

Duc Thanh Nguyen

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Research Interests

- *Computer Vision and Image Processing:* 3D vision and scene understanding, object detection and recognition, shape analysis
- *Machine Learning and Pattern Recognition:* Deep learning, multi-instance multi-label learning, graphical models for machine learning, variational methods, statistical machine learning and pattern recognition
- *Multimedia Signal Processing:* Video analysis, image and video retrieval
- *Document Image Analysis and OCR:* Page segmentation, text extraction, document skew estimation, document binarization
- *Artificial Intelligence:* Scheduling and genetic algorithms

Education

- **Ph.D., in Computer Science, University of Wollongong, Australia, 2012.**
 - Thesis title: Human Detection from Images and Videos
 - Supervisors: Prof. Philip Ogunbona and A/Prof. Wanqing Li
- **M.Sc., in Computer Science, Asian Institute of Technology (AIT), Thailand, 2005.**
 - Thesis title: A Robust Document Layout Analysis Algorithm for Vietnamese Documents
 - Supervisor: A/Prof. Nitin Afzulpurkar
- **B.S., in Information Technology, University of Natural Sciences of HCM City, Vietnam, 2002.**
 - Thesis title: Page Segmentation for Vietnamese Documents

Employment

- Lecturer at the School of Information Technology, Deakin University, Australia, 01/2017 – present
- Research fellow at the School of Information Technology, Deakin University, Australia, 03/2016 – 01/2017
- Postdoctoral research scientist at the Information Systems Technology and Design (ISTD), Singapore University of Technology and Design, 03/2015 – 03/2016
- Research associate at the Smart Foods Centre, School of Medicine, Faculty of Science Medicine and Health, University of Wollongong, 04/2013 – 12/2014
- Research associate at the Information and Communication Technology (ICT) Research Institute, University of Wollongong, 07/2012 – 04/2013

- Research associate at the School of Computer Science and Software Engineering, University of Wollongong, 10/2011 – 7/2012
- Senior R&D Consultant at Smart World Technology Co Ltd., <http://smartworld.com.vn/index.php/en/>, 2010 – 2015
- Part time teaching at the School of Computer Science and Software Engineering, University of Wollongong, 2008 – 12/2014
- Research associate at the Laboratory of Microelectronics, ISE, Asian Institute of Technology (AIT), Thailand, 07/2006 – 08/2006
- Research associate at the Laboratory of Microelectronics, ISE, Asian Institute of Technology (AIT), Thailand, 03/2005 – 08/2005
- Lecturer at the Department of Information Technology, Nong Lam University, HCM City, Vietnam, 2002 – 2008

Research Experience

- **Postdoctoral research scientist (03/2015 – 03/2016)**
 - *Project:* High Quality 3D Reconstruction and Scene Understanding.
 - *Institution/organisation:* Information Systems Technology and Design (ISTD), Singapore University of Technology and Design.
- **Research associate (04/2013 – present)**
 - *Project:* Smart Foods. The project aims to develop a robust algorithm to automatically recognise food images. This project was funded by the Faculty of Science Medicine and Health, University of Wollongong.
 - *Institution/organisation:* Smart Foods Centre, School of Medicine, Faculty of Science Medicine and Health, University of Wollongong.
- **Research associate (07/2012 – 04/2013)**
 - *Project:* iSee Development and Deployment. The project aims to develop a realtime and high quality video-conferencing system. This project was funded by the Smart Services Co-operative Research Centre and the University of Wollongong. The project was the winner of the 2012 iAwards National Research and Development.
 - *Institution/organisation:* Information and Communication Technology (ICT) Research Institute, University of Wollongong.
- **Research associate (10/2011 – 07/2012)**
 - *Project:* Ground Parrot's Call Detection and Recognition. The project aims to develop a system for automatic locating and then recognising (identifying) the ground parrot's calls. This project is part of a research contract from the New South Wales Department of Environmental and Climate Change.
 - *Institution/organisation:* University of Wollongong.

