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Fares Abawi

https://fares.abawi.me

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Framework Expertise: **PyTorch | Keras | ROS | ZMQ | MuJoCo | NumPy | pandas | sklearn | Docker | Jenkins**

Professional Experience

University of Hamburg, DE *Research Associate @ Knowledge Technology Group* ***April 2020 - Present***
Research focused on predicting social attention in dynamic settings, as well as understanding the influence of robot gaze & social cues on humans by conducting user studies.

- *Developed neural social attention (early fusion & late integration) models for multimodal scanpath & saliency prediction, embodied in robots.*
- *Created a framework for multi-middleware and multi-robot integration.*
- *Designed a cognitive robotic simulation paradigm for emulating human-like crossmodal (audiovisual) conflict on a robot.*

Skills*: Simulated & physical robot actuation (iCub & Pepper) using YARP & ROS. Eye tracking data collection and analysis. Teaching & presentation.*

Smartmicro GmbH, DE *Algorithm Engineer @ Tracking and Sensor Fusion Group* ***May 2019 - April 2020***

- *Devised a technique ROS multi-camera + radar calibration & fusion for multi-object tracking, significantly reducing the calibration time.*
- *Developed sequential radar signal classification & trajectory estimation neural models for traffic & automotive applications.*

Skills*: Sensor fusion models using PyTorch & sklearn. CI/CD & MLOps pipelines with Jenkins & Docker. Radar signal processing.*

University of Hamburg, DE *Research Assistant @ Knowledge Technology Group* ***December 2017 - March 2019***

- *Developed visuomotor robot grasping & computer vision models.*
- *Implemented a language model with surprisal-based activation.*

Skills*: Robotic simulation using MuJoCo. Computer vision for object detection & grasping using Keras. Language modeling with TensorFlow.*

Harman International, DE *Internship: Speech Interaction Systems @ Spoken Dialog System Group* ***September 2015 - February 2016***

- *Designed and implemented application concepts for a spoken dialog system.*

Skills*: Grammar parsing tool in Java, XML, & XSLT. Speech engine integration (Ivona text-to-speech & Nuance speech recognizer) in C++.*

German Jordanian University, JO *Internship: Scheduling Automation @ Information Systems and Technology Center* ***July 2014 - September 2014***

- *Developed a graph coloring optimization-based exam scheduling system using AMPL, automating the exam scheduling process. This reduced the time needed to schedule exams for all students at the university from hundreds of human hours to approximately 10 hours.*

Skills*: Mathematical programming with AMPL. Frontend development with JAVA servlets, HTML, & CSS.*

Projects

University of Hamburg, DE *M.Sc. Thesis* ***October 2018 - April 2019***
Intermediate Representations in Deep Multimodal Neural Networks

- *Developed a multimodal/multitask neural model for robot grasping. The model received images & linguistic descriptions as input, allowing target grasping specification.*

Skills*: Data processing & filtration using NumPy & pandas. Robot simulation & inverse kinematics using MuJoCo. 3D object augmentation using OpenGL.*

University of Hamburg, DE ***October 2017 - April 2018***
M.Sc. Project: Designing a Personality-Driven Robot for an HRI Scenario

- *Implemented a near real-time spoken dialogue system for a robot interaction experiment.*
- *Designed a frame-based dialog system with mixed-initiative.*

Skills*: Speech & language engine integration (SpaCy, MITIE, Amazon Polly, & Google Speech) in Python. Speech signal processing & language modeling.*

German Jordanian University, JO *B.Sc. Thesis* ***February 2014 - February 2015***
Alerting Sound Detection, Classification, and Localization for Assisting People with Hearing Disabilities

- *Developed an alert-sound classification (support vector machines) & binaural localization (TDOA) system.*
- *Constructed a hardware prototype with microphone arrays for localizing sound.*

- *Implemented localization algorithms on the Windows Phone, BeagleBone, & Arduino.*

Skills: *C#, C, & Matlab development of localization prototypes. Speech signal processing & spectral feature engineering.*

Open Source Projects

Wrapyfi: *Python wrapper for multi-middleware support, including ROS/2, YARP, & ZMQ with deep learning plugins* https://github.com/fabawi/wrapyfi

Llama + Wrapyfi: *Distributing the Llama LLM on multiple machines using Wrapyfi* https://github.com/modular-ml/wrapyfi-examples_llama

ImageBind LoRA: *Fine-tuning a crossmodal embedding model using Low-Rank adaptation* https://github.com/fabawi/ImageBind-LoRA

Education

University of Hamburg, DE *Dr. rer. nat. Computer Science* — ***July 2020 - Expected: December 2024***

University of Hamburg, DE *M.Sc. Intelligent Adaptive Systems (Computer Science)* — ***October 2016 - April 2019***

German Jordanian University, JO *B.Sc. Communication Engineering* — ***September 2011 - August 2016***

Darmstadt University of Applied Sciences, DE *B.Eng. Electrical Engineering and Information Technology - Exchange* — ***March 2015 - February 2016***
1-year scholarship from the German Academic Exchange Service (DAAD) for outstanding academic achievements.

Selected Publications

(Full list on fares.abawi.me/publications)

Abawi, F.*, Fu, D., & Wermter, S. "Unified Dynamic Scanpath Predictors Outperform Individually Trained Neural Models," arXiv.2405.02929, 2024.*

Abawi, F.*, Allgeuer, P., Fu, D., & Wermter, S. "Wrapyfi: A Python Wrapper for Integrating Robots, Sensors, and Applications across Multiple Middleware," in Proceedings of The ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2024.*

Fu, D., ***Abawi, F.****, et al. "A Trained Humanoid Robot can Perform Human-Like Crossmodal Social Attention and Conflict Resolution," International Journal of Social Robotics, pp. 1325–1340, 15, 2023.*

Fu, D.,* ***Abawi, F.****, & Wermter, S. "Judging by the Look: The Impact of Robot Gaze Strategies on Human Cooperation," in IEEE International Conference on Robot and Human Interactive Communication (RO-MAN) Workshop on Machine Learning for HRI, 2022.*

Abawi, F.*, Weber, T., & Wermter, S. "GASP: Gated Attention for Saliency Prediction," in Proceedings of The International Joint Conference of Artificial Intelligence (IJCAI), 2021.*