



Thi Hoang Ngan Le

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Carnegie Mellon University
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www.andrew.cmu.edu/user/thihoanl*

BIOGRAPHICAL SKETCH

Dr. Le is currently a research associate in Department of Electrical and Computer Engineering (ECE) at Carnegie Mellon University (CMU). She received the PhD degree in ECE at CMU in 2018, ECE Master degree at CMU in 2015, CS Master Degree at University of Science, Vietnam in 2009 and CS Bachelor degree at University of Science, Vietnam in 2005. Her current research interests focus on Image Understanding, Biometrics, Computer Vision, Machine Learning, Deep Learning, Medical Imaging, Reinforcement Learning. Her publications appear in top conferences including CVPR, MICCAI, ECCV, IJCV, ICIP etc, and premier journals including JESA, TIP, PR, JDSP, TIFS, etc. She has co-authored 43+ journals, conference papers, and book chapters, 6+ patents and inventions. She co-organized the first MICCAI Deep Reinforcement Learning tutorial for medical imaging, and has served as a reviewer for 8+ top-tier conferences and journals, including CVPR, NIPS, TIP, PR, IVC, etc

APPOINTMENTS

Research Associate

July 2018 -
present

Carnegie Mellon University

Division of Electrical and Computer Engineering, CyLab Biometrics Center

- Brain tumor detection and segmentation
- Detecting and classifying abnormal pap on the cervix

EDUCATION

PhD Electrical and Computer Engineering

2011 - 2018

Carnegie Mellon University

- Title: Contextual Recurrent Level Set Networks and Recurrent Residual Networks for Semantic Labeling
- Thesis advisor: Prof. Marios Savvides
- Thesis committees:
 - Prof. Vijayakumar Bhagavatula, Carnegie Mellon University
 - Prof. Arun A. Ross, Michigan State University
 - Dr. Saad J. Bedros, University of Minnesota

Master Electrical and Computer Engineering

2011 - 2015

Carnegie Mellon University

- Title: "SparCLEs: Dynamic l_1 Sparse Classifiers with Level Sets for Robust Beard/Moustache Detection and Segmentation"
- Thesis advisor: Prof. Marios Savvides

Master Computer Science

2006 - 2009

University of Science

- Title: Secret Sharing Using Multiple Shadow Images
- Thesis advisor: Prof. Bac Le Hoai and Prof. Chin-Chen Chang
- Thesis grade: 10/10

Bachelor Computer Science

2001 - 2005

University of Science

- Title: Data Hiding in Digital Audio
- Thesis advisor: Prof. Bac Le Hoai
- Thesis grade: 10/10

ACADEMIC AWARDS AND SCHOLARSHIPS

NIH Travel Award, MICCAI 2018 conference in Spain, Sep. 2018

PhD Scholarship in Carnegie Mellon University, U.S., Sep. 2011 - May.2018

PhD Scholarship in Concordia University, Canada in 4 years from May 2010

The best paper award of the International Symposium on Electronic Commerce and Security, ISECS 2008.

Scholarship of Vietnamese Government for Graduated Students, 2008-2010 .

Second Prize of Vietnamese Talents Competition of Dantri Newspaper, 2007.

First Prize of Light the Hope of Vietnamese Government for helping disable people 2007.

First Prize of Nationwide Student's Research Competition 2005.

First Prize of VIFOTEC (Vietnam Fund for Supporting Technology) 2005.

Scholarship of Tuong Minh Company, 2004.

