

PERSONAL DETAILS

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WORK EXPERIENCE

Research Intern

May 2020 - Aug 2020

Facebook Reality Labs

Project: Spatial-Temporal Sparse Sensing for Ego-centric Action Recognition.

Description: We investigated the spatial-temporal relation in videos and conduct sparse sampling on both of these domains. We also proposed an ego-action recognition framework to improve computational efficiency by adaptively skipping the frames and regions that can be predicted through the hallucination of future attention.

Mentor: Dr. Minh Vo

Systems Engineering Intern

May 2019 - Aug 2019

Texas Instruments

Project: Ego-Mobile Object Detection and Tracking using Camera and Radar.

Description: We developed algorithms for object detection and tracking in ego-mobile scenarios by fusing camera and radar sensors. Vision CNNs are used for 2D object detection and range information for the detected objects is measured from radar. We leverage open source frameworks for rapid prototyping and performance evaluation.

Supervisor: Dr. JuneChul Roh

Manager: Dr. Darnell Moore

Research Intern

May 2018 - Aug 2018

IBM Watson Research Center

Project: Large Scaled Mixed-Band Deep Neural Network Acoustic Modeling for Automatic Speech Recognition.

Description: We investigate mixed-bandwidth (MB) deep neural network acoustic modeling for ASR with large-scale training data. We also propose a CNN-based discriminatively trained bandwidth extension (BWE) model with a VGG architecture to map the NB speech to WB speech.

Mentor: Dr. Xiaodong Cui

Manager: Dr. Michael Picheny

Research Intern

May 2017 - Aug 2017

IBM Watson Research Center

Project: Auto-Curation of Sports Highlights for Wimbledon and US Open 2017.

Description: We propose a novel approach for auto-curating sports highlights, and demonstrate it to create a real-world system for the editorial aid of tennis highlight reels, based on players' reactions, players' expressions, and spectators. Our work has been demonstrated at two major international tennis tournaments (2017 Wimbledon and US Open).

Mentor: Dr. Dhiraj Joshi

Manager: Dr. Rogerio S. Feris

Research Assistant

Sep 2016 - present

Center for Cognitive Computing Systems Research (C3SR), IBM

Group: Creative Experiential Learning Advisor (CELA).

Advisor: Prof. Minh N. Do

Director: Dr. Jinjun Xiong

Research Intern

Mar 2015 - Aug 2015

Coordinate Science Lab, University of Illinois at Urbana-Champaign

Project: Multi-modal SLAM System for Indoor Environment using Visual, Inertial Measurement Unit, and Depth Sensors.

Description: We propose to develop a SLAM system for indoor environments using error-state Kalman filtering with three different sources of information: visual, depth, and inertial reading. By experiment, the system is robust against loop closure and human natural walking gesture. The system can also surpass situation where visual features are lost for several frames.

Advisor: Prof. Minh N. Do.

Teaching Assistant

Jan 2018 - Dec 2018

Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

Spring 2018: ECE310 - Digital Signal Processing. Prof. Minh N. Do, Prof. Zhi-Pei Liang

Fall 2018: ECE310 - Digital Signal Processing. Prof. Yoram Bresler, Prof. Dimitris Katselis, Prof. Ilan Shomorony

EDUCATION

Doctor of Philosophy

Jan 2016 - present

Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

Tentative Thesis title: "Learning Temporal Information across Domains: from the Viewpoints of Applications and Modeling", Advisor: Prof. Minh N. Do

Past Research: Learning Motion in Feature Space. We propose a deep learning model to jointly learn both spatial and temporal information without using optical flow. We also propose the novel locally-consistent deformable convolution (LCDC), which enforces a local coherency constraint on the receptive fields, to model motion on feature space.

GPA: 3.78/4.0

Expected Day of Graduation: December 2020

Master of Engineering

Sep 2013 - Sep 2015

Multimedia Communication Systems, Eurecom Institute, Télécom ParisTech

Thesis: "Multi-modal SLAM System for Indoor Environment using Visual, Inertial Measurement Unit, and Depth Sensors", Advisor: Prof. Minh N. Do.

Semester Project: “A study of voice conversion and speech synthesis spoofing attacks against text-dependent speaker verification”, Advisor: A/Prof Nicholas Evans

GPA: 3.99/4.0

Bachelor of Computer Science

Sep 2008 - Sep 2012

Advance Program in Computer Science (APCS), University of Science, Vietnam National University

Thesis: “Natural User Interface for Smart Environment” (Grade: 10.0/10.0), Advisor: A/Prof Minh-Triet Tran.

GPA: 3.95/4.0

SKILLS

Tools PyTorch, TensorFlow, Python, MATLAB, Java, C/C++, Bash, Vim, GitHub

Languages Vietnamese (native), English (fluent), French (intermediate)

RELEVANT COURSES

- **ECE 544 - Pattern Recognition**, Prof. Alexander Schwing, from UIUC. (2017)
- **ECE 490 - Introduction to Optimization**, Prof. Srikant Rayadurgam, from UIUC. (2017)
- **ECE 534 - Random Processes**, Prof. Olgica Milenkovic, from UIUC. (2017)
- **ECE 551 - Digital Signal Processing II**, Prof. Minh N. Do, from UIUC. (2016)
- **ECE 513 - Vector Space Signal Processing**, Prof. Yoram Bresler, from UIUC. (2016)
- **ECE 549 - Computer Vision**, Prof. Svetlana Lazebnik, from UIUC. (2016)
- **Speech - Speech and Audio Processing**, Prof. Nicholas Evans, from Eurecom, Telecom ParisTech. (2014)
- **MathEng - Essential Mathematical Methods for Engineers**, Prof. Nicholas Evans, from Eurecom, Telecom ParisTech. (2014)
- **ImCompress - Image and video Compression and Processing**, Prof. Jean-Luc Dugelay, from Eurecom, Telecom ParisTech. (2013)
- **Digital Signal Processing**, Prof. Minh N. Do, from UIUC. (2013)
- **Data Mining and Information**, Prof. Bao T. Ho, from JAIST. (2013)
- **Machine Learning**, Prof. Marco Cuturi, from Kyoto University. (2011)
- **Logical structure**, Prof. Patrick Bellot, from Telecom ParisTech. (2010)