- **Project manager, researcher (12/2007 – 05/2008)**

- *Project:* Developing an Automatic Timetabling System for Universities. This project was funded by Nong Lam University and written in Java. The project aims to develop a system for automatic allocating academic resources (e.g. teaching rooms, labs, etc.) and optimal scheduling the timetables for lecturers, classes.
- *Institution/organisation:* Department of Information Technology, Nong Lam University, HCM City, Vietnam

- **Project manager, researcher (04/2007 – 12/2007)**

- *Project:* Developing Vietnamese Official Documents Management (VODM) software using Optical Character Recognition (OCR) techniques. This project aims to develop a system managing Vietnamese documents based on recognising scanned documents.
- *Institution/organisation:* Department of Information Technology, Nong Lam University, HCM City, Vietnam

- **Research associate (07/2006 – 08/2006)**

- *Project:* Improving an Optical Character Recognition (OCR) machine (product: **Vision Wizard 1.0**). The purpose of this project is to develop an algorithm for automatically enhancing the low contrast images to improve the recognition performance of an OCR machine. Input images to be processed can be too dark, too bright, and/or blur caused by machine vibration. This 3-month project is the collaboration between the Asian Institute of Technology (AIT) and Western Digital (BangPa-In) Co., Ltd.
- *Institution/organisation:* Laboratory of Microelectronics, ISE, Asian Institute of Technology (AIT), Thailand

- **Research associate (03/2005 – 08/2005)**

- *Project:* Development of an automatic visual inspection system for HDD components. This project is about to construct an inspecting system utilising techniques of digital image processing, visual inspection, computer graphics, and camera interfacing. The outcome of this project is the **Intelligent Inspection System 1.0**. This project was funded by NECTEC (with project number: NT-B-22-E8-36-48-03) and three HDD manufacturers including Seagate Technology (Thailand) Co., Ltd., Western Digital (BangPa-In) Co., Ltd. and Hitachi Global Storage Technologies (Thailand) Co., Ltd. The project was implemented using Borland C++.
- *Institution/organisation:* Laboratory of Microelectronics, ISE, Asian Institute of Technology (AIT), Thailand

- **Researcher (10/2002 – 07/2003)**

- *Project:* Development of a tool for layout analysis of Vietnamese document images. This project is about to create a ground-truth and tool to evaluate document analysis algorithms for Vietnamese document images.
- *Institution/organisation:* Department of Information Technology, Nong Lam University, HCM City, Vietnam

Academic Experience

- Lecturer at the School of Information Technology, Deakin University, Australia (from 01/2017).
 - Teaching subjects
 - * Undergraduate: Data Science Concepts (SIT112), Applied Algebra and Statistics (SIT199), Data Structures and Algorithms (SIT221), Thinking Systems and Cognition Science (SIT205), Object-Oriented Development (SIT232), Mathematics and Physics for Games (SIT204).
 - * Postgraduate: Object-Oriented Development (SIT771), Software Requirements Analysis and Modelling (SIT773).
- Higher Degree Research Supervisor
 - Currently - 2 PhDs, 1 Master
 - Completed - 2 Masters
- Part-time teaching at the School of Computer Science and Software Engineering, University of Wollongong (2008 – 2014).
 - Teaching subjects: Multimedia Computing, Algorithms and Problem Solving, Engineering Programming, Object and Generic Programming in C++.
- Lecturer at the Faculty of Information Technology, Nong Lam University, HCM City, Vietnam (2002 – present).
 - Lecturer/coordinator of courses for undergraduates: Object-oriented Programming, Data Structures and Algorithms, Software Engineering, Computer Graphics, Artificial Intelligence.
 - Coordinator of the linkage and teaching/research co-operation programmes between the Faculty of Information Technology, Nong Lam University with industry, e.g. IBM Vietnam, and other international organisations, e.g. the University of Oslo, Norway.