EDUCATIONAL BACKGROUND

- Sep.2001 - Oct.2005: Bachelor Student
Department: [Department of Computer Science](#)
University: [National University of Science, Vietnam](#)
Thesis title: Data Hiding in Digital Audio
Graduate ranking: Excellent (top 1% of 500 undergraduate students)
- Sep.2006 - Oct.2009: Master Student
Department: [Department of Computer Science](#)
University: [National University of Science, Vietnam](#)
Thesis title: Secret Sharing Using Multiple Shadow Images
Graduate ranking: Excellent (the best Master thesis the best graduate Master student)
- Jan.2008 - Jan.2009: Researcher at MSN Lab, FengChia University, Taichung, Taiwan
Research topic: Watermarking, DataHiding, Steganography
- Sep.2006 - Jan.2009: Teaching Assistant
Department: [Department of Computer Science](#)
University: [National University of Science, Vietnam](#)
Courses:
 - Computer Graphics
 - Data Structures and Algorithms
 - Artificial Intelligence
 - Digital Image Processing
- Jan.2009 - May.2010: Lecturer
Department: [Department of Computer Science](#)
University: [National University of Science, Vietnam](#)
Courses:
 - Data Hiding and Secret Sharing
- May.2010 - Sep.2011: PhD student & Research Assistant
Department: [Department of Computer Science and Software Engineering](#)
University: [Concordia University](#)
Research Topic: Document Analysis and Word Spotting
- Sep.2011 - May.2018: PhD Student & Research Assistant
Department: [Department of Electrical and Computer Engineering](#)
University: [Carnegie Mellon University](#)
Research Topic: Computer Vision & Machine Learning

Biometrics: Facial Decomposition, Facial Hair Analysis; Twins Identification;
Image Understanding: Safety Driving; Shape Analysis; Semantic Instance Segmentation;
Scene Parsing;

Medical Imaging: Detecting and Segmenting Tubular Structure in XRay, Abnormal
Blood Cell, Brain Tumor

- Sep.2016 - Dec.2017: Teaching Assistant

Department: [Department of Electrical and Computer Engineering](#)

University: [Carnegie Mellon University](#)

Courses:

Pattern Recognition Digital Communication and Signal Processing Systems Design

- May.2018 - present: Research Associate

Department: [Department of Electrical and Computer Engineering](#)

University: [Carnegie Mellon University](#)

Research Topic: Computer Vision & Machine Learning

Detecting and Segmenting Brain Tumor

Detecting and Classifying Abnormal Pap Cell

CONSULTING AND INDUSTRIAL EXPERIENCE

- Jun. 2017 - Dec.2017: Consultant at [Research Department at Overstock, USA](#)
- May.2010 - Sep.2011: Consultant at [IMDS Company in Document Analysis, Canada.](#)

PROFESSIONAL EXPERIENCE

- Jul.2018 - present: Work at CMU Cylab Biometrics Center as a Research Associate on projects of Medical Imaging (Detecting and Classifying Abnormal Pap on the Cervix; Brain Tumor Detection and Segmentation)
- Sep.2011 - May.2018: Work at CMU Cylab Biometrics Center as a Research Assistant on various machine learning & computer vision projects, particularly face recognition, semantic segmentation including hand on wheel recognition, grammar-aware based parsing, medical imaging.

CMU Driver Behavioral Situational Awareness System (DB-SAW), sponsored by Federal Highway Administration, U.S. Department of Transportation, Exploratory Advanced Research Program, (09.2013 - 09.2015).

Enhanced Level II Detail Facial Soft Biometrics for an Automatic Forensic-style approach to Facial Matching/Sorting, sponsored by Army Research Lab, \$720,000 (from Feb. 2013 to Feb. 2015).

Soft Biometric Indexing with Matcher Fusion for Robust Identification, sponsored by Army Research Lab, \$695,000 (from Oct. 2011 to Oct. 2013).

- Jan.2009 - May.2010: Being as a lecturer in Department of Computer Sciences, Faculty of Information Technology, University of Sciences, 227 Nguyen Van Cu St., Dist. 5, HCM City, Vietnam.
- From Aug.2008 to Jan.2009: Being as a teaching assistant in Computer Sciences Department, DaYeh University, Dacun, Chunghua, Taiwan.
- Jan.2008 - Jan.2009: Being as a Researcher MSN Lab, Feng Chia University, Taichung, Taiwan.
- Aug.2005 - Jan.2008: Teaching Assistant in Faculty of Information Technology, University of Sciences – 227 Nguyen Van Cu St., Dist. 5, HCM City, Vietnam.

