Anh-Dzung Doan

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EDUCATION

The University of Adelaide — South Australia, Australia
Ph.D. in Computer Science. — *Mar. 2018 - Mar. 2022*

Vietnam National University (University of Science) — Ho Chi Minh City, Vietnam
B.Sc. (with Honours) in IT. — *Sept. 2009 - Sept. 2013*

EXPERIENCE

Postdoctoral researcher — July 2021 - Present
Australian Institute for Machine Learning — *South Australia, Australia*

- Project: *Domain adaptation for maritime situational awareness* with Safran.
  - Develop a weakly supervised test-time domain adaptation, effectively mitigating the domain disparity between simulated and real images, including visible and infrared modalities captured by Safran's Vigy Observer.
  - Develop a "when to adapt" method, saving 50%-90% energy usage for continual domain adaptation without sacrificing the overall performance of the object detection.
  - Develop a diffusion method for infrared-to-visible video translation, achieving a significant improvement in day-to-night object detection accuracy.
- Project: *Edge domain adaptation* with SmartSat CRC.
  - Develop a bandwidth-efficient model update method, achieving domain adaptation by updating only 1% of ResNet50's weights.
  - Our method has been ***implemented in Kanyini***—the first satellite fully designed, built, and owned by South Australia..
- Project: *Neuromorphic computing for combinatorial optimization* with Intel Labs.
  - Develop a novel spiking neural network formulation for hypergraph minimum vertex cover.
  - Our method, ***tested on Intel's Loihi2 neuromorphic chip***, achieves high-quality solutions with significantly lower energy consumption than CPU-based solvers.
- Project: *Quantum robust fitting*.
  - Develop a hybrid quantum-classical algorithm for robust fitting
  - Our algorithm, ***tested on the D-Wave Advantage quantum machine***, offers a global solution or an error bound with sub-linear time complexity, that enables efficient scalability.

Ph.D. student — Mar. 2018 - July 2021
Australian Institute for Machine Learning — *South Australia, Australia*

- Project: *Life-long visual place recognition*.
  - Using state estimation frameworks to develop scalable algorithms for place recognition, exhibiting a sub-linear space-time complexity, particularly effective for scenarios involving continuous accumulation of new data.
  - Won IEEE RA-L Best Paper Award 2021 and APRS/IAPR Best Paper Award in DICTA 2019.
- Project: *Synthesis of urban scenes from games*.
  - Using C++ and Scripthook to develop G2D—an interactive software to collect data from Grand Theft Auto V.
  - G2D has been widely adopted by robotics and computer vision researchers worldwide.
- Project: *Space robotics and rovers*
  - Using Kalman filter, pose estimation, and deep learning to develop a localisation method for rover navigation.
  - Won 3rd place and an innovation award in NASA Space Robotics Challenge (Final stage).

Research intern — June 2020 - Oct. 2020
Niantic US — *Remote*

- Project: *Visual positioning system*.
  - Using camera pose estimation and deep learning to develop a 3D map summarisation method.

Research assistant — Oct. 2014 - Sept. 2017
Temasek Laboratories, Singapore University of Technology and Design — *Singapore*

- Project: *Urban-area scene-based localisation*.
  - Using quantisation, hashing, and camera pose estimation to develop algorithms for on-device visual localisation.
  - The system can be processed entirely on a mobile device.

Co-founder Aug. 2013 - July 2014
Mobile Vision *Ho Chi Minh City, Vietnam*

- Project: *Fine-grained object recognition.*
  - Using Java, C++, OpenCV, and quantisation to develop algorithms, back-end, and front-end architectures.
  - The software can be deployable on an Android OS.

Research intern Feb. 2013 - Mar. 2013
Japan Advanced Institute of Science and Technology *Ishikawa, Japan*

- Conducted research in human action recognition.

AWARDS

2022	**IEEE RA-L Best Paper Award**
2021	**3rd place & Innovation award in NASA Space Robotics Challenge.**
2018-2021	**University of Adelaide International Wildcard Scholarship**
2019	**APRS / IAPR Best Paper Award in DICTA 2019**.
2013	1st Prize - The President's Research Excellence Award. The Chancellor's Research Excellence Award. The Chancellor's Academic Excellence Award.

PUBLICATIONS

Published papers in top AI venues (e.g., NeurIPS, CVPR, ICCV, ECCV, RA-L, ICRA, etc).