Professional Activities

- Organizer of the tutorial on “Creating and Understanding 3D Annotated Scene Meshes”, 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018: <http://iros18.scenenn.net/>).
- Organizer of the tutorial on “Creating Annotated Scene Meshes for Training and Testing Robot Systems” (<http://103.24.77.34:8080/scenenn/dev/icra18/>), 2018 IEEE International Conference on Robotics and Automation (ICRA 2018: <https://icra2018.org/>).
- Member of Advisory board of the Eurographics 2017 Workshop on 3D Object Retrieval (<http://people.sutd.edu.sg/saikit/projects/scenenn/shrec17/index.html>).
- Reviewer
 - Scientific Reports (Nature)
 - IEEE Transactions on Image Processing
 - IEEE Transactions on Intelligent Transportation Systems
 - IEEE Transactions on Circuits and Systems for Video Technology
 - IEEE Signal Processing Letters
 - Image and Vision Computing

- Neurocomputing
- Pattern Recognition Letters
- Technical/Program Committee
 - IEEE International Conference on Computer Vision and Pattern Recognition - CVPR
 - IEEE International Conference on Computer Vision - ICCV
 - International Joint Conference on Artificial Intelligence - IJCAI
 - IEEE International Conference on Image Processing - ICIP
 - Pacific-Asia Conference on Knowledge Discovery and Data Mining - PAKDD
 - Eurographics
 - Pacificgraphics

Honours and Awards

- Best paper honorable mention for the work “SceneNN: a Scene Meshes Dataset with aNNotations”, 2016 IEEE International Conference on 3D Vision (3DV 2016)
- Young Researcher Support granted by the 2014 IEEE International Conference on Computer Vision and Pattern Recognition (CVPR 2014)
- Student Travel Grant to the 2011 IEEE International Conference on Image Processing (ICIP 2011)
- Full scholarship offered by the University of Wollongong, Australia for Ph.D. study in Computer Science, 2008.
- Full scholarship offered by the National University of Singapore (NUS) for Ph.D. study (Computer Science/School of Computing), 2008
- Full scholarship offered by the Ministry of Education and Training (MOET) of Vietnam for Master study in Computer Science, 2004

Research Grants

- ERP22 - Ecosystem Resilience - Technological Advances (2019–2021)
 - Funding agency: Bushfire and Natural Hazards CRC
 - Amount: \$182,700 (AUD)
- A large-scale and fine-grained dataset for detection and recognition of animals in the wild (01/2019–12/2019)
 - Funding agency: Faculty of Science, Engineering and Built Environment, Deakin University
 - Amount: \$14,000 (AUD)
- Heartrac - Improving heart health and wellbeing (2017–2018)
 - Amount: \$205,000 (2017), \$330,000 (2018)
- A multi-source semantic 3D modelling platform for Virtual Singapore (04/2017–12/2018)
 - Funding agency: National Research Foundation of Singapore
 - Amount: \$766,000 (SGD)
- Data-driven approaches for 3D modelling in Graphics and Vision (01/2017–12/2019)
 - Funding agency: Ministry of Education of Singapore

- Amount: \$502,000 (SGD)
- mHealth for automatic dietary assessment and health analysis (01/2017–12/2017)
 - Funding agency: Faculty of Science, Engineering and Built Environment, Deakin University
 - Amount: \$5,000 (AUD)
- Comparing methods for volumetric computation for an image recognition algorithm for photography-based food record dietary assessment (07/2015 – 12/2015)
 - Funding agency: University of Wollongong
 - Amount: \$10,000 (AUD)

Publications

Book Chapters

1. Yasmine Probst, **Duc Thanh Nguyen**, Megan Rollo, and Wanqing Li. mHealth diet and nutrition guidance, in *Mobile Health (mHealth): Multidisciplinary Verticals*, Taylor and Francis (CRC Press), 2014.