PATENTS

1. **Ngan T.H. Le**, Marios Savvides, "Simultaneously Detecting and Classifying Abnormal Pap on the Cervix", CMU Invention Disclosure - under review
2. **Ngan T.H. Le**, Marios Savvides, "Reformulating Level Sets as Deep Recurrent Neural Network Approach to Semantic Segmentation", CMU Invention Disclosure No. 2018-01
3. **Ngan T.H. Le**, Marios Savvides, Boyiadzis Michael, Contis Lydia, Methods and Systems for Disease Classification, This application claims the benefit under 35 U.S.C.119 of U.S.Provisional Application Serial No. 61/967,316, filed on March 17, 2014, which is incorporated by reference herein in its entirety.
4. **Ngan T.H. Le**, K. Luu and M. Savvides, "SparCLeS: Dynamic L1 sparse Classifiers with Level Sets for Robust Beard/Moustache Detection and Segmentation", 2013 Grands: DAAD19-02-1-0389 and W911NF-09-1-027 from the Army Research Office and by cooperative agreement W911NF-10-2-0028 from the Army Research Laboratory
5. **Ngan T.H. Le**, Utsav Prabhu, Marios Savvides, "Automatic Eyebrow Detection, Segmentation, and Matching System - EDMS", 2013 Grands: DAAD19-02-1-0389 and W911NF-09-1-027 from the Army Research Office and by cooperative agreement W911NF-10-2-0028 from the Army Research Laboratory
6. **Ngan T.H. Le**, M. Savvides, "Facial Aging and Asymmetry Decomposition Based Approaches to Identification of Twins", 2013Grands: DAAD19-02-1-0389 and W911NF-09-1-027 from the Army Research Office and by cooperative agreement W911NF-10-2-0028 from the Army Research Laboratory

JOURNAL PAPERS

16. **Ngan T.H. Le**, Ibrahim Alkanhal, and M. Savvides "Deep Framework for Simultaneously Detect and Classify Abnormal Cell on the Cervix" to be submitted
15. **Ngan T.H. Le**, Ibrahim Alkanhal, and M. Savvides "Atrous Convolution for Medical Image Segmentation" to be submitted
14. **Ngan T.H. Le**, Kha Gia Quach, Khoa Luu and M. Savvides "Reformulating Level Sets as Deep Recurrent Neural Network Approach to Semantic Segmentation" , Transactions on Image Processing, Vol. 27, No. 5, May 2018, pp. 2393–2407, Impact Factor: 5.071 [pdf](#), [arxiv](#)

