Omnia Alwazzan

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PhD researcher focusing on heterogeneous biomedical data—including computational pathology and omic data—developing novel multi-modal fusion methods using deep learning algorithms for integrative healthcare.

Profile Overview

- Over nine years of hands-on experience in Artificial Intelligence
- **Expertise** in CNNs, Transformers, Attention, LSTM, Graph Neural Networks, Multiple Instance Learning, and clustering
- **Data integration skills** include multi-modality, high-dimensional tabular data (epigenetics, gene expression, RNA-Seq), and biomedical image analysis (computational pathology, MRI, DEXA scans)
- **Developed and applied** fusion methods (outer arithmetic, dual fusion, flattened outer arithmetic attention), including missing-modality scenarios
- **Proficient** in handling heterogeneous data, data filtering, imbalanced data, data collection, and feature selection

Experience

PhD Graduate Researcher, Queen Mary Digital Environment Research Institute, London Sep 2021 – Present

- Developing innovative AI solutions for Cancer diagnostics
- Leveraging state-of-the-art computer vision methods on large-scale datasets
- Research themes include:
  - multimodal fusion methods – supervised/unsupervised – AI segmentation tools
  - Multiple-instance learning – Attention and Transformer-based methods
- Published 2 first-author papers and one collaborative paper
- Participated in MICCAI medical image segmentation challenges (4th place in ranking).

Research Assistant, Project collaboration between AstraZencs and Queen Mary University of London, London Feb 2024 – Aug 2024

- Developed a multimodal AI model for holistic precision healthcare
- Research themes include:
  - Multimodal drug prediction – Large-scale data cleaning and visualization, – Clustering – AI Explainability

Teaching Assistant, Department of Computer Science and Information Technology, University of Jeddah, Saudi Arabia Sep 2019 – Aug 2021

- Taught and assisted professors in Computer Science courses and labs.

Teaching Assistant, Department of Computer Science and Information Technology, King Abdul-Aziz University, Saudi Arabia Sep 2014 – Aug 2016

- Taught and assisted professors in Computer Science labs

IT Trainer & Team Leader, King Abdul-Aziz University Hospital, Saudi Arabia Jan 2013 – Jun 2014

- - Trained medical staff on the B-Line system, delivered regular project updates to leadership, and resolved technical issues

Education

- **Queen Mary University of London**, PhD in Computer Science — September 2021 – April 2025
  Thesis Title: Deep Multi-modality Fusion for Integrative Healthcare
- **Georgia State University, USA, ATL, GA**, MS in Computer Science — Aug 2017 – Aug 2019
  Thesis Title: Image Captioning and Classification Using Deep Learning Approach
- **King Abdulaziz University, Saudi Arabia**, BS in Computer Science — May 2008 – May 2012
  Thesis Title: Wedding Planner Web-based System

Academic Service

- **Conference and Journal Reviewer:** Reviewed for IEEE TMI journal and MIUA 2022, ISBI 2022, ISBI 2023, and ISBI 2024

Publications:

- **Alwazzan O**, Gallagher-Syed A, Millner T, Brandner C, Patras I, Slabaugh G. "Multimodal Outer Arithmetic Block Dual Fusion of Whole Slide Images and Omics Data for Precision Oncology," IEEE TMI 2025. (Under-Review)
- Zolotarev A, Johnson K, Mohammad Y, **Alwazzan O**, Slabaugh G, Roney C, "Generative AI to Improve the Prediction of Atrial Fibrillation Ablation Outcomes" Frontiers in Cardiovascular Research 2025. (Under-Review)
- Gallagher-Syed A, Senior H, **Alwazzan O**, Pontarini E, Bombardieri M, Pitzalis C, Lewis MJ, Barnes MJ, Rossi L, Slabaugh G. "BioX-CPath: Biologically-driven Explainable Diagnostics for Multistain IHC Computational Pathology," IEEE/CVF CVPR 2025. (Under-Review)
- **Alwazzan O**, Patras I, and Slabaug G, “FOAA: Flattened Outer Arithmetic Attention for multimodal tumor classification,” in International Symposium on Biomedical Imaging (ISBI). IEEE, 2024. **Oral**
- **Alwazzan O**, Khan A, Patras I, and Slabaug G, “MOAB: Multi-modal Outer Arithmetic Block for fusion of histopathological images and genetic data for brain tumor grading,” in International Symposium on Biomedical Imaging (ISBI). IEEE, 2023. **Oral**
- Khan A, **Alwazzan O**, Benning M, Slabaugh G., "Sequential Segmentation of the Left Atrium and Atrial Scars Using a Multi-scale Weight Sharing Network and Boundary-based Processing," (STACOM) workshop, (LAScarQS), MICCAI-2022. **Best Paper Award**

Honors and Awards

- Conducted a research project in collaboration with AstraZeneca as a research assistant, resulting in securing a Knowledge Transfer Partnership (KTP) grant
- Oral presentation, International Symposium on Biomedical Imaging, (ISBI) 2024 — May 2024
- Oral and poster presentation, International Symposium on Biomedical Imaging, (ISBI) 2023 — May 2023
- Best Paper Award, LAScarQS challenge MICCAI-2022 — Sep 2022

Technical Skills

Deep Learning Frameworks: Proficient with PyTorch; familiar with TensorFlow and Keras

Programming Languages: Proficient with Python; working knowledge of C, C++, Java, JavaScript, PHP, HTML, and MATLAB

Data Analysis Tools: Proficient with OpenCV, NumPy, Pandas, SimpleITK, OpenSlide, QuPath, SciPy, and WeightsandBiases (WandB).