EDUCATION

University of Illinois at Urbana-Champaign   PhD in
Mechanical Engineering, Applied Machine Learning (ML)   Expected May 2024
Master of Science in Aerospace Engineering   2019
Related Coursework: Deep Learning (DL), Reinforcement Learning (RL), Generative AI, Artificial Intelligence

Lehigh University   Master of
Engineering in Mechanical Engineering, Manufacturing   2011
Bachelor of Science in Mechanical Engineering   2010

TECHNICAL SKILLS

ML: Semi/un/supervised, DL, transfer learning (Transformers, CNNs, etc.), fine-tuning, few-shot learning, distributed learning
Dev: Python, Tensorflow, Pytorch, Keras, Scikit-learn, Git, cloud computing, Linux, MATLAB
Data Management: Pandas, MySQL, Parquet, Dask.
Spoken Languages: Arabic and English

WORK EXPERIENCE

University of Illinois at Urbana-Champaign   Urbana-Champaign, IL
Research Assistant & Teaching Assistant   August 2016 – Present
- Engineered a robust multi-modal ML framework for real-world application, significantly enhancing system deployment readiness.
- Implemented denoising algorithms & generated data to boost detection accuracy and model reliability in diverse environments.
- Advanced sensor fusion methodologies to optimize data quality for ML processing, markedly improving detection performance.
- Created data pipelines and engineered features robust to environmental disturbances, yielding improved model performance.
- Managed participant recruitment, coordination, & collection of clinical experiments, ensuring well-labeled & accurate datasets.
- Led a team of 30 graduate and undergraduate students, mentoring, coordinating, and evaluating.

Courses taught: Fundamentals of Signal Processing, Design of Thermal Systems, Design for Manufacturability, Mechanical Design II

Joint Center of Excellence at KACST and Stanford University   Palo Alto, CA, & Riyadh, Saudi
Research Associate   *Jan* 2015 – Aug 2016
- Spearheaded the design and optimization of bespoke subscale aircraft test beds, significantly advancing stall-spin (SS) research through the integration of advanced signal processing, sensor fusion, and ML flight classification algorithms.
- Enhanced stall and spin prediction models with innovative sensor fusion, denoising, and ML classification algorithms.
- Optimized Data Acquisition system, & data management to increase operational flight-testing efficiency.
- Engineered a novel fail-safe SS detection controller using predictive analytics, setting new standards in SS prediction and recovery systems, contributing to advancing aerospace safety protocols.
- Created novel methodologies to evaluate airflow conditions and characteristics through hardware and software design.

SABIC   Aljubail, Saudi
Machinery Diagnostics Engineer   *Mar* 2011 – Jan 2015
- Pioneered the use of data mining to provide insights, significantly improving productivity and reliability metrics.
- Provided critical engineering support globally, enhancing productivity across 90 affiliates.
- Led the revamp of engineering SOPs, streamlining procedures across SABIC's global operations.
- Spearheaded lean manufacturing initiatives, improving production records by 15% and operational efficiency by 12%.

Publications

- Alkurdi, A. et al., Review of Machine Learning Methods for Anxiety Detection. *IEEE Trans. on Affective Computing*, submitted
- Alkurdi, A. et al., Assessing Impact of Environmental noise on Anxiety Detection. *IEEE Trans. on Affective Computing*, under submission
- Alkurdi, A. et al., Advancing Anxiety Detection: Efficacy of Machine Learning Models in Real-World, under submission
- Ziegelman, L., Alkurdi, A. et al., Feasibility of VR in Eliciting Anxiety in Older Women. *2021 IEEE EMBC.*
- R. B., Alkurdi, A., et al., In-flight measurement of wing surface pressures on UAV during stall/spin maneuvers. *2016 AIAA flight testing*.

PROJECT HIGHLIGHTS

NanoGPT chatbot
- Created a generative pretrained transformer gpt3-based chatbot. Based on Andrej Karpathy implementation.
- Trained on Shakespeare writings, it generates conversation based on user prompt.

GANs Image generator and CNN explainer

- Created a discriminator/generator GAN pair on the CIFAR10 datasets, for synthetic image generation to maximize class output scores or highlight specific features, utilizing it as an explainability method for CNNs.

RL-based glider pilot
- Created a OpenAI gym environment that is a simulation of flight mechanics.
- Implemented a SARSA RL to learn to navigate turbulent environment to maximize flight path.
- Implementation based on Reddy et al.'s "Glider Soaring via RL in the field."

Awards
'16-'22 Fellowship, Awarded the KACST Graduate Studies Fellowship for exceptional achievements researchers
'05-'13 Award, Awarded the 'Future Leader Shield' by SABIC CEO for performance and leadership excellence as a junior engineer
'05-'13 Fellowship, Awarded the SABIC College Scholarship for B.S. and M.S. in Mechanical Engineering