Hoang-Nhat Tran

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ACADEMIC DETAILS

Affiliation	Major	Time	GPA
Hanoi University of Science & Technology	B.E. in Control Engineering and Automation	2014 – 2019	2.73
Hanoi University of Science & Technology	M.S. in Control Engineering and Automation	2019 – 2020	3.83

RESEARCH EXPERIENCES

- **Dynamic Hand Gesture Recognition from Multi-modal Streams Using Deep Neural Network** (Graduation Project)
  *(**Supervisor**: Assoc. Prof. Thanh-Hai Tran (Department of Computer Vision, MICA International Research Institute - HUST), February 2019 - June 2019)*
  - Studied foundation of machine learning and deep learning (focus on multiple kernel learning algorithms, Support Vector Machine, and 3D convolutional neural networks).
  - Incorporated C3D network, EasyMKL algorithm, and SVM classifier in a unified framework for multi-modal human activity and gesture recognition.
  - Investigated three different multi-modal fusion methods, i.e. early fusion, late fusion, and MKL-based fusion; evaluated the proposed framework on RGB, Optical Flow, and Depth modalities of MICAGes dataset. The results are presented in [1].

- **Human Action Recognition using Deep Learning and Multi-view Discriminant Analysis** (Master Project)
  *(**Supervisor**: Assoc. Prof. Thanh-Hai Tran (Department of Computer Vision, MICA International Research Institute - HUST), October 2019 - December 2020)*
  - Studied multi-view analysis techniques (MvCCA, MvDA, MvDA-vc).
  - Incorporated multi-view analysis techniques and deep feature extractors in a unified framework for multi-view human activity and gesture recognition from video.
  - Proposed "Pairwise-Covariance Multi-view Discriminant Analysis" (pc-MvDA) that introduces pairwise-covariance constraint to more efficiently separate classes' centers; then evaluated it on three datasets (IXMAS, MuHAVi, MICAGes). The results are presented in [2].
  - Working on local extensions of multi-view discriminant analysis algorithms, which could preserve the local structure of data among views while maintaining the discriminatory performance.

- **Research on an automatic system for evaluating educational activities in classrooms based on image processing and artificial intelligence** (Research Project)
  *(**Principal Investigator**: Assoc. Prof. Thi-Lan Le (Department of Computer Vision, MICA International Research Institute - HUST), June 2020 - date)*
  - Proposed the "Locality and Relative Distance-Aware Nonlocal block", which extends the default Non-local block with larger embedding convolutional filters coupled with 2D relative distance representation with efficient implementation; and replaced it in Libra-RCNN architecture for experiments in detecting hand-raising gesture in a classroom dataset. The results are presented in [3].
  - Studied Transformer networks in computer vision and working on 2D relative position representation for Vision Transformer.
  - Participated in the development of a simple Hungarian-based method for combining head detection and face detection results for improving the precision of student counting in classroom environment. The results are presented in [4].

- **Edge intelligence based hand gesture recognition using wearable multimodal sensors for human machine interaction** (Research Project)
  *(**Principle Investigator**: Assoc. Prof. Thanh-Hai Tran (Department of Computer Vision, MICA International Research Institute - HUST), September 2020 - date)*
  - Conducted comparative experiments on a range of lightweight object detector models for deployment on an embedded system of static hand posture recognition using hand-wrist camera. The results are presented in [5].

- Reviewing and testing multi-modal fusion techniques for dynamic hand posture recognition using multiple data streams captured from wearable sensors.

COLLABORATIVE PROJECTS EXPERIENCES

- **South Vietnam Flag Detection on Video Stream** (Collaboration between MICA and HDVietnam)
  *(**Organization**: HDVietnam, December 2019 - May 2020)*
  - Collected and annotated images and videos available online for training; then deployed CenterNet object detection model in C++.
- **Vision Server for AGV Collision Avoidance** (Collaboration between HUST and SDV)
  *(**Organization**: Samsung Display Vietnam, August 2020 - November 2020)*
  - The tasks involved in object detection, multiple object tracking, camera calibration, object localization from detection results, and industrial communication protocols.
- **Storage Devices Detection for X-ray Security Scanner** (Collaboration between HUST and SDV)
  *(**Organization**: Samsung Display Vietnam, October 2021 - date)*
  - Working on GUI design, deployment of object detection or instance segmentation models.

TEACHING EXPERIENCES

- **Teaching Assistant**
  *(**Organization**: AI Academy Vietnam, November 2020 - February 2021)*
  - Assisted the Basic Machine Learning, Deep Learning, and Computer Vision classes with technical problems and programming assignments.
- **Teaching Assistant**
  *(**Organization**: Samsung Display Vietnam, April 2021)*
  - Instructed the class in Python programming and computer vision libraries; and aided with technical issues, programming assignments, and final project.

PUBLICATIONS

- [1] Thanh-Hai Tran, Hoang-Nhat Tran, and Huong-Giang Doan. "Dynamic Hand Gesture Recognition from Multi-modal Streams Using Deep Neural Network". In: *Multi-disciplinary Trends in Artificial Intelligence*. Springer International Publishing, 2019, pp. 156–167. ISBN: 978-3-030-33709-4
- [2] Hoang-Nhat Tran et al. "Pairwise-Covariance Multi-view Discriminant Analysis for Robust Cross-View Human Action Recognition". In: *IEEE Access* 9 (2021), pp. 76097–76111. DOI: 10.1109/ACCESS.2021.3082142
- [3] Thu-Hien Le et al. "Locality and Relative Distance-Aware Non-local Networks for Hand-Raising Detection in Classroom Video". In: (MAPR 2021), (to appear)
- [4] Thi-Oanh Ha et al. "Improvement of People Counting by Pairing Head and Face Detections from Still Images". In: (MAPR 2021), (to appear)
- [5] Thanh-Hai Tran et al. "A Pilot Study on Hand Posture Recognition from Wrist-worn Camera for Human Machine Interaction". In: (ATC 2021), (to appear)

CONFERENCE PRESENTATIONS

- Participated to present the outcomes of research [5] (online).

TECHNICAL SKILLS

- **Programming Languages:** Fluent in Python, familiar with C++ and Matlab.
- **Frameworks:** Experience working with Numpy, Scipy, OpenCV, scikit-learn, PyTorch, Tensorflow, Keras, pandas, matplotlib, Seaborn, PyQT5, ...
- **Tools:** Linux OS, Github, LaTeX.

LANGUAGES

- Vietnamese: (Native)
- English: (TOEIC 940)
- French: (DELF B1)

REFERENCES

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