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Fares Abawi (PhD Candidate)

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Fares Abawi

PERSONAL INFORMATION

PyTorch | Keras | ROS | MuJoCo | Docker | NumPy | pandas | sklearn

Nationality & Residence — **Bahrain** (permanent resident in **Germany**)

Languages — **English** (native proficiency), **Arabic** (native proficiency), **German** (intermediate proficiency)

EDUCATION

University of Hamburg, DE
July 2020 - Now
(Expected: December 2024)
Ph.D. Computer Science
My research is focused on predicting social attention in dynamic settings & understanding the influence of robot gaze & social cues on humans. I explore different neural techniques to integrate non-verbal social cues through late & early fusion

University of Hamburg, DE
October 2016 - April 2019
M.Sc. Intelligent Adaptive Systems (Computer Science)
Courses: Human-Computer Interaction, Neural Networks, Bio-inspired AI, Machine Learning & Speech Signals

German Jordanian University, JO
September 2011 - August 2016
B.Sc. Communication Engineering
Courses: Analog/Digital Electronics, Electromagnetics, Signal Processing, Networks, Embedded Sytems & OOP

Darmstadt Univ. of Appl. Sc., DE
March 2015 - February 2016
B.Eng. Electrical Engineering and Information Technology - Exchange Student
1-year scholarship from the German Academic Exchange Service (DAAD) for achieving the highest academic merits

PROFESSIONAL EXPERIENCE

University of Hamburg, DE
April 2020 - Now
Research Associate @ Knowledge Technology Group
Developed neural attention models for multimodal scanpath & saliency prediction, implemented on robots:
- Simulated & physical robot actuation (iCub & Pepper) using YARP & ROS
- Audiovisual multimodal integration for modeling social attention using PyTorch
- Cognitive simulation for emulating human-like crossmodal (audiovisual) conflict on a robot

Smartmicro GmbH, DE
May 2019 - April 2020
Algorithm Engineer @ Tracking and Sensor Fusion Group
Developed neural models for traffic and automotive radar signal processing:
- ROS multi-camera + radar calibration & fusion for multi-object tracking
- Sequential radar signal classification & trajectory estimation using PyTorch & sklearn
- CD & MLOps pipelines with Jenkins & Docker

University of Hamburg, DE
December 2017 - March 2019
Research Assistant @ Knowledge Technology Group
Developed visuomotor grasping models & language models:
- Robotic simulation for object grasping using MuJoCo
- Computer vision for object detection & grasping using Keras
- Language modeling with surprisal-based activation using Keras & Tensorflow

Harman International, DE
September 2015 - February 2016
Internship: Speech Interaction Systems @ Spoken Dialog System Group
Developed application concepts for a spoken dialog system:
- Grammar parsing tool in Java, XML & XSLT
- Speech engine integration (Ivona text-to-speech & Nuance speech recognizer) in C++

German Jordanian University, JO
July 2014 - September 2014
Internship: Scheduling Automation @ Information Systems and Technology Center
Developed a graph coloring optimization-based exam scheduling system using AMPL

PROJECTS

University of Hamburg, DE
October 2018 - April 2019
M.Sc. Thesis: Intermediate Representations in Deep Multimodal Neural Networks (Grade: 1.0)
Developed a multimodal/multitask neural network for goal-oriented grasping:
- Data processing and filtration using NumPy & pandas
- Developing object grasping models with images & linguistic description as input built with Keras
- Robot simulation & inverse kinematics using MuJoCo
- 3D object augmentation in real scenes using OpenGL

University of Hamburg, DE
October 2017 - April 2018
M.Sc. Project: Designing a Personality-Driven Robot for an HRI Scenario (Grade: 1.0)
Developed the spoken dialogue system for a robotic interaction experiment:
- Designing a frame-based dialog system with mixed-initiative
- Speech & language engine integration (SpaCy, MITIE, Amazon Polly & Google Speech)
- Speech signal processing & language modeling

German Jordanian University, JO
February 2014 - February 2015
B.Sc. Thesis: Alerting Sounds Detection, Classification, and Localization for Assisting People with Hearing Disabilities (Grade: 98%)
Developed an alert-sound classification (support vector machines) & localization system (TDOA):
- Construction of a hardware prototype with microphone arrays
- C#, C & Matlab development of localization prototypes
- Code development on Windows Phone, BeagleBone & Arduino
- Speech signal processing & feature engineering

Open Source
Wrapyfi: Python wrapper for multi-middleware support including ROS/2, YARP & ZMQ with deep learning plugins
Llama + Wrapyfi: Distributing the Llama LLM on multiple machines using Wrapyfi
ImageBind LoRA: Fine-tuning a crossmodal embedding model using Low-Rank adaptation

SELECTED PUBLICATIONS

Full list on https://orcid.org/0000-0002-4240-5351

[1] **F. Abawi**, P. Allgeuer, D. Fu, and S. Wermter. "Wrapyfi: A Python Wrapper for Integrating Robots, Sensors, and Applications across Multiple Middleware," to appear in Proceedings of *The ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2024. Related code: https://github.com/fabawi/wrapyfi

[2] M. Kerzel*, **F. Abawi***, M. Eppe, and S. Wermter. "Enhancing a Neurocognitive Shared Visuomotor Model for Object Identification, Localization, and Grasping With Learning From Auxiliary Tasks," in *IEEE Transactions on Cognitive and Developmental Systems*, 2022. Related code: https://github.com/knowledgetechnologyuhh/augmented_grasping_3d

[3] **F. Abawi**, T. Weber, and S. Wermter. "GASP: Gated Attention for Saliency Prediction," in Proceedings of *The International Joint Conference of Artificial Intelligence (IJCAI)*, 2021. Related code: https://github.com/knowledgetechnologyuhh/gasp