Ruwan Tennakoon

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I am a computer scientist with over 10 years of experience in computer vision and machine learning. I have delivered robust computer solutions for medical image analysis, smart sensing, intelligent automation, and defense applications.

CAREER

Senior Lecturer - Artificial Intelligence — **RMIT University**
Jan 2022 – Now — Melbourne, Australia

Lecturer - Artificial Intelligence — **RMIT University**
May 2019 – Dec 2021 — Melbourne, Australia

Research Fellow — **RMIT University**
April 2017 – May 2019 — Melbourne, Australia

Post-Doctoral Researcher — **IBM-Research Australia**
May 2016 – April 2017 — Melbourne, Australia

Research Fellow — **RMIT University**
February 2015 – May 2016 — Melbourne, Australia

PROFESSIONAL EXPERIENCE

Senior Electronics Engineer — **EMDigital (Pvt) Ltd**
June 2009 – Feb 2011 — Colombo, Sri Lanka

Engineer - Access Networks — **Dialog Broadband Networks**
February 2007 – April 2009 — Colombo, Sri Lanka

EDUCATION

Swinburne University of Technology, Melbourne, Australia
PhD, Computer Vision, 2011–2015
Thesis: Volumetric Image Analysis: Optical flow, Registration and Segmentation,

University of Peradeniya, Peradeniya, Sri Lanka
BSc (Engineering), Electrical & Electronic Enginerring, 2002–2007 GPA: 3.9/4.0
Results: First Class (Honours)

RESEARCH FUNDING

ARC Linkage Project Grant (Chief Investigator, Machine Learning): Integrity Assessment of Self-Piercing Rivet Joints: i4.0 Approach from 2020 to 2023. $487,419

CSIRO Next Generation Artificial Intelligence Graduate Program (Chief Investigator): AI Techniques for Emergency Management and Critical Infrastructure from 2023 to 2028. $1,485,000

Cyclotek (Aust) Pty Ltd (Lead Chief Investigator): Application of AI techniques to PET imaging 2022 to 2025. $140,000

Defence Science Institute (DSI) Collaborative grant (Lead Chief Investigator): Capability development for 3D virtual representation of stress visualisation data in geometrically components. from 2021 to 2022. $120,000

Innovation Connections Grant (Lead Chief Investigator): Automated inspection system for polypropylene sheet extrusion from 2020 to 2021. $97,436

Defence Science and Technology (DST) (Chief Investigator, Computer Vision): Modelling and Control for Autonomous Underwater Vehicles (AUV's) from 2021 to

2024. $93,000

Defence Science and Technology (DST) (Chief Investigator, Computer Vision): 3D Stress Superimposition Capability for the Digital Enterprise from 2023 to 2023. $99,000

Defence Science and Technology (DST) (Chief Investigator, Machine Learning): Mixed Reality for Aircraft Maintenance from 2022 to 2023. $100,000

HealthRecon Connect (Lead Chief Investigator): Develop predictive models using health insurance claim data for revenue cycle management from 2022 to 2023. $50,000

Australian Machine Vision Pty Ltd (Lead Chief Investigator): Computer Vision based Automated Visual Inspection for Food from 2023 to 2027. $74,000

PUBLICATIONS

I have [co-]authored over 40 peer-reviewed full papers in journals and international conferences. A few selected papers are listed below together with [co-]authored book chapters (1) and patents (3). A complete list of my publications can be found at Google scholar.

Selected Journal Articles

[1] Ruwan B Tennakoon, Alireza Bab-Hadiashar, Zhenwei Cao, Reza Hoseinnezhad, and David Suter. Robust model fitting using higher than minimal subset sampling. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 2016.

[2] WeiQin Chuah, Ruwan Tennakoon, Reza Hoseinnezhad, David Suter, and Alireza Bab-Hadiashar. An information-theoretic method to automatic shortcut avoidance and domain generalization for dense prediction tasks. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, 2023.