HONORS AND AWARDS

- Oral presentation at ICCV: “Learning Motion in Feature Space: Locally-Consistent Deformable Convolution Networks for Fine-Grained Action Detection” (October 2019)
- Oral presentation at INTERSPEECH: “Large-Scale Mixed-Bandwidth Deep Neural Network Acoustic Modeling for Automatic Speech Recognition” (September 2019)
- Video of the month award in CSL (July 2019)
- Patent “Action Detection by Exploiting Motion in Receptive Fields” (filed in May 2018)
- Auto-curation system for US Open tournament’s official highlights (August 2017)
- Auto-curation system for Wimbledon tournament’s official highlights (July 2017)
- Eiffel scholarship laureate by French Government (2013-2015)
- Award in AmCham Scholarship (2011)
- Award in Nokia Tap The Apps (2011)
- Rank 1 of APCS - class of 2008 (2011-2012)
- Rank 1 of APCS - class of 2008 (2010-2011)

PATENTS

- [1] **Khoi-Nguyen C. Mac**, Raymond Yeh, Dhiraj Joshi, Minh N. Do, Rogerio S. Feris, Jinjun Xiong. “Action Detection by Exploiting Motion in Receptive Fields”, filed in May 2018.

JOURNAL PUBLICATIONS

- [1] Michele Merler, **Khoi-Nguyen C. Mac**, Dhiraj Joshi, Quoc-Bao Nguyen, Stephen Hammer, John Kent, Jinjun Xiong, Minh N. Do, John R. Smith, Rogerio S. Feris. “Automatic Curation of Sports Highlights using Multimodal Excitement Features”, *IEEE Transactions on Multimedia (TMM)*, pp. 1147-1160, October 2018.

CONFERENCE PUBLICATIONS

- [1] **Khoi-Nguyen C. Mac**, Dhiraj Joshi, Raymond A. Yeh, Jinjun Xiong, Rogerio S. Feris, Minh N. Do. “Learning Motion in Feature Space: Locally-Consistent Deformable Convolution Networks for Fine-Grained Action Detection”, *International Conference on Computer Vision (ICCV)*, pp. 6282-6289, Seoul, Korea, October 2019.
(Oral)

- [2] **Khoi-Nguyen C. Mac**, Xiaodong Cui, Wei Zhang, Michael Picheny. “Large-Scale Mixed-Bandwidth Deep Neural Network Acoustic Modeling for Automatic Speech Recognition”, *20th Annual Conference of the International Speech Communication Association (INTERSPEECH)*, pp. 251-254, Graz, Austria, September 2019.
(Oral)
- [3] Hoang-An Le, **Khoi-Nguyen C. Mac**, Truong-An Pham, Vinh-Tiep Nguyen, Minh-Triet Tran. “Multimodal Smart Interactive Presentation System”, *International Conference on Human-Computer Interaction (HCI International)*, pp. 67-76, Las Vegas, Nevada, USA, July 2013.
- [4] Hoang-An Le, **Khoi-Nguyen C. Mac**, Truong-An Pham, Minh-Triet Tran. “Realtime Pointing Gesture Recognition and Applications in Multi-user Interaction”, *Asian Conference on Intelligent Information and Database Systems (ACIIDS)*, pp. 355-364, Kuala Lumpur, Malaysia, March 2013.
- [5] Hoang-An Le, **Khoi-Nguyen C. Mac**, Truong-An Pham, Vinh-Tiep Nguyen, Minh-Tiet Tran, Anh-Duc Duong. “SIM-Smart Interactive Map with Pointing Gestures”, *Intelligent Human-Machine Systems and Cybernetics (IHMSC)*, pp. 344-349, Nanchang, China, August 2012.

WORKSHOP PUBLICATIONS

- [1] Michele Merler, Dhiraj Joshi, **Khoi-Nguyen C. Mac**, Quoc-Bao Nguyen, John Kent, Stephen Hammer, Jinjun Xiong, Minh N. Do, John R. Smith, Rogerio S. Feris. “The Excitement of Sports: Automatic Highlights Using Audio/Visual Cues”, *The IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, pp. 2520-2523, Salt Lake City, Utah, USA, August 2018.
- [2] I Pratikakis, MA Savelonas, F Arnaoutoglou, G Ioannakis, A Koutsoudis, T Theoharis, MT Tran, VT Nguyen, VK Pham, HD Nguyen, HA Le, BH Tran, QH To, MB Truong, TV Phan, MD Nguyen, TA Than, **KNC Mac**, MN Do, AD Duong, T Furuya, R Ohbuchi, M Aono, S Tashiro, D Pickup, X Sun, PL Rosin, RR Martin. “SHREC’16 Track: Partial Shape Queries for 3D Object Retrieval”, *Proceedings of the Eurographics 2016 Workshop on 3D Object Retrieval (3DOR)*, pp. 79-88, Lisbon, Portugal, May 2016.