Journals

2. Thin Nguyen, Hung Nguyen, Mark E. Larsen, Bridianne O’Dea, **Duc Thanh Nguyen**, John Yearwood, Dinh Phung, Svetha Venkatesh, and Helen Christensen. Using spatiotemporal distribution of geocoded Twitter data to predict US county-level health indices. *Future Generation Computer Systems*, (in press)
(5-year impact factor: 4.787, impact factor: 3.997)
3. **Duc Thanh Nguyen**, Ngoc Son Vu, Thanh Toan Do, Thin Nguyen, and John Yearwood. Improving Chamfer template matching using image segmentation. *IEEE Signal Processing Letters*, Vol. 25, No. 11, 2018
(Impact factor: 2.813)
4. **Duc Thanh Nguyen**, Binh-Son Hua, Lap-Fai Yu, and Sai-Kit Yeung. A robust 3D-2D tool for scene segmentation and annotation. *IEEE Transactions on Visualization and Computer Graphics*, Vol. 24, No. 12, 2018
(Impact factor: 3.078)
5. **Duc Thanh Nguyen**, Philip Ogunbona, Wanqing Li, Elizabeth Tasker, and John Yearwood. Detection of ground parrot vocalisation: a multiple instance learning approach. *Journal of Acoustical Society of America*, Vol. 142, No. 3, 2017
(Impact factor: 1.680)
6. Thin Nguyen, Mark E. Larsen, Bridianne O’Dea, **Duc Thanh Nguyen**, John Yearwood, Dinh Phung, Svetha Venkatesh, and Helen Christensen. Kernel-based features for predicting population health indices from geocoded social media data. *Decision Support Systems*, Vol. 102, 2017
(5-year impact factor: 4.290, impact factor: 3.222)
7. **Duc Thanh Nguyen**, Wanqing Li, and Philip Ogunbona. Human detection from images and videos: a survey. *Pattern Recognition*, Vol. 51, 2016
(5-year impact factor: 4.991, impact factor: 4.582)
8. Yasmine Probst, **Duc Thanh Nguyen**, Minh Khoi Tran, and Wanqing Li. Dietary assessment on a mobile phone using image processing and pattern recognition techniques: algorithm design and system prototyping. *Nutrients*, Vol. 7, No. 8, 2015
(5-year impact factor: 4.187, impact factor: 3.550)

9. **Duc Thanh Nguyen**, Zhimin Zong, Philip Ogunbona, Yasmine Probst, and Wanqing Li. Food image classification using local appearance and global structural information. *Neurocomputing*, Vol. 140, 2014
(5-year impact factor: 3.211, impact factor: 3.317)
10. **Duc Thanh Nguyen**, Philip Ogunbona, and Wanqing Li. A novel shape-based non-redundant local binary pattern descriptor for object detection. *Pattern Recognition*, Vol. 46, No. 5, 2013.
11. **Duc Thanh Nguyen**, Wanqing Li and Philip Ogunbona. Inter-occlusion reasoning for human detection based on variational mean field. *Neurocomputing*, Vol. 110, 2013.
12. **Duc Thanh Nguyen**, Wanqing Li, and Philip Ogunbona. Local intensity distribution descriptor for object detection. *IET Electronics Letters*, Vol. 47, No. 5, 2011
(5-year impact factor: 1.119, impact factor: 1.155)

