Mohammed Baharoon

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Website | Scholar | LinkedIn | GitHub | Twitter

Education

Penn State University — World Campus (Online)
Bachelor of Science, Software Engineering, *GPA: 4.0/4.0* — May 2021 - May 2025

Relevant Coursework: Intermediate Programming; Object Oriented Design; Digital Design; Programming Languages Concepts; Matrices; Calculus with Analytic Geometry I & II; Ordinary Differential Equations.

King Saud bin Abdulaziz University for Health Sciences — Riyadh, Saudi Arabia
Bachelor of Health Informatics, *GPA: 4.74/5.0, Rank: 1/26* — Jul 2019 - Jun 2023

Leadership: Google DSC Founder and Lead, TEDxKSAU Technical Lead

Medical Coursework: Anatomy and Physiology; Principles of Disease (Immunology and Pathology); Basic Pharmacology; Biochemistry; Behavioral Sciences.

Informatics Coursework: Introduction to Health Care Systems; Information Systems; Analysis of Healthcare Data; Coding and Classification Systems; Health care Data Structures and Management; Systems Analysis.

Experience

King Abdullah University of Science and Technology (KAUST) — Thuwal, Saudi Arabia
Computational Sciences Group — December 2023 - June 2024
Research Intern - PI: Prof. Dominik L. Michels

- Will be employing self-supervised and multimodal learning for plant disease identification from visual modalities and meteorological data.

MedARC — Remote
Neuroimaging & AI Lab — August 2023 - Present
Research Volunteer - PI: Dr. Paul S. Scotti

- Developing a self-supervised foundation model for fMRI representations using a joint masked auto encoding with contrastive learning objective.
- Building pipelines for downstream fMRI tasks like fMRI-to-image retrieval and image reconstruction, for comprehensively evaluating the foundation model and comparing the results to SoTA.

Fatima Fellowship — Remote
Research Fellow - Mentor: Dr. Wei Peng — Jun 2023 - Present

- Working on a self-supervised multimodal foundation model for downstream medical image analysis across X-ray, CT, and MRI using an extension of DINOv2's method.
- Evaluating the robustness of open source foundation models trained on natural images in the medical domain, under different tasks and modalities and under low and high data settings.

Tahakom — Riyadh, Saudi Arabia
Systems Engineering Department — Mar 2023 - Jun 2023
Software Developer Intern - Manager: Majed Bin Osfoor

- Developed a YOLOv7-based tailgating detection system with a +95% precision rate, tested throughout multiple days on real live stream data.
- Optimized the system's efficiency by 2-3x for NVIDIA edge computing by incorporating efficient object tracking, conditional inference, and other optimization techniques with DeepStream SDK.

King Abdullah International Medical Research Center — Riyadh, Saudi Arabia
AI & Bioinformatics Department — Oct 2022 - Mar 2023
Research Intern - Supervisor: Prof. Abdulrhman Aljouie

- Devised multimodal deep learning systems that combine fundus photographs with demographic information to predict hypertension, open-sourcing the code and model weights. [Link]
- Outperformed previous fundus-only systems for hypertension prediction by 2-5% in AUROC and AUPRC scores by the incorporation of demographic data using intermediate fusion. [Link]

Publications

[1] **Baharoon, M.**, Almatar, H., Alduhayan, R., Aldebasi, T., Alahmadi, B., Bokhari, Y., Alawad, M., Almazroa, A., & Aljouie, A. (2023). HyMNet: a Multimodal Deep Learning System for Hypertension Classification using Fundus Photographs and Cardiometabolic Risk Factors. arXiv preprint arXiv:2310.01099.

Awards, Honors, and Achievements

- Google CSRMP Scholar, Google Research — Class 2022B
- The President Walked Award, Penn State University — 2022
- Nominated for Prince Faisal bin Bandar Award for Excellence and Creativity — 2023

Teaching and Talks

Teaching Mathematics to over 25,000 views at YouTube, @Al-Jawhar.

Taught the 4-day course "Introduction To Programming with Python" to over 35 students at KSAU-HS.

Presented a lecture on Deep Learning applications to over 400 people as part of an online AI Bootcamp.

Gave a talk on Computer Vision with TensorFlow to over 200 people on Zoom, part of GDSC events.

Skills

Programming: Python, PyTorch, C++, JavaScript, React, Django, PHP, HTML, CSS.
Research: Deep Learning, Computer Vision, multimodal Machine Learning, Medical AI.
Technologies: Linux, Git, Docker, Edge Computing (NVIDIA Jetson).

References

- **Dr. Wei Peng** - wepeng@stanford.edu
  Postdoctoral Researcher, Stanford University
  Under the Fatima Fellowship, I currently work with Dr. Peng on building a cross-modal self-supervised foundation model for medical image analysis.
- **Prof. Abdulrhman Aljouie** aljouieab@mngha.med.sa - (+966) 11 429 4444
  Assistant Professor, KSAU-HS; Associate Research Scientist, KAIMRC
  Prof. Aljouie was my supervisor during my internship at KAIMRC, and I was a student for him in class HINF 414 at KSAU-HS.
- **Prof. Raghib Abusaris** - sarisr@ksau-hs.edu.sa - (+966) 11 4295445
  Professor and Deputy Chairman of the Public Health Programs, KSAU-HS
  I was the top student under Prof. Raghib for the class Mathematical Reasoning (HINF 305), KSAU-HS.

Projects and other experiences

Neuromatch
Technical Department Volunteer

- Worked on building the portal used by more than 4500 students and TAs for applying to Neuromatch Academy [Link]
- Helped implement an attendance system for TAs to track students' attendance on the portal

HyMNet

- HyMNet is a an open multimodal deep learning system that can predict hypertension from fundus photographs, age, and gender features with an AUC of 0.79. [Link]

Rawiyaih

- Built a platform for Arabic writers to write and read novels for a community of other Arabic readers and writers. [Link]

Certifications and Training

Deep Learning Specialization - DeepLearning.AI
T5 Data Science Bootcamp – Saudi Authority for Data and Artificial Intelligence (SDAIA)
NASA L'SPACE Academy - NASA
Google Data Analytics – Coursera
Intermediate JavaScript - MCIT PROGRAM - Udacity