[3] Ruwan Tennakoon, Gerda Bortsova, Silas Ørting, Amirali K Gostar, Mathilde MW Wille, Zaigham Saghir, Reza Hoseinnezhad, Marleen de Bruijne, and Alireza Bab-Hadiashar. Classification of volumetric images using multi-instance learning and extreme value theorem. *IEEE Transactions on Medical Imaging (TMI)*, 2019.

[4] R. Tennakoon, A. Sadri, R. Hoseinnezhad, and A. Bab-Hadiashar. Effective sampling: Fast segmentation using robust geometric model fitting. *IEEE Transactions on Image Processing (TIP)*, 2018

[5] Ruwan B Tennakoon, Alireza Bab-Hadiashar, Zhenwei Cao, and Marleen de Bruijne. Nonrigid registration of volumetric images using ranked order statistics. *IEEE Transactions on Medical Imaging (TMI)*, 2014.

[6] Sundaram Muthu, Ruwan Tennakoon, Tharindu Rathnayake, Reza Hoseinnezhad, David Suter, and Alireza Bab-Hadiashar. Motion segmentation of RGB-D sequences: Combining semantic and motion information using statistical inference. *IEEE Transactions on Image Processing (TIP)*, 2020.

Selected Conference Publications

[1] Ruwan Tennakoon, David Suter, Erchuan Zhang, Tat-Jun Chin, and Alireza Bab-Hadiashar. Consensus maximisation using influences of monotone boolean functions. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2021.

[2] WeiQin Chuah, Ruwan Tennakoon, Reza Hoseinnezhad, Alireza Bab-Hadiashar, and David Suter. Itsa: An information-theoretic approach to automatic shortcut avoidance and domain generalization in stereo matching networks. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.

[3] Erchuan Zhang, David Suter, Ruwan Tennakoon, Tat-Jun Chin, Alireza Bab-Hadiashar, Giang Truong, and Syed Zulqarnain Gilani. Maximum consensus by weighted influences of monotone boolean functions. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.

[4] Ruwan Tennakoon, Amirali K. Gostar, Reza Hoseinnezhad, Marleen de Bruijne, and Alireza Bab-Hadiashar. Deep multi-instance volumetric image classification with extreme value distributions. In *Asian Conference on Computer Vision (ACCV)*, 2018.

[5] R. Tennakoon, A. K. Gostar, R. Hoseinnezhad, and A. Bab-Hadiashar. Retinal fluid segmentation in OCT images using adversarial loss based convolutional neural networks. In *2018 IEEE 15th International Symposium on Biomedical Imaging (ISBI 2018)*, April 2018.

Patents

[1] Rahil Garnavi, Dwarikanath Mahapatra, Suman Sedai, and Ruwan Tennakoon. Generating an enriched knowledge base from annotated images, United States patent number: US10002311B1, Jun 2018.

[2] Rahil Garnavi, Dwarikanath Mahapatra, Pallab Roy, Suman Sedai, and Ruwan Tennakoon. Classification of severity of pathological condition using hybrid image representation, United States patent number: US10169872B2, Jan 2019.

[3] Rahil Garnavi, Dwarikanath Mahapatra, Pallab Roy, and Ruwan Tennakoon. System and method to teach and evaluate image grading performance using prior learned expert knowledge base, United States patent number: US10984674B2, Apr 2021.

Book Chapters

[1] Ruwan Tennakoon, Alireza Bab-Hadiashar, and Zhenwei Cao. Nonlinear approaches in three dimensional medical image registration. In *Nonlinear Approaches in Engineering Applications*, pages 251–280. Springer, 2015.

Invited Lecturers/Talks

[1] "Incidental detection of prostate cancer with computed tomography scans" at AI Highlights and REF Snapshots session - Aikenhead Centre for Medical Discovery (ACMD) Research Week. 2021.

