

Lukas Schäfer

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SKILLS

Programming

Competent
Python • C++ • SML
Familiar
C • Java • Rust • HTML • CSS • Matlab • Bash

Technologies and Tools

TensorFlow • Keras • NumPy • UNIX • Git • Vim

Languages

Native in German • Fluent in English • Intermediate in French • Beginner in Japanese

EDUCATION

M.Sc. Informatics

University of Edinburgh

09/2018 – Present

Edinburgh, United Kingdom

- Expected graduation in August 2019
- Specialisation in Machine Learning and Reinforcement Learning
- DAAD (German Academic Exchange Service) graduate scholarship
- Modules include: Reinforcement Learning, Algorithmic Game Theory and its Applications, Machine Learning and Pattern Recognition, Probabilistic Modelling and Reasoning, Decision Making in Robots and Autonomous Agents

B.Sc. Computer Science, minor subject Japanese

Saarland University

10/2015 – 09/2018

Saarbrücken, Germany

- Degree classification: grade of 1.2 (German scale) equivalent to UK 1st class honours
- BSc thesis: Domain-Dependent Policy Learning using Neural Networks in Classical Planning
- Modules include: Automated Planning, Admissible Search Enhancements, Neural Networks: Implementation and Application, Information Retrieval and Data Mining, Software Engineering, Modern Imperative Programming Languages

Abitur - Secondary School

Warndtgymnasium Geislautern, Völklingen

08/2008 – 06/2015

Geislautern, Germany

- Graduated Abitur 1.0 with examination subjects:
Mathematics - 15, English - 12, Computer Science - 14, German - 15, History - 15
- Prizes received:
 - Year's best student award of the Warndtgymnasiums Geislautern
 - Computer science and mathematics award 2015 of Saarland University

PROJECT EXPERIENCE

Autonomous Robot Localisation, University of Edinburgh

Group Project for Robotics: Science and Systems Lecture

09/2018 – 12/2018

- Constructed a four-wheel differential steering mobile robot as group of three for autonomous localisation in a known environment using LEGO aside of technical components including a Raspberry Pi computer
- Implemented particle-filter localisation and obstacle avoidance based on IR and sonar sensors
- Robot successfully managed to navigate through the constructed arena, detect and communicate points of interest using light sensors and return back to its deployment location

Galaxy-based Search, University of Edinburgh

Group Project for Natural Computing Lecture

09/2018 – 12/2018

- Implemented the Galaxy-based Search Algorithm (GbSA) and Particle Swarm Optimisation (PSO) baseline for PCA approximation as metaheuristic optimisation algorithms
- Evaluated and analysed GbSA and its foundational research paper, outlined limitations, proposed adjustments to the algorithm and showed their positive impact on performance in an evaluation

Plagiarism Detection Tool, Saarland University

04/2017 – 07/2017

Group Project for Software Engineering Lecture

- Researched, planned and built a reliable similarity detection for text & code in Python with language-specific analysis for Python and C as a group of five
- Designed and implemented a web-based output creation, highlighting similar submissions and plagiarism
- Our software is now successfully used in our customer's lectures to detect plagiarism cases on Python code

Concurrent CDCL SAT-Solver, Saarland University

07/2017 – 09/2017

Group Project for Modern Imperative Programming Languages Seminar

- Planned and implemented a concurrent Conflict-Driven Clause Learning SAT-Solver using Rust
- Optimised literal assignment using multiple heuristic strategies, pure variable detection and handling

RESEARCH

Reinforcement Learning for Video Game Playing, University of Edinburgh

09/2018 – 01/2019

Informatics Research Review

- Reviewed the development of reinforcement learning research for game playing and the challenge from board games Backgammon, Chess and Go to video games focusing on Atari and StarCraft
- Outlined the development of common reinforcement learning approaches and highlighted the challenge of multi-agent tasks, particular in partially-observable environments and proposed recent, promising ideas

B.Sc. Dissertation, Saarland University

04/2018 – 07/2018

Foundations of Artificial Intelligence (FAI) Group

- Transferred policy-learning neural network architecture of Action-Schema Networks to classical automated planning
- Implemented the network using Keras, adjusted its training for classical planning and extended the FastDownward planning framework with policy capabilities
- Extensive evaluation and analysis was conducted on IPC domains of varying complexity identifying limitations in generalisation, scalability and training stability
- Received grade 1.0 from both reviewers Prof. Dr. Jörg Hoffmann and Dr. Mario Fritz

TEACHING EXPERIENCE

Voluntary Lecturer and Coach, Saarland University

09/2017 – 10/2017

Mathematics Preparation Course

- Assisted the organization of the mathematics preparation course for upcoming computer science students
- Explained importance of mathematics for CS, formal languages and predicate logic to ~ 250 participants in daily lectures of the first week
- Supervised two groups to provide feedback and further assistance in daily coaching-sessions
- The course received BESTE-award for special student commitment 2017 of Saarland University

Programming 1 Teaching Assistant, Saarland University

10/2016 – 03/2017

Dependable Systems and Software Group

- Taught first-year students fundamental concepts of functional programming, basic complexity theory and inductive correctness proofs in weekly tutorials and office hours
- Marked weekly tests as well as mid- and endterm exams
- Collectively created learning materials and discussed student progress as part of the whole teaching team

VOLUNTEERING

Navigation Team Member, University of Edinburgh

09/2018 – Present

HYPED – University of Edinburgh Hyperloop Society

- Working on navigation of Hyperloop prototype including sensor filtering and processing to estimate location, orientation and speed of the pod
- Final Design Package was approved by SpaceX for their 2019 Hyperloop competition

School Year Representative, Warndtgymnasium

08/2013 – 07/2015

- Elected committee member representing school year; involved in organisation of school events and sponsor negotiations