Chi Nhan Duong

CONTACT INFORMATION

Deepcam, LLC.
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RESEARCH INTERESTS

Computer Vision, Deep learning, Reinforcement Learning, Machine Learning, Digital Image Processing.

Specific topics:

- Deep Generative Models and Deep Reinforcement Learning for Face Modeling.
- Deep Learning Models for Face Recognition.
- Face Aging (Age Estimation, Age Progression).
- Image denoising, inpainting and super-resolution.

EDUCATION

Ph.D. in Computer Science, **Concordia University**, Canada 2013 - 2018
Department of Computer Science & Software Engineering

- Thesis Title: *Beyond PCA: Deep Learning Approaches for Face Modeling and Aging*
- Supervisors: *Professor Tien D. Bui and Professor Khoa Luu (University of Arkansas)*
- Courses taken: Advanced Image Processing,Pattern Recognition, Large Scale Optimization.
- GPA: 4.3/ 4.3
- Area of Study: Computer Vision, Machine Learning, Compressed Sensing, Optimization, Deep Learning, Digital Image Processing.

Master in Computer Science, **University of Science**, Vietnam 2008 - 2010
Faculty of Information Technology

- Thesis Title: *Fine tuning age-estimation with global and local facial features*
- Supervisors: *Professor Hoai Bac Le and and Professor Khoa Luu (University of Arkansas)*
- Thesis grade: 9.2/10
- Area of Study: Computer Vision, Machine Learning, Optimization.

B.S. in Computer Science, **University of Science**, Vietnam 2004 - 2008
Faculty of Information Technology
Honor Program

- Thesis Title: *Watermarking techniques for video copyright protection*
- Supervisor: *Professor Hoai Bac Le*
- Thesis grade: 9.1/10
- Rank: Excellent
- Area of Study: Digital Image Processing.

JOURNAL PUBLICATIONS

[1] **Chi Nhan Duong**, Kha Gia Quach, Khoa Luu, T. Hoang Ngan Le, Marios Savvides, Tien D. Bui, "**Learning from Longitudinal Face Demonstration - Where Tractable Deep Modeling Meets Inverse Reinforcement Learning**", *International Journal of Computer Vision (**IJCV**)*, 2019. *Link* (***Impact factor***: 11.541)

[2] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, "**Deep Appearance Models: A Deep Boltzmann Machine Approach for Face Modeling**", *International Journal of Computer Vision (**IJCV**)*, 2018. *Link* (***Impact factor***: 11.541)

[3] T. Hoang Ngan Le, **Chi Nhan Duong**, Ligong Han, Khoa Luu, Kha Gia Quach, Marios Savvides, "**Deep Contextual Recurrent Residual Networks for Scene Labeling**", Pattern Recognition, 2018. *Link* (***Impact factor***: 4.582)

[4] T. Hoang Ngan Le, Kha Gia Quach, Khoa Luu, **Chi Nhan Duong**, Marios Savvides. "**Reformulating Level Sets as Deep Recurrent Neural Network Approach to Se-**

mantic Segmentation". IEEE Transactions on Image Processing (TIP), 2018. *Link* (***Impact factor***: 4.828)

[5] Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu, Tien D. Bui. "**Non-convex Online Robust PCA: Enhance Sparsity via ℓ_p-norm Minimization**". *Computer Vision and Image Understanding (**CVIU**)*, 2017. *Link* (***Impact factor***: 2.498)

CONFERENCE PUBLICATIONS

[6] **Chi Nhan Duong**, Thanh-Dat Truong, Khoa Luu, Kha Gia Quach, Hung Bui, Kaushik Roy, "**Vec2Face: Unveil Human Faces from their Blackbox Features in Face Recognition**", *The IEEE International Conference on Computer Vision and Pattern Recognition (**CVPR**)*, Seattle, 2020. (**Accepted**)

[7] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Nghia Nguyen, Eric Patterson, Tien D. Bui, T. Hoang Ngan Le, "**Automatic Face Aging in Videos via Deep Reinforcement Learning**", *The IEEE International Conference on Computer Vision and Pattern Recognition (**CVPR**)*, Long Beach, 2019. *Link*

[8] **Chi Nhan Duong**, Kha Gia Quach, T. Hoang Ngan Le, Nghia Nguyen, and Khoa Luu, "**MobiFace: A Lightweight Deep Learning Face Recognition on Mobile Devices**", *The IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, Florida, 2019. *Link*

