards tuning of very noise target functions.
- Fully Bayesian treatment of model hyperparameters and acquisition functions.

Chess Tuning Tools — *github.com/kiudee/chess-tuning-tools*

Creator/Maintainer — *Jan. 2020–present*

- Special purpose chess engine parameter tuning software with an easy to use command line interface.
- Employed in the fine-tuning of the well-known Leela Chess Zero engine.

Publications

Conference Proceedings

Learning Choice Functions via Pareto-Embeddings
Karlson Pfannschmidt, Eyke Hüllermeier
KI, 2020

Extreme F-measure Maximization using Sparse Probability Estimates
Kalina Jasinska, Krzysztof Dembczynski, Róbert Busa-Fekete, Karlson Pfannschmidt, Timo Klerx, Eyke Hüllermeier
ICML, 2016

Evaluating Tests in Medical Diagnosis: Combining Machine Learning with Game-Theoretical Concepts
Karlson Pfannschmidt, Eyke Hüllermeier, Susanne Held, Reto Neiger
IPMU, 2016

Preprints

Efficient time stepping for numerical integration using reinforcement learning
Michael Dellnitz, Eyke Hüllermeier, Marvin Lücke, Sina Ober-Blöbaum, Christian Offen, Sebastian Peitz, Karlson Pfannschmidt
2021

Learning Choice Functions: Concepts and Architectures
Karlson Pfannschmidt, Pritha Gupta, Eyke Hüllermeier
2020

Deep Architectures for Learning Context-dependent Ranking Functions
Karlson Pfannschmidt, Pritha Gupta, Eyke Hüllermeier
2018

Education

Doctorate Degree (in progress) — *Paderborn, Germany*
Paderborn University — *Apr. 2015–present*
Thesis (in progress): Learning Choice and Ranking Functions

Master of Computer Science — *Paderborn, Germany*
Paderborn University — *Sep. 2012–Apr. 2015*
Thesis: Solving the Aggregated Bandits Problem

Bachelor of Computer Science — *Paderborn, Germany*
Paderborn University — *2008–Sep. 2012*
Thesis: Learning in Adversarial Environments

Extracurricular Activity

Leela Chess Zero Open Source Project — *lczero.org*
Core Member — *Jan. 2020–present*
- Developed a general purpose optimization library with application to computer chess.
- Active contributor to the open source project.

Presentation

TNG | Big Techday 12 — *Munich, Germany*
Co-Presenter for <LCZero, the Neural Network-Based Chess Engine> — *June 7th, 2019*
- Introduced the inner workings of the chess engine LCZero to a tech audience.
- Present the differences between traditional chess engines and neural network based ones.

Program Committees

2021 **External Reviewer**, International Conference on Machine Learning (ICML) — *Vienna, Austria*
2018 **Local Chair**, European Conference on Data Analysis — *Paderborn, Germany*