Mashaan Alshammari

Riyadh, Saudi Arabia
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Last Updated: February 2024

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. I designed material for computer science at masters 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	Authored +15 research papers.
Communication	English (fluent), Arabic (native).
Technical	Python and Java programming, Python's ML libraries (scikit-learn, pytorch, seaborn).
Curriculum design	Experience in designing computer science and data science courses according to Australian Qualifications Framework (AQF) and Saudi Arabia's NCAAA.

Professional Experience

CURRICULUM DEVELOPMENT COLLABORATOR — **Jul 2023 — Present**
Sydney Polytechnic Institute — *Sydney, Australia*

- 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).
- Designed experiments using python ML libraries (scikit-learn, pytorch, seaborn, and others).

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.
- Upgraded obsolete network components during online operation.

INTERN — **JUN 2009 — JAN 2010**
Saudi Aramco — *Dhahran, Saudi Arabia*

- Completed cooperative training at EXPEC ARC as a member of 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, Jupyter Notebook

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

VisionTransformer-MNIST

ViT, pytorch, Jupyter Notebook

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

Graph Convolutional Networks (GCNs)

GNNs, GCNs, pytorch, Jupyter Notebook

- Implementation of the paper *"Semi-Supervised Classification with Graph Convolutional Networks"*, which was published in ICLR 2017.
- Graph Convolutional Networks (GCNs) perform node classification in graphs.

ADDA

GANs, pytorch, Jupyter Notebook

- 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
- Information Sciences Journal
- Expert Systems with Applications 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.