Lukas Schäfer

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SKILLS

Programming

Competent
Python • C++ • SML

Familiar
C • Java • Rust • HTML • CSS • Matlab • Bash

Technologies and Tools
PyTorch • TensorFlow • Keras • NumPy • UNIX • Git

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

EDUCATION

M.Sc. Informatics   09/2018 – 08/2019
University of Edinburgh   Edinburgh, United Kingdom

- Degree classification: Distinction (77.28%)
- MSc thesis: Dissertation: Curiosity in Multi-Agent Reinforcement Learning (74%)
- 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   10/2015 – 09/2018
Saarland University   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 (1.0)
- 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   08/2008 – 06/2015
Warndtgymnasium Geislautern, Völklingen   Geislautern, Germany

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

WORK EXPERIENCE

Team Advisor, University of Edinburgh   09/2019 – Present
HYPED – University of Edinburgh Hyperloop Team

- Consulting the HYPED software team especially regarding navigation and sensor filtering to achieve a reliable prototype design competing at the 5th SpaceX Hyperloop Competition

Navigation Software Engineer, University of Edinburgh   09/2018 – 08/2019
HYPED – University of Edinburgh Hyperloop Team

- Developing navigation system of "The Flying Podsman" Hyperloop prototype using sensor filtering, processing and control techniques to estimate location, orientation and speed of the pod
- Finalist for the SpaceX 2019 Hyperloop competition in California in Summer 2019

PROJECT EXPERIENCE

Autonomous Robot Localisation, University of Edinburgh   09/2018 – 12/2018
Group Project for Robotics: Science and Systems Lecture

- 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 · 09/2018 – 12/2018
Group Project for Natural Computing Lecture
- 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 EXPERIENCE

M.Sc. Dissertation, University of Edinburgh · 05/2019 – 08/2019
Autonomous Agents Research Group
- Applied curiosity as intrinsically computed exploration bonuses for multi-agent reinforcement learning (MARL)
- Implemented count- and prediction-based curiosities for value-based and policy-gradient MARL methods using PyTorch
- Evaluated the influence of curiosity on cooperative and competitive MARL under partial observability and sparse rewards in a multi-agent particle environment
- Applied curiosity led to improved stability and convergence of policy-gradient MARL trained with sparse reward signals

B.Sc. Dissertation, Saarland University · 04/2018 – 07/2018
Foundations of Artificial Intelligence (FAI) Group
- Transferred domain-dependent policy learning Action-Schema Networks to classical automated planning
- Implemented the network using Keras, slightly adjusted its training for classical planning and extended the FastDownward planning framework
- Extensive evaluation and analysis was conducted on IPC domains of varying complexity identifying limitations in generalisation and scalability

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