Conference Papers

13. Quang-Hieu Pham, **Duc Thanh Nguyen**, Binh-Son Hua, Gemma Roig, and Sai-Kit Yeung. JSIS3D: Joint semantic-instance segmentation of 3D point clouds with multi-task pointwise networks and multi-value conditional random fields. in *Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition - CVPR*, 2019. (**Oral - 5.6% acceptance rate**)
14. Quang-Hieu Pham, Binh-Son Hua, **Duc Thanh Nguyen**, and Sai-Kit Yeung. Real-time progressive 3D semantic segmentation of indoor scene. in *Proceedings of the IEEE Winter Conference on Applications of Computer Vision - WACV*, 2019.
15. Tian Feng, Quang-Trung Truong, **Duc Thanh Nguyen**, Jing Yu Koh, Lap-Fai Yu, Alexander Binder, and Sai-Kit Yeung. Urban zoning using higher-order Markov random fields on multi-view imagery data. in *Proceedings of the European Conference on Computer Vision - ECCV*, 2018.
16. Hung Nguyen, Van Nguyen, Thin Nguyen, Mark Larsen, Bridianne O'Dea, **Duc Thanh Nguyen**, Trung Le, Dinh Phung, Svetha Venkatesh, and Helen Christensen. Jointly predicting affective and mental health scores using deep neural networks of visual cues on the Web. in *Proceedings of the Web Information Systems Engineering - WISE*, 2018.
17. Quang-Hieu Pham, Minh-Khoi Tran, Wenhui Li, Shu Xiang, Heyu Zhou, Weizhi Nie, Anan Liu, Yuting Su, Minh-Triet Tran, Ngoc-Minh Bui, Trong-Le Do, Tu V Ninh, Tu-Khiem Le, Anh-Vu Dao, Vinh-Tiep Nguyen, Minh N Do, Anh-Duc Duong, Binh-Son Hua, Lap-Fai Yu, **Duc Thanh Nguyen**, Sai-Kit Yeung. RGB-D Object-to-CAD retrieval. in *Proceedings of the Eurographics Workshop on 3D Object Retrieval*, 2018.
18. Thin Nguyen, **Duc Thanh Nguyen**, Mark Larsen, Bridianne O'Dea, John Yearwood, Dinh Phung, Svetha Venkatesh, and Helen Christensen. Prediction of population health indices from social media using kernel-based textual and temporal features. in *Proceedings of the ACM World Wide Web - WWW*, Cognitive Computing Alternative Research Track, 2017.
19. Binh-Son Hua, Quang-Trung Truong, Minh-Khoi Tran, Quang-Hieu Pham, Lap-Fai Yu, **Duc Thanh Nguyen**, and Sai-Kit Yeung. SHREC'17: RGB-D to CAD retrieval with ObjectNN dataset. in *Proceedings of the Eurographics Workshop on 3D Object Retrieval*, 2017.
20. **Duc Thanh Nguyen**, Binh-Son Hua, Minh-Khoi Tran, Quang-Hieu Pham, and Sai-Kit Yeung. A Field Model for Repairing 3D Shapes. in *Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition - CVPR*, 2016.
21. Thanh-Toan Do, Anh-Dzung Doan, **Duc Thanh Nguyen**, and Ngai-Man Cheung. Binary Hashing with Semidefinite Relaxation and Augmented Lagrangian. in *Proceedings of the European Conference on Computer Vision - ECCV*, 2016.

