Fábio Ferreira

Résumé

Objective

I'm a dedicated Computer Science M. Sc. student at KIT in Karlsruhe, Germany. I graduated B. Sc. from University of Applied Sciences Karlsruhe as one of the top 8% graduates in Computer Science. Motivated by my Deep Learning bachelor thesis, I have been setting my focus of study in Machine Learning and am actively contributing as a researcher at the H2T (High Performance Humanoid Technologies Lab). Accompanying my Master's for the past 12 months, I have investigated the value of latent representations for Video Understanding in Cognitive Robotics at the H2T along with my research partner Jonas Rothfuss. My current research project focuses on the Inverse Reinforcement Learning problem and aims for a better interplay with Learning by Demonstration. Alongside, I'm employed as a working student software engineer at a subsidiary company of the Daimler AG and participating in hackathons.

Person

Place of birth	Calw, Germany
Citizenships	German and Portuguese
Date of birth	17th of April 1990

Education

2016–now **M. Sc.**, *Karlsruhe Institute of Technology*, in Karlsruhe.
Computer Science with focus on Machine Learning

2013-2016 **B. Sc.**, *Karlsruhe University of Applied Sciences*, in Karlsruhe, *GPA: 3.8, with distinction (graduated as one of the top 8% in two years)*.
Computer Science, Computer Vision

2010-2012 **State-Certified Technical Engineer**, *Advanced training, Gottlieb–Daimler–Schule 2 – Fachschule für Technik*, in Sindelfingen, *GPA: 3.9 (graduated best in class)*.
Electrical Engineering, Computer Science

2006-2009 **IT systems engineer**, *Apprenticeship, Deutsche Telekom AG*, in Stuttgart.
Information Processing

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Research Projects

2017–now **Inverse Reinforcement Learning in conjunction with Learning by Demonstration (working title)**, *Fábio Ferreira, Jonas Rothfuss, You Zhou, Prof. Dr. Tamim Asfour*.

Link -

2016–2017 **Deep Episodic Memory: Encoding, Recalling, and Predicting Episodic Experiences for Robot Action Execution**, *Fábio Ferreira, Jonas Rothfuss, You Zhou, Dr. Eren E. Aksoy, Prof. Dr. Tamim Asfour*, Submitted to IEEE International Conference on Robotics and Automation (ICRA) 2018.

Action understanding is an important cognitive faculty which can help robots efficiently encode, store, and retrieve observed human demonstrations. This is of great interest in cognitive robotics for creating memory units to encapsulate gained information from past experiences, which can be then recalled to adapt ongoing and future behaviors. We introduce a novel deep neural network architecture for encoding, storing, and recalling past action experiences in an episodic memory-like manner. The network creates a low-dimensional latent space representation of the observed actions. Such a formulation in the latent space allows robot to classify different action types and retrieve the most similar episodes to the query action. The proposed deep network further helps robots predict and generate the next possible frames of the currently observed action.

Link https://goo.gl/RsDUMT

Bachelor Thesis

Title ***Optimal CNN Architectures for Defect Classification in Images***

Supervisors Prof. Dr. Norbert Link, Prof. Dr.-Ing. Laubenheimer

Description The final paper addresses the use of Convolutional Neural Networks (CNN) for defect classification in the automatical optical inspection. The performance and accuracy of classification varies and both are dependent on the selection of the architecture and characteristics of the underlying dataset. The training of artificial neural networks is incorporated with time-consuming and expensive efforts. To minimize those, methods were evaluated that allow to choose an optimal architecture from a set of architectures within a reasonable amount of time.

Scholarship

2015–now **German Academic Scholarship Foundation**, *Admission in November 2015, suggested by the university for exceptional student performance*, https://ferreirafabio.github.io/data/sdv.pdf.

Work Experience

October 2017–now **Research Assistant**, *High Performance Humanoid Technologies Lab*, Karlsruhe Institute of Technology.

Advisory function for Deep Learning and hardware equipment acquisition, TensorFlow staff training, research

2013–now **Working Student**, *MBtech Group GmbH & Co. KGaA*, Sindelfingen.
Software development, responsible for tools and scripts used by 30 engineers

2012–2013 **Software Developer**, *MBtech Group GmbH & Co. KGaA*, Sindelfingen.
Software development in exhaust aftertreatment for Daimler AG, using Matlab/Simulink and Daimler tools

2010–2010 **Network Administrator**, *Sparkassen-IT GmbH & Co. KG*, Calw.
Configuration of Cisco Systems network devices, Linux server administration

Other Experience

September 2017 **HackX 2017 Hackathon**, *Cologne, Germany, Microsoft Headquarters*, Tree-based representation of news articles based on Microsoft Azure Cognitive Services - Prototype created during the hackathon (sponsors: Microsoft, Handelsblatt, FlowFact), awarded for the best innovation and best pitch, https://www.hackathon.com/event/hackx—artificial-intelligence-hackathon-2017-36159341564.

March 2017 **StartHack 2017 Hackathon**, *St. Gallen, Switzerland, University of St. Gallen*, Participated in an AI challenge by Deutsche Bank at the StartHack Hackathon which was held in St. Gallen. Our team implemented a coupon recommendation prototype based on bank account expenses. The application recommends vouchers based on your bank account expenses and current location, so that when purchases are detected on the credit card, a suitable voucher will be provided the next time the customer logs into his Deutsche Bank account, https://starthack2017.devpost.com.

November 2016 **Speaker at the Deep Learning Student Talk**, *Karlsruhe University of Applied Sciences*, Both Prof. Link and Prof. Laubenheimer invited me as a speaker (along with two other alumni) to the first Deep Learning Student Talk with approximately 50 attendees. During the 60 minute presentation, I gave an introduction to the basics of Deep Learning and provided insights into my bachelor thesis results, https://ferreirafabio.github.io/data/posterdl.pdf.

Software Language Skills

Language	Level	Experience
Python	practitioner	2 years
Java	practitioner	3 years
Matlab	practitioner	3 years
C/C++	experienced beginner	2.5 years
SQL	beginner	1 year
C#	beginner	1 year

Machine Learning Skills

Frameworks and Platforms TensorFlow, Caffe, OpenCV, scikit–learn, Amazon Web Services, Microsoft Azure

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Knowledge	Deep Learning for Computer Vision, Inductive, deductive, generative and discriminative learning, hypothesis space theory, Bayesian inference theory, VC–dimension theory, decision trees, SVM, Reinforcement Learning, Automatic Speech Recognition (ASR), basics of Natural Language Processing (NLP)
Models	CNN, RNN/LSTM, Auto–Encoders, MDP, HMM, Markov Logic Network, Deep Belief Networks, Restricted Boltzmann Machines

Software Skills

Development	Eclipse SDK, PyCharm, Matlab, Simulink, MS Visual Studio and TFS
Testing	The MathWorks Polyspace, Tessy Test
Versioning	SVN, Git

Languages

German	IRL level 5
English	IRL level 4
Portuguese	IRL level 4
Spanish	IRL level 1

Interests

Reading	Besides working and studying, I use a large amount of my free time for reading books.
Sports	I play volleyball in a society and enjoy hiking in the alps and Black Forest region.
Politics	Besides my interest for national and international politics, I enjoy political discussions at the German Academic Scholarship Foundation.

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