[9] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Ngan Le, "**ShrinkTeaNet: Million-scale Lightweight Face Recognition via Shrinking Teacher-Student Networks**", *Advances in Neural Information Processing Systems (NeurIPS)*, Canada, 2019. **(Submitted)** *Link*

[10] Thanh-Dat Truong, **Chi Nhan Duong**, Khoa Luu, Minh-Triet Tran, "**Recognition in Unseen Domains: Domain Generalization via Universal Non-volume Preserving Models**", *arXiv preprint arXiv:1905.13040.*, 2019. *Link*

[11] Thanh-Dat Truong, Khoa Luu, **Chi Nhan Duong**, Ngan Le, Minh-Triet Tran, "**Image Alignment in Unseen Domains via Domain Deep Generalization**", *arXiv preprint arXiv:1905.12028.*, 2019. *Link*

[12] Thanh-Dat Truong, Khoa Luu, **Chi Nhan Duong**, Ngan Le, Minh-Triet Tran, "**Generative Flow via Invertible nxn Convolution**", *arXiv preprint arXiv:1905.10170.*, 2019. *Link*

[13] Kha Gia Quach, T. Hoang Ngan Le, Khoa Luu, **Chi Nhan Duong**, Ibsa Jalata, Karl Ricanek, "**Non-Volume Preserving-based Feature Fusion Approach to Group-Level Expression Recognition on Crowd Videos**", *arXiv preprint arXiv:1811.11849.*, 2018. *Link*

[14] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, "**Longitudinal Face Aging in the Wild-Recent Deep Learning Approaches**", *Computer and Robot Vision (CRV)*, Canada, 2018. **(Accepted)** *Link*

[15] Tien D. Bui, Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu, "**Lp Norm Relaxation Approach for Large Scale Data Analysis: A Review**", *International Conference Image Analysis and Recognition (ICIAR)*, Portugal, 2018. *Link*

[16] **Chi Nhan Duong**, Kha Gia Quach, Khoa Luu, T. Hoang Ngan Le, Marios Savvides, "**Temporal Non-Volume Preserving Approach to Facial Age-Progression and Age-Invariant Face Recognition**", *The IEEE International Conference on Computer Vision (**ICCV**)*, Italy, 2017.(ORAL) (Acceptance rate 2.09%) *Link*

[17] T. Hoang Ngan Le, Kha Gia Quach, ChenChen Zhu, **Chi Nhan Duong**, Khoa Luu, Marios Savvides, "**Robust Hand Detection and Classification in Vehicles and in the Wild**", *The IEEE International Conference on Computer Vision and Pattern Recognition Workshop (**CVPRW**)*, Hawaii, 2017. *Link*

[18] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, "**Longitudinal Face Modeling via Temporal Deep Restricted Boltzmann Machines**", *The IEEE International Conference on Computer Vision and Patern Recognition (**CVPR**)*, Las Vegas, 2016. (Acceptance rate 29.9%) *Link*

[19] Kha Gia Quach*, **Chi Nhan Duong***, Khoa Luu, Tien D. Bui, "**Robust Deep Appearance Models**", *The 23rd International Conference on Pattern Recognition (**ICPR**)*, Cancun, 2016. **(*equal contribution)** *Link*

[20] Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu, Tien D. Bui, "**Depth-based 3D Hand Pose Tracking**", *The 23rd International Conference on Pattern Recognition (**ICPR**)*, Cancun, 2016. *Link*

[21] **Chi Nhan Duong**, Khoa Luu, Kha Gia Quach, Tien D. Bui, "**Beyond Principal Components: Deep Boltzmann Machines for Face Modeling**", *The IEEE International Conference on Computer Vision and Patern Recognition (**CVPR**)*, Boston, 2015. (Acceptance rate 28.4%) *Link*

[22] Kha Gia Quach, Khoa Luu, **Chi Nhan Duong**, Tien D. Bui. **Robust ℓ_p-norm Singular Value Decomposition**. *NIPS Workshop on Non-convex Optimization for Machine Learning: Theory and Practice* **(NIPSW)**, December 2015. *Link*