13. **Ngan T.H. Le**, Chi Nhan Duong, Ligong Han, Khoa Luu and M. Savvides "Deep Contextual Recurrent Residual Networks for Scene Labeling" , Pattern Recognition, Volume 80, August 2018, Pages 32-41, 5-Year Impact Factor: 4.341 [pdf](#), [arxiv](#)
12. **Ngan T.H. Le**, CC Zhu, Y. Zheng, K. Luu, and M. Savvides "DeepSafeDrive: A Grammar-aware Driver Parsing Approach to Driver Behavioral Situational Awareness (DB-SAW)" , Pattern Recognition , Volume 66, June 2017, Pages 229-238, 5-Year Impact Factor: 4.341 [pdf](#)
11. **Ngan T.H. Le**, Khoa Luu, K., ChenChen Zhu and Savvides, M., " Semi Self-Training Beard/Moustache Detection and Segmentation Simultaneously," Image and Vision Computing, Volume 58, February 2017, Pages 214–223, 5-Year Impact Factor: 2.875, [pdf](#)
10. **Ngan T.H. Le**, and Savvides, M., "A Novel Shape Constrained Feature-based Active Contour (SC-FAC) Model for Lips/Mouth Segmentation with Unconstrained Background," Pattern Recognition, Vol. 54, Pages 23–33, 2016, 5-Year Impact Factor: 4.341 [pdf](#)
9. K. Luu, C. C. Zhu, C. Bhagavatula, **Ngan T.H. Le** and M. Savvides, "A Deep Learning Approach to Joint Face Detection and Segmentation," Special Issue, Advances in Face Detection and Facial Image Analysis, Springer, Pages 1–12, 02 April 2016, [pdf](#)
8. **Ngan T.H. Le**, Seshadri, K, Luu, K., and Savvides, M., "A Facial Aging and Asymmetry Decomposition to Twins Identification," Pattern Recognition, Vol.48, Issue 12, Pages 3843–3856, 2015, 5-Year Impact Factor: 4.341, [pdf](#)
7. **Ngan T.H. Le**, Luu, K., and Savvides, M., "SparCLeS: Dynamic L1 Sparse Classifiers with Level Sets for Robust Beard/Moustache Detection and Segmentation," IEEE Transactions on Image Processing (TIP), Vol. 22, No. 8, pp. 3097-3107, Aug. 2013, Impact Factor: 5.071, [pdf](#)
6. **Ngan T.H. Le**, Lin, C. C., Chang, C. C., and Le, H. B., "A high quality and small shadow size visual secret sharing scheme based on hybrid strategy for grayscale images," Journal of Digital Signal Processing, Vol. 21, Issue 6, pp. 734 - 745, 2011, 5-Year Impact Factor: 2.216 [pdf](#)
5. Chen, W. J., Chang, C. C., and **Ngan T.H. Le**, "High Payload Steganography Mechanism Using Hybrid Edge Detector", Journal of Expert Systems with Application, Vol. 37, No. 4, pp. 3292-3301, April, 2010, Impact Factor: 3.768, 5-Year Impact Factor: 3.711 [pdf](#)
4. Chang, C. C., Lee, J. S., **Ngan T.H. Le**, "Improved Wet Paper Coding Based on an n-Indicator and a Fuzzy Edge Detector," Journal of Digital Signal Processing, Vol. 20, Issue 4, pp. 1286-1307, 2010, 5-Year Impact Factor: 2.216 [pdf](#)
3. Chang, C. C., Lin, C. C., **Ngan T.H. Le** and Le, H. B., "Sharing a Verifiable Secret Image Using Two Shadows," Pattern Recognition, Vol. 42, Issue 1, pp. 3097-3114, May, 2009, 5-Year Impact Factor: 4.341 [pdf](#)
- [14] Chang, C. C., Lin, C. C., **Ngan T.H. Le**, and Le, H. B., "Self Verifying Visual Secret Sharing Using Error Diffusion and Interpolation Techniques," IEEE Transactions on Information Forensics and Security, Vol. 4, Issue 4, pp. 790 – 801, Dec. 2009, Impact Factor: 5.825, [pdf](#)
2. Chang, C. C., Lin, C. C., **Ngan T.H. Le**, and Le, H. B., "A Probabilistic Visual Secret Sharing Scheme for Grayscale Images with Voting Strategy," International Journal of Intelligent Information Technology Application (IJIITA), Vol. 1, No. 1, Jul. 2008, pp, [pdf](#)

1. Le Hoai Bac, Luu Khoa, **Ngan T.H. Le**, "Audio watermarking using psychoacoustic auditory model and spread spectrum theory", Post, Telecommunications and Information Technology Journal, Vietnam, April 2006.