Patent

2022 Dung Anh Doan, Daniyar Turmukhambetov, Soohyun Bae
"Repeatability predictions of interest points"
US Patent Application Number 17730555

Journals

2024 Anh-Dzung Doan, Bach Long Nguyen, Surabhi Gupta, Ian Reid, Markus Wagner, Tat-Jun Chin
"Assessing Domain Gap for Continual Domain Adaptation in Object Detection"
Computer Vision and Image Understanding (CVIU) **(Q1, IF = 4.3)**.

Andrew Du, Anh-Dzung Doan, Yee Wei Law, Tat-Jun Chin
"Domain Adaptation for Satellite-Borne Multispectral Cloud Detection"
Remote Sensing **(Q1, IF = 4.2)**.

Bach Long Nguyen, Anh-Dzung Doan, Tat-Jun Chin, Christophe Guettier, Estelle Parra, Ian Reid, Markus Wagner
"Sensor Allocation and Online-Learning-based Path Planning for Maritime Situational Awareness Enhancement: A Multi-Agent Approach"
IEEE Transactions on Intelligent Transportation Systems (T-ITS) **(Q1, IF = 7.9)**.

2021 Anh-Dzung Doan, Yasir Latif, Tat-Jun Chin, Ian Reid
"HM^4: Hidden Markov Model with Memory Management for Visual Place Recognition"
IEEE Robotics and Automation Letters (RA-L) **(Q1, IF = 4.6)**.

2020 Anh-Dzung Doan, Yasir Latif, Tat-Jun Chin, Yu Liu, Shin-Fang Ch'ng , Thanh-Toan Do, Ian Reid
"Visual Localization Under Appearance Change: Filtering Approaches"
Neural Computing and Applications (NCAA) **(Q1, IF = 4.5)**.
Special Issue on Best of DICTA 2019

2019 Thanh-Toan Do, Tuan Hoang, Dang-Khoa Le Tan, Anh-Dzung Doan, Ngai-Man Cheung
"Compact Hash Code Learning with Binary Deep Neural Network"
IEEE Transactions on Multimedia (TMM) **(Q1, IF = 8.4)**.

2018 Ngoc-Trung Tran, Dang-Khoa Le Tan, Anh-Dzung Doan, Thanh-Toan Do, Tuan-Anh Bui, Mengxuan Tan, Ngai-Man Cheung
"On-device Scalable Image-based Localization via Prioritized Cascade Search and Fast One-Many RANSAC"
IEEE Transactions on Image Processing (TIP) **(Q1, IF = 10.8)**.

Conferences

2024 Tam Ngoc-Bang Nguyen, Anh-Dzung Doan, Zhipeng Cai, Tat-Jun Chin.
"Slack-Free Spiking Neural Network Formulation for Hypergraph Minimum Vertex Cover".
The Annual Conference on Neural Information Processing Systems (NeurIPS) **(CORE A*)**.

Ryan Faulkner, Luke Haub, Simon Ratcliffe, Anh-Dzung Doan, Ian Reid, Tat-Jun Chin.
Simultaneous Diffusion Sampling for Conditional LiDAR Generation.
Under review

Anh-Dzung Doan, Vu Minh Hieu Phan, Surabhi Gupta, Markus Wagner, Tat-Jun Chin, Ian Reid.
TC-PDM: Temporally Consistent Patch Diffusion Models for Infrared-to-Visible Video Translation.
Under review

Anh-Dzung Doan, Bach Long Nguyen, Terry Lim, Madhuka Jayawardhana, Surabhi Gupta, Christophe Guettier, Ian Reid, Markus Wagner, Tat-Jun Chin.
Weakly Supervised Test-Time Domain Adaptation for Object Detection.
Under review

2022 Anh-Dzung Doan, Michele Sasdelli, Tat-Jun Chin, David Suter.
"A Hybrid Quantum-Classical Algorithm for Robust Fitting".
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) **(CORE A*)**.

Ragav Sachdeva, Ravi Hammond, James Bockman, Alec Arthur, Brandon Smart, Dustin Craggs, Anh-Dzung Doan, Thomas Rowntree, Elijah Schutz, Adrian Orenstein, Andy Yu, Tat-Jun Chin, Ian Reid
"Robotic Vision for Space Mining"
International Conference on Robotics and Automation (ICRA) **(CORE A*)**.

2021 Anh-Dzung Doan, Daniyar Turmukhambetov, Yasir Latif, Tat-Jun Chin, Soohyun Bae
"Learning to Predict Repeatability of Interest Points"
International Conference on Robotics and Automation (ICRA) **(CORE A*)**.