[23] **Chi Nhan Duong**, Kha Gia Quach, Tien D. Bui, "**Are Sparse Representation and Dictionary Learning Good for Handwritten Character Recognition?**", *The 14th International Conference on Frontiers in Handwriting Recognition (**ICFHR**)*, Crete, Greece, 2014. (ORAL Acceptance rate 20.8%) *Link*

[24] Kha Gia Quach, **Chi Nhan Duong**, Tien D. Bui, "**Sparse representation and Low-rank approximation for Robust Face Recognition**", *The 22nd International Conference on Pattern Recognition (**ICPR**)*, Stockholm, Sweden, 2014. *Link*

[25] **Chi Nhan Duong**, Pham Dinh Thang Cap, Thanh Duc Ngo , Duy-Dinh Le, Hoai Bac Le, Duc Anh Duong, Shin'ichi Satoh, "**Robust Eye Localization in Video By Combining Eye Detector and Eye Tracker**", *The 21st International Conference on Pattern Recognition (**ICPR**)*, Tsukuba, Japan, Nov 2012. (Acceptance rate 48.53%) *Link*

[26] Kha Gia Quach, **Chi Nhan Duong**, Khoa Luu and Hoai Bac Le, "**Gabor Wavelet-Based Appearance Models**", *The 9th IEEE-RIVF Intl. Conf. on Computing and Communication Tech. (**RIVF**)* , Vietnam, 2012. (ORAL Acceptance rate 28%) *Link*

[27] **Chi Nhan Duong**, Kha Gia Quach, Khoa Luu, Hoai Bac Le, Karl Ricanek, "**Fine tuning age-estimation with global and local facial features**", *The 36th International Conference on Acoustics, Speech and Signal Processing (**ICASSP**)*, 2032 - 2035, 2011. (Acceptance rate 49%) *Link*

TEACHING EXPERIENCE

Teaching Assistant Sep 2014 - 2016
Concordia University, Canada
Computer Lab Instructor and Tutor: Image Processing (COMP6771).

Lecturer Jan 2011 - Dec 2012
University of Science, Vietnam
Instructor for advanced Computer Science course: Data Hiding and Secret Sharing.
Computer Lab Instructor: Computer Graphics, Data Structures and Algorithms, Artificial Intelligence.

Teaching Assistant 2009 - Dec 2010
University of Science, Vietnam
Computer Lab Instructor: Data Hiding and Secret Sharing, Computer Graphics, Data Structures and Algorithms, Artificial Intelligence.

PROFESSIONAL EXPERIENCE

Deepcam, LLC., USA

Senior Technical Staff **Aug 2018 - present**

- *Deep Learning Models for Face Recognition*
- *Soft biometrics with age and gender estimation*
- *Tractable Deep Generative Models for Longitudinal Face Modeling*
- *Generative Adversarial Networks for Face Modeling*
- *Deep Generative Models for Domain Generalization*

CyLab Biometrics Center, Carnegie Mellon University, USA

Research Associate **Sep 2016 - Jul 2018**

- *Deep Learning Models for Face Recognition*
- *Soft biometrics with age and gender estimation*
- *Tractable Deep Generative Models for Longitudinal Face Modeling*
- *Generative Adversarial Networks for Face Modeling*
- *Deep Learning Models for Scene Parsing*

Concordia University, Canada

Research Assistant **Jan 2013 - 2016**

- *Deep Generative Model for Longitudinal Face Modeling*
- *Deep Boltzmann Machines for Face Modeling*: proposed a novel Deep Appearance Models (DAMs) approach to accurately capture both shape and texture of face images under large variations. This model can be used as an efficient replacement for Active Appearance Models (AAMs).
- *Low rank matrix factorization, Compressed sensing, Sparse representation and dictionary learning*: evaluating the sparse representation based system for face recognition with occlusions.
- *Handwritten character recognition*: applied the theories of sparse representation and dictionary learning to handwritten character recognition.

National Institute of Informatics, Tokyo Japan

Research Intern **Feb 2012 - Aug 2012**

- *Eye Localization in Video*: proposed to combine both tracker and detector for robust eye localization in video. The new system can overcome challenging factors such as: extreme head pose change, closed eyes and occlusion.
- *Video Aesthetic Assessment*: proposed a system to automatically extract the beautiful scene in broadcast videos. Four scene-level features for scene aesthetic assessment including (1) length of scene, (2) scene difference, (3) overall picture of scene and (4) object interestingness are designed. These four features will fully exploit the temporal information and provide a better understanding of human impression from scene.
- *Face recognition*.

