Ibrahim Aldarmaki

Research Assistant at Khalifa University
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Education

The University of Edinburgh Sep 2020 – May 2023
BEng (Hons.) in Electronics and Electrical Engineering *First Class Honours* *Edinburgh, UK*

United Arab Emirates University (Transferred) Aug 2019 – July 2020
BSc in Electrical Engineering *GPA: 4.00/4.00* *Al Ain, UAE*

Applied Technology High School Aug 2019 – July 2020
Advanced Science Program (ASP) *Class Rank: 1* *Country Rank: 6* *Fujairah, UAE*

Experience

Research Assistant Sep 2024 – Present
Khalifa University *Abu Dhabi, UAE*

- Conducting research on Wi-Fi sensing for healthcare applications, with a focus on signal processing and machine learning techniques to enhance sensing accuracy and reliability.
- Developing software designs and solutions for real-time Wi-Fi sensing using off-the-shelf hardware.

Research Assistant Dec 2023 – April 2024
Mohammed Bin Zayed University of Artificial Intelligence *Abu Dhabi, UAE*

- Investigating generative and predictive code-switching models, utilizing pre-trained Large Language Models (LLMs) to advance multilingual code-switching prediction and generation.
- Worked on deep neural networks for Multichannel Speech Enhancement and developed a novel, parameter-efficient MSE neural architecture.

Signal Processing Summer School Jun 2023
University Defense Research Collaboration (UDRC) *Edinburgh, UK*

- Engaged in theoretical and practical sessions in statistical signal processing, tracking & sensing, machine learning, and source separation.

Teaching Assistant Sep 2022 – May 2023
The University of Edinburgh *Edinburgh, UK*

- Served as a teaching assistant for the third-year digital systems design course, guiding students in developing synchronous digital circuits and realizing finite-state machines from high-level functional specifications and prototyping them on FPGA hardware.
- Facilitated the learning process in the second-year digital systems design course in analyzing and designing combinational and sequential gate-level circuits.

Space Science Researcher Jun 2022 – Aug 2022
Mohammed Bin Rashid Space Centre *Dubai, UAE*

- Studied the Martian surface diurnal temperature and characterized its thermophysical properties using observed diurnal temperatures taken by Emirates Mars Mission's (EMM) Emirates Mars Infrared Spectrometer (EMIRS) instrument.
- Developed and presented thermophysical properties estimation algorithms that surpassed current industry standards in accuracy and efficiency.

Selected Projects

Navigating Through The Unknown Jupyter Notebook Nov 2023

- Developed a simulation of dynamic system behavior and sensor inputs, incorporating noise to model real-world measurement uncertainty.
- Designed and implemented a Kalman filter for accurate state (position and velocity) estimation, refining the object's trajectory by combining model predictions with noisy measurements.

DNNs for DoA Estimation using Circular Microphone Arrays Bachelors Thesis Sep 2022 – May 2023

- Conducted research on signal processing and machine learning algorithms to use Deep Neural Networks (DNNs) Direction of Arrival (DOA) estimation.
- Developed speaker localization algorithms using statistical signal processing and deep learning techniques, achieving a 36% improvement in performance over standard algorithms.

RISC Microprocessor & Remote Car Interface Development Jan 2023 – Apr 2023

- Developed a RISC Microprocessor using Verilog HDL and prototyped it on a FPGA board.
- Created a customized programming language and compiler to optimize the processor's programming efficiency and functionality.
- Developed a remote car interface that uses the processor to control the car's movement and utilized a VGA display to show the control interface.

Sentiment Analysis of Text Mar 2023

- Performed sentiment analysis and visualization on social media platforms, such as Twitter (now known as X), and review text data.
- Developed and optimized machine learning and deep learning algorithms to estimate sentiment in raw text data, selecting the most effective approach.

Visible Light Communication System Design and Implementation Jan 2022 – Mar 2022

- Designed and constructed a robust optical communication system by leveraging expertise in PCB design, assembly, component testing, and soldering, ensuring optimal performance and reliability.

Publications

Ibrahim Aldarmaki, Thamar Solorio, Bhiksha Raj, Hanan Aldarmaki, "RelUNet: Relative Channel Fusion U-Net for Multichannel Speech Enhancement," arXiv:2410.05019, 2024. [Online]. Avialable: https://arxiv.org/abs/2410.05019

Technical Skills

Python, PyTorch, TensorFlow, Scikit-Learn, MATLAB, Minitab, Java, C, LTSpice, Xilinx, Verilog HDL, Basys3 FPGA, STM32
Board

References

Prof. Thamar Solorio
Professor of Natural Lanuage Processing
Mohammed Bin Zayed University of Artificial Intelligence
Email: thamar.solorio@mbzuai.ac.ae
Relationship: Research Supervisor

Prof. Bhiksha Raj
Professor of Computer Science
Carnegie Mellon University
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Relationship: Research Supervisor

Dr. Stewart Smith
Senior Lecturer of Electronics and Electrical Engineering
The University of Edinburgh
Email: stewart.smith@ed.ac.uk
Relationship: Personal Tutor (Faculty Advisor)