22. Binh-Son Hua, Quang-Hieu Pham, **Duc Thanh Nguyen**, Minh-Khoi Tran, Lap-Fai Yu, and Sai-Kit Yeung. SceneNN: a Scene Meshes Dataset with aNNotations. in *Proceedings of the International Conference on 3D Computer Vision - 3DV*, 2016. (**Best paper honorable mention award**)
23. **Duc Thanh Nguyen**, Minh-Khoi Tran, and Sai-Kit Yeung. An MRF-poselets model for detecting highly articulated humans. in *Proceedings of the IEEE International Conference on Computer Vision - ICCV*, 2015.
24. **Duc Thanh Nguyen**. A novel chamfer template matching method using variational mean field. in *Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition - CVPR*, 2014.
25. Lijuan Zhou, Wanqing Li, Yuyao, Philip Ogunbona, and **Duc Thanh Nguyen**. Discriminative key pose extraction using extended LC-KSVD for action recognition. in *Proceedings of the International Conference on Digital Image Computing: Techniques and Applications - DICTA*, 2014 (oral).
26. **Duc Thanh Nguyen**, Philip Ogunbona, and Wanqing Li. Detecting humans under occlusion using variational mean field method. in *Proceedings of the IEEE International Conference on Image Processing - ICIP*, 2011 (oral).
27. **Duc Thanh Nguyen**, Philip Ogunbona, and Wanqing Li. Human detection with contour-based local motion binary patterns. in *Proceedings of the IEEE International Conference on Image Processing - ICIP*, 2011.
28. Hongda Tian, Wanqing Li, Philip Ogunbona, **Duc Thanh Nguyen**, and Ce Zhan. Smoke detection in videos using non-redundant local binary pattern-based features. in *Proceedings of the IEEE International Workshop on Multimedia Signal Processing - MMSP*, 2011.
29. **Duc Thanh Nguyen**, Wanqing Li, and Philip Ogunbona. Human detection using local shape and non-redundant binary patterns. in *Proceedings of the IEEE International Conference on Control, Automation, Robotics and Vision - ICARCV*, 2010 (oral).
30. **Duc Thanh Nguyen**, Zhimin Zong, Philip Ogunbona, and Wanqing Li. Object detection using non-redundant local binary patterns. in *Proceedings of the IEEE International Conference on Image Processing - ICIP*, 2010.
31. Zhimin Zong, **Duc Thanh Nguyen**, Philip Ogunbona, and Wanqing Li. On the combination of local texture and global structure for food classification. in *Proceedings of the IEEE International Symposium on Multimedia - ISM*, 2010 (oral).
32. **Duc Thanh Nguyen**, Wanqing Li, and Philip Ogunbona. An improved template matching method for object detection. in *Proceedings of the 9th Asian Conference on Computer Vision - ACCV*, 2009.
33. **Duc Thanh Nguyen**, Wanqing Li, and Philip Ogunbona. A novel template matching method for human detection. in *Proceedings of the IEEE International Conference on Image Processing - ICIP 2009*, 2009.
34. **Duc Thanh Nguyen**, Philip Ogunbona, and Wanqing Li. Human detection based on weighted template matching. in *Proceedings of the IEEE International Conference on Multimedia and Expo - ICME*, 2009.
35. **Duc Thanh Nguyen**, Wanqing Li, and Philip Ogunbona. A Part-based template matching method for multi-view human detection. in *Proceedings of the Conference on Image and Vision Computing New Zealand - IVCNZ*, 2009.
36. **Duc Thanh Nguyen**. A rotation method for binary document images using DDA algorithm. in *Proceedings of the ACM Symposium on Document Engineering - DocEng*, 2008 (oral).
37. **Duc Thanh Nguyen**, Dai Binh Vo, Tu Mi Nguyen Thi, and Thuy Giang Nguyen. A robust document skew estimation algorithm using mathematical morphology. in *Proceedings of the IEEE International Conference on Tools with Artificial Intelligence - ICTAI*, 2007 (oral).

38. **Duc Thanh Nguyen**, Cam Thi Nguyen, Tham Luong Thi, Thanh Loan Nguyen Thi, and Kim Loan Tran Thi. An application of genetic algorithm for weekly course timetabling problem. in *Proceedings of the International Conference on Artificial Intelligence - ICAI*, 2007 (oral).
39. **Duc Thanh Nguyen**. Solving timetabling problem using genetic and heuristic algorithms. in *Proceedings of the 8th IEEE International Conference on Software Engineering, Artificial Intelligence, Networking, and Parallel/Distributed Computing - ACIS/SNPD*, 2007 (oral).
40. **Duc Thanh Nguyen** and Nitin Afzulpurkar. Page decomposition for document images with complex layout. in *Proceedings of the International Conference on Computer Science and Its Application - ICCSA*, 2006 (oral).

Technical Reports

41. Quang-Hieu Pham, Binh-Son Hua, **Duc Thanh Nguyen**, and Sai-Kit Yeung. Real-time progressive 3D semantic segmentation for indoor scene. *arXiv:1804.00257*, 2018.
42. **Duc Thanh Nguyen**, Binh-Son Hua, Lap-Fai Yu, and Sai-Kit Yeung. A robust 3D-2D tool for scene segmentation and annotation. *arXiv:1610.05883*, 2016.

Referees

Available based on requests.