FPT Sofware, Ho Chi Minh City, Vietnam

Software and Web Design Engineer Intern **Jun 2007 - Aug 2007**

- Designed and developed a web-based translated document mangement system.

University of Science, Vietnam

Research Assistant **Sep 2009 - Feb 2012**

- *Facial Age Estimation*: proposed an advanced age-estimation approach that combines global and local features derived from a facial image.
- *Digital Image Tampering Detection using Color Filter Array*.

Undergraduate Student **Sep 2004 - Aug 2008**

- *Video Watermarking*: applied DCT and DWT techniques to embed copyright information to video and proposed a new method that combines these techniques to improve the scheme's robustness.
- A project in Handwritten characters recognition using Feed-Forward Neural Network.
- A course project in Image Processing: develop Traffic Sign Detection with four kinds of sign: circle, triangle, rectangle and square.

PROJECT EXPERIENCE

Deepcam, LLC., USA
- *Face Matching SDK*
- *Light-weight networks for Face Recognition in mobile devices*
- *Face Recognition in Surveillance Camera*

CyLab Biometrics Center, Carnegie Mellon University, USA
- *Face Matching SDK*
- *Face Analysis SDK for age and gender estimation*
- *Long range face matching*

Vietnam National University, Vietnam
- *Efficient Face Retrieval In Large Scale Video Archives (2012 - 2013)*

HONORS AND AWARDS

Concordia University, Canada
- Outstanding Reviewer, CVPR 2019.
- Outstanding Contribution in Reviewing, Signal Processing.
- Doctoral Prize in Engineering and Computer Science, Concordia University, 2019.
- Nominated for the CIPPRS Doctoral Dissertation Award, 2017.
- Concordia Accelerator Award, 2017
- Concordia University Conference and Exposition Award, 2017
- Centre for Pattern Recognition and Machine Intelligence Graduate Scholarship, 2016.
- Centre for Pattern Recognition and Machine Intelligence Graduate Scholarship, 2014.
- Concordia University full tuition recruitment award, (2013 - 2015).

Odon Vallet scholarship (2003).

SKILLS

Programming: MFC/ WinAPI, C/C++, C#, R, Python, Java, SQL, MySQL.
Libraries: DeepNet, OpenCV, OpenGL.
Deep Learning frameworks: Caffe, Tensorflow, Mxnet, Pytorch
Tools: Matlab, Microsoft Visual Studio, IPython.
Operating Systems: Linux, Microsoft Windows, Apple OS X.
Languages: Fluency in English, and Vietnamese. Intermediate French.
Soft skills:
- Teamwork, self-study ability, motivated.
- Problem-solving and analytical skills.
- Patience and hard working.

ACADEMIC SERVICES

Conference Reviewer

Conference on Computer Vision and Pattern Recognition (CVPR), 2020.
European Conference on Computer Vision (ECCV), 2020.
AAAI Conference on Artificial Intelligence (AAAI), 2020.
Conference on Computer Vision and Pattern Recognition (CVPR), 2019.
International Conference on Computer Vision (ICCV), 2019.
IEEE CVPR Precognition Workshop, 2019.
MICCAI MIL3ID Workshop, 2019.
International Conference on Document Analysis and Recognition (ICDAR), 2015.

Journal Reviewer

Signal Processing, Signal Processing Letters.
Pattern Recognition, Pattern Recognition Letters.
Transactions on Image Processing.
Transactions on Pattern Analysis and Machine Intelligence.
Transactions on Information Forensics & Security.
Electronics Journal.

Program Committee Member

IEEE CVPR Precognition Workshop, 2020.
IEEE CVPR Precognition Workshop, 2019.

VOLUNTEERING ACTIVITIES

John Molson MBA International Case Competition, Canada — Jan 2014

- Role: Welcome team, and Judge coordinator.
- Guide the judges to the appropriate presentation rooms, introduce the judges, explain the competition rules and keep track of time of the competing team's presentation.

Woman Center, Montréal, Canada — Dec 2013

- Help them sorting and packing donations that was used in Christmas.

REFERENCES

Available upon request