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ALI ZIA

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Educational History

1. Doctor of Philosophy (Artificial Intelligence) from Griffith University, Australia, 2020
   Thesis: Exploring extrinsic spectral properties of hyperspectral image for 3D computer vision.
2. Master's in Computing from Australia National University, Australia, 2009
   Thesis/Project: Structured object recognition for content-based image retrieval.
3. B.Sc. in Computer Sciences (Hons.) from Punjab University, Pakistan, 2006
   Final Project: Biometric security system with control of electric devices of a building.

Employment

Institution	Position	Start Date	End Date
Australian National University, Australia	Postdoctoral Research Fellow, HDR supervisor	2021	Till Date
ARC Hub for Driving Farming Productivity and Disease Prevention, Griffith University, Australia	Research Fellow	2020	2021
Griffith Online Team, Griffith University, Australia	Programmer Developer	2016	2018
Griffith University, Australia	Lecturer, Lab Instructor , and Student Coach	2014	2021
COMSATS University, Pakistan	Assistant Professor	2009	2014
NICTA Neville Roach Lab, Australia	Research Scholar	2008	2009
Various Software houses like Systems Ltd, Cambridge Docs, and Techlogix, Pakistan	Software Engineer	2006	2008
Punjab University, Pakistan	Teaching Assistant	2002	2006

Recent Competitive Funding

Funder:	Project Title:	$ Awarded	Year
MRFF DAAC Mission (Applied)	Multi-modal Dementia Patient Monitoring Using Higher Order Representational Deep Learning.	$2.7M	2024
CSIRO (CSIRO-Chinese Academy of Sscience partnership project)	Novel AI and hyperspectral-based tool to select salt-tolerant legumes to increase grain and pasture production	$500,000	2023
CSIRO	Analyzing protein content in different varieties of chickpeas using hyperspectral imaging and machine learning	$600,000	2023
CSIRO (AI4M)	3D hyperspectral analysis of meat to identify meat contamination project	$135,000	2022

***** Details of old funding available on demand.

Recent Awards and Membership

Name of Prize/Award	Institution/Organisation	Year
Runner-up Paper Award for Contrastive-Aware ViT for Weakly Supervised Semantic Segmentation	DICTA 2023	2023
ICML 2023 Topological Deep Learning Challenge	ICML Topology and Geometry (TAG) in Machine Learning Team	2023

Nominated for CERC Committee and AgCatalyst committee at Agriculture and Food business unit due to active leadership quality	CSIRO	2023

***** Details of old awards available on demand.

Selected Profession Membership/Collaborations:

- Australian Computer Society.
- Queensland AI Hub.
- Association for Advancement of Artificial Intelligence.
- Educational Advances in Artificial Intelligence.
- Florida Artificial Intelligence Research Society.
- IEEE.
- Adjacent Senior Researcher for collaboration in various Universities in Pakistan, Middle East and China.

Research

Research Areas:

Artificial Intelligence, Machine Learning, 3D computer vision, Hyperspectral Imaging and Deep Topological data analysis

Research Statement:

My research endeavors are characterized by a dual focus on theoretical implications and practical applications, driven by a strong commitment to making meaningful contributions to the Australian as well as the global community. During my ab initio research tenure, I conducted pioneering research in the field of near-field hyperspectral imaging for 3D computer vision, focusing on its potential to generate transformative impacts across various sectors, including agriculture, medicine, and beyond. My research outcomes have been practically utilised in products by various organisations and are cited in numerous research articles. Some of this research work includes projects such as livestock behavior detection, 3D hyperspectral analysis for contamination identification in meat, sugarcane disease detection, and the development of a smart monitoring system for Parkinson's patients.
Through my ongoing efforts, I strive to foster positive impacts by pushing the boundaries of innovation and benefiting diverse sectors through the application of cutting-edge technology and methodologies.

Recent Selected Research Projects:

- Livestock Behaviour Recognition.
- Meat Contamination Detection using hyperspectral imaging.
- Chickpea variety profiling using hyperspectral data.
- Predicting salt-tolerance in legumes using hyperspectral data.
- Beneficial insect spreading.
- Document reconstruction.
- Sugarcane disease detection.

Selected Publications:

I have 5 accepted and 2 submitted publications in 2023.

Ali Zia, Abdelwahed Khamis, James Nichols, Usman Bashir Tayab, Zeeshan Hayder, Vivien Rolland, Eric Stone and Lars Petersson. "Topological Deep Learning: A Review of an Emerging Paradigm", A.I. Reviews, 2024.
Impact: One of the first papers to explore different aspects of topological deep learning.