[2] "Incidental detection of prostate cancer with computed tomography scans" at Victorian Comprehensive Cancer Centre's (VCCC) Monday Lunch Live forum. 2021.

[3] "Data-Efficient ML for CT Image Analysis: Applications in Prostate Cancer and Emphysema Detection" at AI in Helthcare Workshop Series, Centre for Eye Research Australia (CERA). 2021.

TEACHING

Post-graduate level teaching:

[1] Deep Learning (RMIT University) 2020-Present
Lecturer & Course coordinator. Developed course content.

[2] Computational Machine Learning (RMIT University) 2019-2021
Lecturer & Course coordinator.

Under-graduate level teaching:

[1] Programming Studio 2 (RMIT University) 2023-Present
Lecturer & Course coordinator. Developed course content.

[2] Machine Learning (RMIT University) 2019-2021
Lecturer & Course coordinator.

[3] Advanced Programming Techniques (RMIT University) 2021-2022
Lecturer & Course coordinator.

SUPERVISION

Dr. Alireza Sadri (Associate Supervisor) 2015-2018
Thesis: *Image Analysis by Maximised Statistical Use of Geometry-Shape Constraints.*
Graduate destination: Research Fellow - Monash University.

Dr. Sundaram Muthu (Associate Supervisor) 2018-2022
Thesis:*Identification of Moving Objects in Complex Dynamic Scenes Using Semantics.*
Graduate destination: Postdoctoral Research Fellow - CSIRO.

Dr. Wei Qin Chuah (Associate Supervisor) 2019-2022
Thesis: *Passive Visual Depth Estimation in Deep Learning Era.*
Graduate destination: Research Fellow - RMIT.

Dr. Ayman Mukhaimar (Associate Supervisor) 2019-2022
Thesis:*Robust 3D Shape Classification: A Machine Learning Approach.*
Graduate destination: Research Fellow - RMIT.

Steven Korevaar (Associate Supervisor) 2020-Present
Thesis: *Domain generalization for medical image analysis.*

Prabath Mudiyanselage (Senior Supervisor) 2022-Present
Thesis:*Application of AI Techniques to Positron Emission Tomography (PET) Imaging.*

AWARDS & SCHOLARSHIPS

[1] Best paper award (Silver), Workshop on AI-enabled Medical Image Analysis (AIMIA) - ECCV 2022. D. Mahapatra, S. Korevaar, B Bozorgtabar, R Tennakoon., "Unsupervised domain adaptation using feature disentanglement and GCNs for medical image classification".

[2] Best Bovine Paper award, Australian Robotic and Automation Association, 2022. Paper: Wei Chuah et. al. "Towards Building a vet assist system: Animal pose estimation and counting walking steps".

[3] Invention Achievement Award - IBM Research Australia, 2017.

[4] Mangers choice of the year award - IBM Research Australia, 2016.

[5] Swinburne University Postgraduate Research Award (SUPRA) - 2011 to 2014.

PROFESSIONAL ACTIVITIES

Program Committee member at international conferences

[1] Awards/Promotion chair (VIC): Digital Image Computing: Techniques & Applications (DICTA), 2020 (Website).

[2] Program committee member: International Conference on Robotics, Computer Vision and Intelligent Systems (ROBOVIS) 2024 (Website).

Reviewer for international journals

[1] IEEE Transaction on Medical Imaging (TMI).

[2] IEEE Transaction on Image Processing (TIP).

[3] IEEE Transactions on Neural Networks and Learning Systems (TNNLS).

[4] IEEE Transactions on Intelligent Transportation Systems (T-ITS).

[5] IEEE Access

COMPUTER SKILLS

Expert skills in programming: C, C++, Python, VHDL, Assembly and MATLAB.
Proficiency with deep learning frameworks: Tensorflow, Keras, Caffe, Theano.
Proficiency with computer vision toolkits: OpenCV, Insight Segmentation and Registration Toolkit (ITK).

REFEREES

Available on Request