Elahe Vahdani

Ph.D. Candidate, Computer Science

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Summary

Current **Ph.D. Candidate in Computer Science** (Computer Vision) with Proficient Programming Skills.

Interested in **Machine Learning**, **Computer Vision**, **Data Analysis**, and **Software Engineering**.

Education

The City University of New York — New York, NY

Ph.D. Candidate, Computer Science — *2015 – Present*

Master of Philosophy (MPhil), Computer Science

- **Adviser:** Prof. YingLi Tian
- **Research:** Currently, I'm working on Action Recognition, and Temporal Action Detection tasks, and am interested in designing algorithms with limited supervision, such as self-supervised and weakly-supervised learning. I have also worked on Facial Expression Analysis, Cross-Modality Bridging and Vehicle Re-identification projects. Prior to that, my research was focused on Approximation Algorithms for NP-Hard problems.
- **GPA:** 3.74/4.0 (62 credits Ph.D. level courses from CUNY, Columbia University, and NYU)

Sharif University of Technology — Tehran, Iran

B.S. in Mathematics and Computer Science — *2009 – 2014*

Technical Skills

Technical Tools

- **Programming Languages:** Python, C++, Java, MATLAB, R, SQL.
- **Python/Deep Learning Libraries:** PyTorch, Tensorflow, TensorboardX, NumPy, Matplotlib, pandas, H5Py.
- **Machine Learning/Data Analysis:** Apache Spark, Hadoop, Mahout, Weka, Rapid Miner, Scikit-learn.
- **General:** Linux, Git, Docker, VS Code, Visual Studio, Eclipse, OpenCV, LaTeX.

Related Knowledge

- **Computer Vision:** Image Processing, Video Analysis, Action Recognition and Detection, Human Pose Estimation, Object Detection, Semantic Segmentation, Facial Expression Analysis, Vehicle Re-identification and Tracking, Cross-Modality Bridging (Mesh, Point Cloud, Images, Text).
- **Machine Learning:** Classification, Regression, Self-Supervised, Unsupervised, Semi-Supervised Learning, Reinforcement Learning, Transfer Learning, Domain Adaptation, Adversarial Learning, Few-shot Learning.
- **Deep Learning:** RNN, CNN, BiLSTM, Autoencoders, VAEs, GANs.
- **General CS Knowledge:** Algorithms, Data Structures, Probability and Statistics, Linear Algebra, Pattern Recognition, Database, Graphs, Randomized Algorithms, Network Systems, Stochastic Process, Signal Processing.

Professional Experience

Continuous Sign Language Recognition (NSF Project) — 2019 – 2020

- **Project Manager:** YingLi Tian (Distinguished Professor at CUNY)
- Developed an educational software using deep-learning methods for sign language students to automatically process their signing video assignments and send them an immediate feedback regarding the fluency of their signing.

Cross-Modality Bridging (Mesh, Point-cloud, and Images) — 2020

- **Project Manager:** YingLi Tian (Distinguished Professor at CUNY)
- Designed a novel cross-modal center loss to map the representations of different modalities into a common space.

Automatic Estimation of Pain Intensity from Facial Expression 2019

- **Project Manager:** Zakia Hammal (Principal Project Scientist at CMU)
- Designed a deep-learning based method to estimate the pain intensity in patients with shoulder pain, from their facial expressions in the given videos. The results were compared with self-reported pain levels as the ground-truth.

Multi-camera Vehicle Tracking and Re-identification on AI City Challenge 2019

- **Project Manager:** YingLi Tian (Distinguished Professor at CUNY)
- Proposed an enhanced multi-granularity network with multiple branches to extract visual features for vehicles with different levels of grains, which outperformed the state-of-the-art vehicle ReID methods by 16.3% on Veri dataset.

Isolated Sign Language Recognition (NSF Project) 2018

- **Project Manager:** YingLi Tian (Distinguished Professor at CUNY)
- Propose a 3DCNN based framework for sign language recognition from RGB-D videos, by fusing multiple modalities (hand gestures, facial expressions, body poses) and multiple channels (RGB, depth, motion, and skeleton joints).

Metabolics Estimation 2018

- **Project Manager:** Hao Su (Professor at CUNY)
- Worked on estimation of metabolics given the data collected by wearable motion sensors.

Approximation Algorithms for Scheduling Problems in Sensor Networks 2017

- **Project Manager:** Amotz Bar-Noy (Professor at CUNY)
- Designed an approximation algorithm for an NP-hard problem related to scheduling a set of jobs with deadlines.

Teaching Experience

Adjunct Lecturer, The City University of New York New York, NY

- CSc 21700 - Probability and Statistics *(at City College)* 2018, 2019, 2020
- CSc 22000 - Algorithms *(at City College)* Spring 2018, Summer 2020
- CSci 235 - Software Design and Analysis II *(at Hunter College)* Spring 2018

Publications

[1] **E. Vahdani** and Y. Tian, "Action detection in untrimmed videos with deep learning models: A survey," *preprint*, 2020.

[2] **E. Vahdani**, L. Jing, Y. Tian, and M. Huenerfauth, "Recognizing american sign language nonmanual signal grammar errors in continuous videos", *ICPR*, 2020.

[3] L. Jing, **E. Vahdani**, J. Tan, and Y. Tian,"Cross-modal center loss", *preprint*, 2020.

[4] S. Hassan, L. Berke, **E. Vahdani**, L. Jing, Y. Tian, and M. Huenerfauth, "An isolated-signing rgbd dataset of 100 american sign language signs produced by fluent asl signers", *LREC* 2020.

[5] L. Jing, **E. Vahdani**, M. Huenerfauth, and Y. Tian, "Recognizing american sign language manual signs from rgb-d videos", *preprint*, 2019.

[6] Y. Chen, L. Jing, **E. Vahdani**, L. Zhang, M. He, and Y. Tian, "Multi-camera vehicle tracking and re-identification on AI city challenge 2019", *CVPR Workshops*, 2019.

[7] **E. Vahdani**, A. Bar-Noy, M. P. Johnson, and T. Abdelzaher, "Gathering information in sensor networks for synchronized freshness", *IEEE SECON*, 2017.

Honors and Awards

N2 Women - IEEE Communications Society Grant 2018

Doctoral Student Research Grant, CUNY 2017

Science Fellowship, Awarded by City University of New York 2015

Bronze Medal in National Informatics Olympiad, Iran 2007

Service

Reviewer for IEEE Transactions on Multimedia (**TMM**), Transactions on Circuits and Systems for Video Technology (**TCSVT**), Computer Vision and Image Understanding (**CVIU**), Journal of Machine Vision and Applications (**MVAP**), and Journal of Visual Communication and Image Representation (**JVCI**).