Mustafa Hajij, Mathilde Papillon, Ali Zia et. al. "TopoX: A Suite of Python Packages for Machine Learning on Topological Domains", Journal of Machine Learning Research (Impact Factor: 5.18), 2023 (submitted) **Impact: Open source library to progress work in graph-based topological deep learning.**
Ali Zia, Renuka Sharma, Vivien Rolland, Arablouei, Reza, Lars Petersson, Aaron Ingram. "CVB: A Video Dataset of Cattle Visual Behaviours", CVPR workshop on animal behaviour, 2023. **Impact: First cattle Dataset paper that comprehensively addresses coarse to fine grain behaviours.**
Ali Zia, Jun Zhou, and Yongsheng Gao. "Exploring chromatic aberration and defocus blur for relative depth estimation from monocular hyperspectral Image", IEEE Transactions on Image Processing (IEEE TIP),30:4357-4370, 2021. (Impact factor: 11.041) **Impact: one of the first papers for depth estimation for the monocular hyperspectral image using manifold learning.**
Ali Zia, Jie Liang, Jun Zhou, and Yongsheng Gao. "3D reconstruction from hyperspectral images", In Proceedings of the IEEE Winter Conference on Applications of Computer Vision (WACV), pages 318-325, Waikoloa Beach, Hawaii, 2015. **Impact: One of the first papers on 3D structure from spectra using geodesic distance measures.**
Suhad Lateef Al-khafaji, Jun Zhou, Ali Zia, and Alan Wee-Chung Liew. "Spectral-spatial scale-invariant feature transform for hyperspectral images", IEEE Transactions on Image Processing (IEEE TIP), 27(2):837-850, 2018. (Impact factor: 11.041) **Impact: First paper to explore spatial-spectral features in hyperspectral images based on correlation.**
Usman Bashir Tayab, Ali Zia, Fuwen Yang, Junwei Lu, and Muhammad Kashif. "Short-term load forecasting for microgrid energy management system using hybrid HHO-FNN model with best-basis stationary wavelet packet transform", Energy, 203, 117857, 2020. (Impact factor: 8.857) **Impact: Proposes an effective machine learning approach that combines optimisation strategy for embedded devices.**

***** For further information please visit my google scholar page.

Teaching and Supervision

Teaching, Communication, and Outreach Statement:
During my various academic roles spanning over 15 years at ANU, Griffith, and COMSATS University, my teaching and learning approach included active engagement with students, active learning, project-based learning, inquiry-based learning, and promoting a practical approach to technology-enhanced methods (like interactive digital whiteboards, classes via videoconference and questionnaires). I have also utilised innovative instructional strategies and was able to cultivate a passion for learning among my students resulting in an average rating above 4 out of 5 at various universities. My teaching experience encompasses a broad spectrum of educational settings, accommodating groups of varying sizes through diverse instructional modes, including web-based and face-to-face formats. Notably, my contributions were recognized by Griffith University through my appointment as a student coach, wherein I provided valuable inputs into the university's research student policies and procedures in order to provide the required assistance, guidance, and support to research students. These professional experiences have significantly contributed to the development of my communication and interpersonal skills. My leadership style is inclusive encouraging collaboration with accountability which is an essential ingredient in multifaceted, complex, and challenging projects. I have effectively demonstrated my capacity to collaborate with colleagues and stakeholders, fostering fruitful partnerships.

Selected Courses Taught and Designed:		
• Introduction to Big Data Analytics.	• Artificial Intelligence.	• Computer Vision.

• Sensor Networks. • Introduction to Programming. • Software Engineering. • Electric Circuits.	• Introduction to Machine Learning. • Operating Systems Concepts. • Systems Programming.	• Human-Computer Interaction. • Computing for Management. • Programming Principals.

HDR/Honours Supervision:
• Currently co-supervising 3 PhD students and supervising 1 visiting PhD student (1 year at ANU). • Successfully supervised more than 3 Postgraduate research students and 33 bachelor's (Hons.) students to completion over a period of 15 years for thesis/final year project.

Selected Skills and Technologies:

Development Languages	Python, R, MATLAB Script, C/C++, Java, PHP, JavaScript, Objective C, C#, Assembly Language.
Selected Tools, Frameworks, and Libraries	Slurm (on HPC), PyTorch, TensorFlow, NumPy, OpenCV, MATLAB, Octave, Data ming tools like Orange and Weka, versioning tools like svn and Github, Silex, Twig, Vue.js, Angular, Symfony, Laravel, Visual Studio, Java Struts, JavaServer Faces, Crystal Reports, BPM studio, Bea web Logics server, Apache Tomcat, Rational Rose, Visio, Macromedia Flash, Load Runner, Microsoft Project Manager, Mango DB, SQL server 2003, MySQL, and Oracle etc.
Teaching Aid and Research tools	Blackboard, Moodle, Miro board, Milanote, Zoom, Teams, Yammer, Texstudio, JabRef etc.

References:

1. Prof. Jun Zhou

Professional Relationship: Ph.D. supervisor.
Email: jun.zhou@griffith.edu.au
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2. Prof. Eric Stone

Professional Relationship: PostDoctoral Manager/Supervisor at ANU.
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3. Dr. Vivien Rollands

Professional Relationship: Senior Research Scientist at CSIRO.
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