CONFERENCE PAPERS

23. **Ngan T.H. Le**, Raajitha Gummadi, Marios Savvides, "Deep Recurrent Level Set for Segmenting Brain Tumors", MICCAI 2018, pp 646-653, September 2018, [pdf](#), [arxiv](#)
22. C. N. Duong, K. G. Quach, K. Luu, **Ngan T.H. Le** and M. Savvides, "Temporal Non-Volume Preserving Approach to Facial Age-Progression and Age-Invariant Face Recognition", IEEE International Conference on Computer Vision (ICCV), Venice, Italy, Oct. 2017, [pdf](#)[arxiv](#)
21. **Ngan T.H. Le**, KhaGia Quach, Chenchen Zhu, Chi Nhan Duong, Khoa Luu, Marios Savvides, "Robust Hand Detection and Classification in Vehicles and in the Wild", CVPRW, pp. 1203-1210, July 2017, [pdf](#)
20. **Ngan T.H. Le**, Chenchen Zhu, Yutong Zheng, Khoa Luu, Marios Savvides, "Robust Hand Detection in Vehicles ", ICPR 2017, pp. 573-578, [pdf](#)
19. Ligong Han, **Ngan T.H. Le**, Marios Savvides "An Automatic Cells Detection and Segmentation," SPIE Medical Imaging 2016, doi: 10.1117/12.2254068, [pdf](#)
18. Y. Zheng, C. Zhu, K. Luu, **Ngan T.H. Le**, C. Bhagavatula and M. Savvides, "Towards a Deep Learning Framework for Unconstrained Face Detection," IEEE 8th Intl. Conference on Biometrics: Theory, Applications and Systems (BTAS), Buffalo, NY, Sep. 2016, [pdf](#), [arxiv](#)
17. **Ngan T.H. Le**, Yutong Zheng*, Chenchen Zhu*, Khoa Luu, and Marios Savvides, "Multiple Scale Faster-RCNN Approach to Driver's Cell-phone Usage and Hands on Steering Wheel Detection", CVPRW 2016, Las Vegas, NV, USA [pdf](#)
16. Chenchen Zhu*, Yutong Zheng*, Khoa Luu, **Ngan T.H. Le**, Chandrasekhar Bhagavatula, and Marios Savvides, "Weakly Supervised Facial Analysis with Dense Hyper-column Features", CVPRW2016, Las Vegas, NV, USA, [pdf](#)
15. **Ngan T.H. Le**, Khoa Luu., and Savvides, M., "Fast and Robust Self-Training Beard/Moustache Detection and Segmentation," International Conference on Biometrics (ICB), pp. 1-8, Phuket, Thailand 2015, [pdf](#)
14. Faten M'hiri, **Ngan T.H. Le**, , Luc Duong, Christian Desrosiers, Mohamed Cheriet, "Hierarchical Segmentation and Tracking of Coronary Arteries in 2d x-ray Angiography Sequences", International Conference on Image Processing (ICIP), pp. 1707-1011, Quebec, Canada, 2015, [pdf](#)
13. Karanhaar Singh , Khoa Luu , **Ngan T.H. Le**, Marios Savvides , "A Robust Contour Sampling and Tensor-Based Approach To Facial Beard And Mustache Shape Segmentation And Matching," International Conference on Image Processing (ICIP), pp. 1399-1403, Quebec, Canada, 2015, [pdf](#)
12. **Ngan T.H. Le**, U. Prabhu., and Savvides, M., "A Novel Eyebrow Segmentation and Eyebrow Shape-based Identification," International Joint Conference on Biometrics (IJCB), pp. 1-8, Florida USA 2014, [pdf](#)

11. Hong Quan Hua, **Ngan T.H. Le**, Hoac Bac Le, "An Effective Initialization for ASM-based Methods," 13th International Conference on Computer Information Systems and Industrial Management Applications, Vol. 8838, pp.421-432, Vietnam 2014T, [pdf](#)
10. **Ngan T.H. Le**, Luu, K., Seshadri, K., and Savvides, M. "A Facial Aging Approach to Identification of Identical Twins", the IEEE Fifth International Conference on Biometrics: Theory, Applications and Systems (BTAS 2012), pp. 91-98, Washington DC, US. Sept. 2012.
9. **Ngan T.H. Le**, Luu, K., U. Prabhu, Savvides, M., "A Novel Energy based Filter for Cross-Blink Eye Detection," Intl. Conf. on Image Processing (ICIP'12), Orlando, US., Sept. 2012. pp. 1845-1848, [pdf](#)
8. **Ngan T.H. Le**, Luu, K., Seshadri, K., and Savvides, M., "Beard and Mustache Segmentation Using Sparse Classifiers on Self-Quotient Images", Intl. Conf. on Image Processing (ICIP'12), Orlando, US., Sept. 2012, pp. 165-168, [pdf](#)
7. Luu, K., **Ngan T.H. Le**, Seshadri, K., and Savvides, M., "FaceCut - A Robust Approach for Facial Feature Segmentation", Intl. Conf. on Image Processing (ICIP'12), Orlando, US., Sept. 2012, pp. 1841-1844, [pdf](#)
6. Mhiri, F., **Ngan T.H. Le**, Duong, L., and Cheriet, M., "A New Adaptive Segmentation Framework of Tubular Structures in X-Ray Angiography", Intl. Conf. on Information Science, Signal Processing & their application (ISSPA 2012), Quebec, Canada, pp. 496-500, July, 2012, [pdf](#)
5. **Ngan T.H. Le**, Bui, T. D., Suen, C. Y. "Ternary Entropy-based Binarization of Degraded Document Images Using Morphological Operators", Intl. Conf. on Document Analysis and Recognition (ICDAR 2011), pp. 114-118, Beijing, China, September, 2011, [pdf](#)
4. **Ngan T.H. Le**, Nguyen. K. H, Le, H. Bac, "Literature Survey on Watermarking Tools, Watermark Attacks, and Benchmarking Tools", The 2nd International Conferences on Advances in Multimedia (MMEDIA), pp. 67-73, Greece, 2010, [pdf](#)
3. **Ngan T.H. Le**, Nguyen. K. H, Le, H. Bac, "A Robust Biometric Watermark-Based Authentication Scheme" The 5th International Conference on Digital Information Management (ICDIM), pp. 398-403, Canada, 2010, [pdf](#)
2. Lee, J. S., **Ngan T.H. Le**, "Hybrid (2, n) Visual Secret Sharing Scheme for Color Images", International Conference on Computing and Telecommunication Technologies, pp.1-8, 2009, [pdf](#)
1. Chang, C. C., Lin, C. C., **Ngan T.H. Le**, and Le, H. B., "A New Probabilistic Visual Secret Sharing Scheme for Color Images," Proceedings of the Fourth International Conference on Intelligent Information Hiding and Multimedia Signal Processing (IIHMSP 2008), pp. 1305-1308, China, Aug. 2008, [pdf](#)