2020 Yasir Latif, Anh-Dzung Doan, Tat-Jun Chin, Ian Reid
"SPRINT: Subgraph Place Recognition for INtelligent Transportation"
International Conference on Robotics and Automation (ICRA) **(CORE A*)**.

2019 Anh-Dzung Doan, Yasir Latif, Tat-Jun Chin, Yu Liu, Thanh-Toan Do, Ian Reid
"Scalable Place Recognition Under Appearance Change for Autonomous Driving"
IEEE/CVF International Conference on Computer Vision (ICCV) **(Oral) (CORE A*)**.

Anh-Dzung Doan, Yasir Latif, Thanh-Toan Do, Yu Liu, Shin-Fang Ch'ng, Tat-Jun Chin, Ian Reid
"Visual Localization Under Appearance Change: A Filtering Approach"
International Conference on Digital Image Computing: Techniques and Applications (DICTA)

Shin-Fang Ch'ng, Alireza Khosravian, Anh-Dzung Doan, Tat-Jun Chin
"Outlier-Robust Manifold Pre-Integration for INS/GPS Fusion"
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) **(CORE A)**.

2016 Thanh-Toan Do, Anh-Dzung Doan, Ngai-Man Cheung
"Learning to Hash with Binary Deep Neural Network"
European Conference on Computer Vision (ECCV) **(CORE A*)**.

Thanh-Toan Do, Anh-Dzung Doan, Duc-Thanh Nguyen, Ngai-Man Cheung
"Binary Hashing with Semidefinite Relaxation and Augmented Lagrangian"
European Conference on Computer Vision (ECCV) **(Spotlight) (CORE A*)**.

2013 Dung A. Doan, Ngoc-Trung Tran, Phong D. Vo, Bac Le, Atsuo Yoshitaka
"Combining Descriptors Extracted from Feature Maps of Deconvolutional Networks and SIFT Descriptors in Scene Image Classification"
The International Conference on Computational Science and Its Applications (ICCSA).

Dung A. Doan, Ngoc-Trung Tran, Phong D. Vo, Bac Le
"Learned and Designed Features for Sparse Coding in Image Classification"
The 10^{th} International Conference on Computing and Communication Technologies (RIVF).

Technical reports

2019 Anh-Dzung Doan, Abdul Mohsi Jawaid, Thanh-Toan Do, Tat-Jun Chin
"G2D: from GTA to Data"
arXiv preprint arXiv:1806.07381.
[Project page]

MENTORSHIP

Current Tam Ngoc-Bang Nguyen (Ph.D.) - Topic: *Neuromorphic computing for combinatorial optimization.*

Ryan Faulkner (Ph.D.) - Topic: *Diffusion models for LiDAR generation.*

Past Andrew Du (Ph.D.) - Topic: *Edge domain adaptation.* Now Lead AI Engineer in SmartSat CRC.

Tianjiao Jiang (Master) - Topic: *Federated learning for visual place recognition.* Now Ph.D. student in The University of Adelaide with a full scholarship.

ACTIVITIES

Member of Technical Program Committee

- RSS 2023 Workshop on Towards Safe Autonomy: New Challenges and Trends in Robot Perception (website)

Regular reviewer for top AI conferences and journals:

- IEEE Robotics and Automation Letters (RA-L).
- International Journal of Robotics Research (IJRR).
- IEEE Transactions on Multimedia (TMM).
- IEEE Transactions on Artificial Intelligence (TAI).
- APSIPA Transactions on Signal and Information Processing.
- IEEE Transactions on Emerging Topics in Computational Intelligence.
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE/CVF Conference on Computer Vision and Pattern Recognition.
- IEEE/CVF International Conference on Computer Vision (ICCV).
- European Conference on Computer Vision (ECCV).
- Asian Conference on Computer Vision (ACCV).
- Asian Conference on Machine Learnin (ACML).
- AAAI Conference on Artificial Intelligence.
- Digital Image Computing: Techniques and Applications (DICTA).

ENGINEERING SKILLS

Languages: C/C++, Python, MATLAB, Java, SQL.
Frameworks: Robot Operating System (ROS), Pytorch, Streamlit.
Developer Tools: Git, Eclipse, PyCharm, Visual Studio.
Libraries: Detectron2, Faiss, OpenCV, Gurobi, COLMAP, Numpy, Matplotlib.

REFERENCES

Prof. Tat-Jun Chin.
Professorial Chair of Sentient Satellites, SmartSat CRC.
Director of AI for Space, Australian Institute for Machine Learning.
School of Computer and Mathematical Sciences.
The University of Adelaide, Australia.
Email: tat-jun.chin@adelaide.edu.au

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