Thomas Haferlach

Contact

Email	t.haferlach@gmail.com
Phone	+49 (0)176 58158410
Address	Koepenicker Chaussee 26
City	10317 Berlin
Country	Germany

Profiles

LinkedIn · Artist Page · GitHub · SoundCloud

Summary

I am passionate about multidisciplinary research and development involving machine learning, audio processing, distributed systems, art, and data visualization. By combining pragmatic problem-solving skills with a strong background in software engineering, I am able to apply cutting edge academic research in practice.

Work & Research Experience

2018-09

Foresight Researcher at **Envisioning**

Berlin Area, Germany

Researched future trends of Artificial Intelligence for the World Government Summit in Dubai drawing on academic papers, news and science fiction.

Currently investigating technologies that will impact sustainability in the medium- and long-term future for the GIZ (Deutsche Gesellschaft fuer Internationale Zusammenarbeit) in Germany.

2018-05 till 2018-06

Talk about Artificial Intelligence and Art at the Frontiere IA Conference at **MUTEK & Frontière IA**

Montreal, Canada Area

Conceived the live visuals for the band "Die Wilde Jagd" by creating a system that visualizes audio using Deep Neural Networks. Subsequently got invited to give a talk on applications of AI with art at the Frontière IA conference in Montreal

2018-03 till 2018-03

Machine Learning and Music Hacklab: Swarm Animism at **transmediale - art & digital culture**

Berlin Area, Germany

Conceived and performed a musical piece which used the smartphones of the attendees to listen and react by generating sounds. This resulted in a form of musical swarm intelligence which blurs the border between performer and participant.

2010-01 till 2018-12

Artist and Organizer at **Voodoohop**

São Paulo Area, Brazil

As one of the founders of the multidisciplinary art collective Voodoohop, I became deeply involved with the art and music scene of São Paulo and Brazil. Guided by the principle of stimulating individual and joint freedom of expression, Voodoohop is enjoying international success with performances at events all over Europe, the USA, South America and a sold out physical release in Japan.

As a musician, I have created a unique live performance in which software I developed is responsible for generating harmony, melody and modifying the musical arrangements in real time.

2008-03 till 2016-03

Freelance Developer at **SuperUber (Rio de Janeiro), Conception (Rio de Janeiro), TIM (São Paulo), ArtRio, City of São Paulo**

Brazil

Conceived and developed a range of interactive installations using technologies including machine learning, computer vision, distributed computing, controllers, sensors, embedded computing and data visualization.

Examples:

1. With the help of facial tracking, a microphone and pitch analysis, participants could paint on a blank canvas using their voice and head movements.
2. An OpenGL based climbing game in which a user climbs a mountain using the movement of his own hands
3. For the 2014 FIFA World Cup, using computer vision and real-time image augmentation, participants took selfies with the official mascot superimposed onto the image.

2007-06 till 2007-10

Research and publication of my bachelor thesis at **The University of Edinburgh**

Edinburgh, United Kingdom

Implementation of my thesis Evolving a Neural Model of Insect Path Integration on a physical robot and publication in the journal "Adaptive Behavior"

2006-10 till 2007-02

Software Engineer at **Amazon Development Centre Scotland**

Edinburgh, United Kingdom

Agile development of backend tooling, A/B testing and data mining for sales optimization.

Technologies: Java, Spring Framework, Test-Driven Development, Agile Development, Python, Distributed Computing

2004-08 till 2005-07

Software Engineering Internship at **Sun Microsystems**

Portland, Oregon Area

Worked as a team developer on several inner process projects.

Researched and developed a prototype failure analysis classification engine using technologies from the field of data mining and machine learning.

Technologies: Java, Text Classification, Agile Development

Education

2001-01 till 2006-01

The University of Edinburgh: Artificial Intelligence and Computer Science

Bachelor of Science with *First class honors*

Modules: Artificial Intelligence, Computer Science, Mathematics, Physics, Advanced Vision, Computational Complexity, Intelligent Autonomous Robotics, Modelling and Simulation, Visualization, Neural Computation

Extra: French, Human Communication

Thesis: Evolving Neural Models of Path Integration

1995-01 till 2001-01

Albert Schweitzer Gymnasium, Kassel

Abitur with grade 1.7

Publications

2009-01

Low Level Approaches to Cognitive Control B. Webb, J. Wessnitzer, H. Rosano, M. Szenher, M. Zampoglou, T. Haferlach, P. Russo

Spatial Temporal Patterns for Action-Oriented Perception in Roving Robots (book)

We describe several neural network implementions of insect based methods of navigation. We present the preliminary results of modelling associative learning capabilities based on the insect mushroom bodies.

2007-03

Evolving a Neural Model of Insect Path Integration T. Haferlach, J. Wessnitzer, M. Mangan & B. Webb

Adaptive Behaviour 15(3)

We use a genetic algorithm to evolve a novel neural model of path integration, based on input from cells that encode the heading of the agent in a manner comparable to the polarization-sensitive interneurons found in insects. The home vector is encoded across a circular array of cells that integrate this input. We demonstrate the capabilities of the network under noisy conditions in simulation and on a robot.

Awards & Projects

2017-01

Harmonic Audio Mixing Visualization Tools

Open-source project: An innovative way of analyzing and visualizing musical harmony using colors, waveforms and the harmonic circle. Technologies: React - Max/MSP - Ableton Live - Electron - Node.js

2007-06

Simulated Car Racing Competition (2nd Place) / **IEEE Congress on Evolutionary Computation**

Trained a modular neural network architecture to control an agent that competed successfully in the IEEE CEC Simulated Car Racing Competition.

2001-05

Honorary Membership / **German Physics Society**

Languages

English (Native speaker) **German** (Native speaker) **Portuguese** (Full professional) **French** (Basic conversational)

Skills

Software Engineering: Agile Development, Object-Oriented Programming, Functional Programming, Distributed Computing, Full Stack Programming, Java, Javascript, Typescript, Python, SQL, NoSQL, Git, Node.js

Machine Learning: Artificial Neural Networks, Generative Models, Computer Vision, PyTorch (basic), Tensorflow (basic), Max/MSP, Audio Classification, Digital Signal Processing, Web Crawling, Data Processing Pipelines, Data Visualization, Applying academic research in practice

Soft Skills: Working independently, Conveying technical information to a non-technical Audience, Logical thinking and problem solving, Excellent written and oral communication skills