INVITED TALKS AT INTERNATIONAL CONFERENCES

1. Deep Reinforcement Learning in Medical Imaging, MICCAI 2018, , Granada, Spain, Sep. 2018

SEMINARS

4. University of Arkansas, Deep Learning - based Semantic Segmentation, Oct. 2018
3. University of Arkansas, Deep Learning in Medical Imaging, Oct. 2018
2. University of Arkansas, Fundamentals of Deep Learning, Sep. 2018
1. University of MSU, Reformulating LevelSet in Deep Learning Framework, (Planning)

TEACHING

Guest Lecturer

CSCE4013 at [Department of CSCE, in University of Arkansas](#)

Review of Deep Learning [slides](#)

CSCE5683 [Department of CSCE, in University of Arkansas](#)

Image Segmentation - part 1(Thresholding, Region-based methods) [slides](#)

Image Segmentation - part 2 (Clustering, Graph-based methods) [slides](#)

Image Segmentation - part 3 (Level Sets, Machine Learning-based) [slides](#)

Teaching Assistant [Carnegie Mellon University, Pittsburgh, PA, USA](#)

Sep.2016 - Dec.2017

18551 - Digital Communication and Signal Processing Systems Design

18792 - Pattern Recognition Theory

Lecturer [University of Science, Vietnam](#)

Jan.2009 - May.2010

Data Hiding and Secret Sharing

Teaching Assistant [University of Science, Vietnam](#)

Aug.2006 - Jan.2008

Computer Graphics

Data Structures and Algorithms

Artificial Intelligence

Digital Image Processing

EXTERNAL PROFESSIONAL SERVICE

Thesis advisor

Master thesis

- Thesis title: An Improvement ASM for solving Face Recognition problem
Year: 2014
[Department of Computer Science, University of Science, Vietnam](#)
Student: Hong Quan Hua
Co-supervisor: Hoai Bac Le (Email: lhbac@fit.hcmus.edu.vn)
- Thesis title: Review PCA technology for the problem of Face Recognition
Year: 2013
[Danang University of Technology, Vietnam](#)
Student: Anh Hung Duong
Co-supervisor: Trung Hung Vo (Email: vthung@ute.udn.vn)

Bachelor thesis

- Thesis title: Watermarking in Videos
Year: 2010
[Department of Computer Science, University of Science, Vietnam](#)
Student: Thanh Duc Chau
Co-supervisor: Hoai Bac Le (Email: lhbac@fit.hcmus.edu.vn)
- Thesis title: Fingerprint Watermarking
Year: 2010
[Department of Computer Science, University of Science, Vietnam](#)
Student: Nguyen K.H
Co-supervisor: Hoai Bac Le (Email: lhbac@fit.hcmus.edu.vn)

Conference Reviewer

Conference on Computer Vision and Pattern Recognition(CVPR)
Conference on Neural Information Processing Systems, NIPS
Medical Image Computing and Computer Assisted Intervention Society (MICCAI)
International Conference on Document Analysis and Recognition (ICDAR)

Journal Reviewer

Transactions on Signal Processing
Transactions on Image Processing
Pattern Recognition Letters.
Pattern Recognition.
Journal of Digital Signal Processing
Journal of Image and Vision Computing