Mashaan Alshammari

مشعان عواد الشمري

Email | YouTube | GitHub | LinkedIn

I am a machine learning researcher, working on graph clustering and deep learning problems. Previously, I held academic positions in an Australian institute and a Saudi university, where I designed computer science courses for both master's and undergraduate levels.

Education

Doctor of Philosophy - PhD, Computer Science, *The University of Sydney*, ***2017 — 2021***
Thesis title: Graph Filtering and Automatic Parameter Selection for Efficient Spectral Clustering

Master of Science, Computer Science, *King Fahd University of Petroleum and Minerals (KFUPM)*, ***2013 — 2016***
Thesis title: Human In-Place Action Recognition using Combination of Kinect Data Streams

Bachelor of Science, Computer Science, *University of Hail,* ***2005 — 2010***

Skills

Research & Development	A leading author on 13+ research papers, with 100+ verified reviews on ORCID.
Technical	Previously Java and Matlab, currently using Python's ML libraries (pytorch, jax, flax, PyG, scikit-learn).
Curriculum design	Designing CS courses following Australian Qualifications Framework (AQF) and Saudi Arabia's NCAAA.
Social media	22K+ views and 550+ watch hours for my YouTube educational videos.

Professional Experience

Curriculum Development Collaborator ***Jul 2023 — Present***
Sydney Polytechnic Institute ***Remote***

- Participated in curriculum development for a Master of Data Science and Bachelor of Computing.
- Designed the outline and planner documents for courses: Database Systems (U211), Cybersecurity and Information Assurance (U312), and Full-stack development (U322).

Machine Learning Researcher ***Jun 2022 — Present***
Freelance ***Riyadh, Saudi Arabia***

- Working on machine learning research with researchers from the University of Sydney and KFUPM.
- Our research focuses on Graph Convolutional Network (GCN) and Unsupervised Domain Adaptation (UDA).
- Creating YouTube tutorials on Python ML experiments using PyTorch, JAX, Flax, and scikit-learn.

Assistant Professor ***Jan 2021 — Jun 2022***
University of Hail ***Hail, Saudi Arabia***

- Participated in curriculum design and lecturing for multiple graduate and undergraduate computer science courses.
- Adapted new teaching strategies to teach the following courses: data structures (ICS202), advanced database (ICS434), and machine learning for big data (CSAI510).

Curriculum Development Collaborator ***Sep 2020 — Mar 2021***
Sydney Polytechnic Institute ***Sydney, Australia***

- Participated in curriculum development for a Master of Data Science.
- Designed lecture slides, assignments, practical sessions, and exams for courses: Database Systems and Infrastructure (MDS604), Mathematics for data science (MDS602), and Artificial Intelligence and Innovation (MDS607).

System Engineer ***Aug 2010 — May 2012***
SABIC ***Jubail, Saudi Arabia***

- In charge of securing and maintaining the plant network components.
- Successfully upgraded obsolete network components while maintaining uninterrupted plant operations.

Intern ***Jun 2009 — Jan 2010***
Saudi Aramco ***Dhahran, Saudi Arabia***

- Completed cooperative training at EXPEC ARC as a member of the computational modeling team.
- Developed a GUI interface populating the simulator output, large text files, into a database.

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Selected Projects

My YouTube Channel *pytorch, jax, Jupyter*

- I create videos explaining machine learning methods. The video starts by reading a paper or a book and ends with a code.
- I cover topics like how a convolutional layer is implemented as matrix multiplication in pytorch.

VisionTransformer-MNIST *ViT, pytorch, Jupyter*

- Implementation of "An Image is Worth 16x16 Words: Transformers for Image Recognition at Scale", by Google research.
- Vision transformers replace CNNs as the preferred method for image classification.

Graph Convolutional Networks (GCNs) *GNNs, GCNs, pytorch, Jupyter*

- Implementation of "Semi-Supervised Classification with Graph Convolutional Networks", which was published in ICLR2017.
- Graph Convolutional Networks (GCNs) perform node classification in graphs.

ADDA *GANs, pytorch, Jupyter*

- Implementation of the paper "Adversarial Discriminative Domain Adaptation", which was published in CVPR 2017.
- ADDA uses GANs to perform unsupervised domain adaptation (UDA).

Selected Publications

- **Mashaan Alshammari**, John Stavrakakis, Adel F. Ahmed, Masahiro Takatsuka: "Graph Construction using Principal Axis Trees for Simple Graph Convolution.", arXiv:2302.12000, 2023.
- **Mashaan Alshammari**, John Stavrakakis, Adel F. Ahmed, Masahiro Takatsuka: "Random projection forest initialization for graph convolutional networks.", MethodsX, 2023.
- **Mashaan Alshammari**, John Stavrakakis, Adel F. Ahmed, Masahiro Takatsuka: "Random projection tree similarity metric for SpectralNet.", Array, 2023.
- **Mashaan Alshammari**, John Stavrakakis, Adel F. Ahmed, Masahiro Takatsuka: "The Effect of Points Dispersion on the k-nn Search in Random Projection Forests.", IEEE Access, 2022.
- **Mashaan Alshammari**, John Stavrakakis, Masahiro Takatsuka: "A Parameter-Free Graph Reduction for Spectral Clustering and Spectralnet.", Array, 2022.
- **Mashaan Alshammari**, John Stavrakakis, Masahiro Takatsuka: "Refining a k-nearest neighbor graph for a computationally efficient spectral clustering.", Pattern Recognition, 2021.
- **Mashaan Alshammari**, Masahiro Takatsuka: "Approximate spectral clustering density-based similarity for noisy datasets.", Pattern Recognition Letters, 2019.
- **Mashaan Alshammari**, Masahiro Takatsuka: "Approximate spectral clustering with eigenvector selection and self-tuned k.", Pattern Recognition Letters, 2019.

Selected Activities

Journal Reviewer

- Pattern Recognition Journal
- Neurocomputing Journal
- Information Sciences Journal

Conference Organization

- Program committee, 30th International Conference on Neural Information Processing (ICONIP2023), Changsha, China, November 20-23, 2023.
- Technical Program Committee, 7th International Conference on Data Science and Machine Learning Applications (CDMA2022), Riyadh, Saudi Arabia, March 1-3, 2022.