# 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

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

**Elbit Systems of Australia** (Chief Investigator, Computer Vision): Crowd monitoring for Emergency management 2022 to 2024. $418,000

**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, Machine Learning): Mixed Reality for Aircraft Maintenance from 2022 to 2023. $100,000

**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] 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.

[3] 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

[4] 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.

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

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

**Under-graduate level teaching**:

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

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

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

[4] 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.

**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**