Tahereh Zarrat Ehsan

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RESEARCH INTERESTS

- Deep Learning (including Unsupervised, Self-supervised, Probabilistic Learning)
- Machine Learning
- Image and Video Processing
- Representation Learning
- Generative Modeling
- Generalizability and explainability of Deep Learning
- Human Behavior Recognition
- Breast Cancer Detection

EDUCATION

University of Guilan

Rasht, Iran

2015 - 2019

M.Sc., Electrical engineering, Major: Digital Electronic

- Thesis: Abnormal human behavior recognition based on image processing techniques, Defended with the score of A^+

University of Guilan

Rasht, Iran

2009 - 2014

B.Sc., Electrical engineering

- Thesis: Analysis and design of a PID controller for regulating blood glucose of diabetic patients

PUBLICATIONS

1. **Ehsan, T.Z**., Nahvi, M and Mohtavipour, S.M., "Learning Deep Latent Space for Unsupervised Violence Detection", *Multimedia Tools and Applications*, **2023.** https://doi.org/10.1007/s11042-022-13827-7
2. **Ehsan, T.Z**., Nahvi, M and Mohtavipour, S.M., "An Accurate Violence Detection Framework Using Unsupervised Spatio-Temporal Action Translation Network", **2023**. (Accepted for publication at *Visual Computer journal*)
3. **Ehsan, T.Z**., Nahvi, M and Mohtavipour, S.M., DABA-Net: Deep Acceleration-Based AutoEncoder Network for Violence Detection in Surveillance Cameras, IEEE MIVP (Machine Vision and Image Processing) conference, **2022.** DOI: https://doi.org/10.1109/MVIP53647.2022.9738791
4. **Ehsan, T.Z.** and Mohtavipour, S.M., "Vi-Net: A Deep Violent Flow Network for Violence Detection in Video Sequences", IEEE 11th International Conference on Information and Knowledge Technology (IKT), **2020**.

DOI: https://doi.org/10.1109/IKT51791.2020.9345617

5. **Ehsan, T.Z.** and Nahvi, M., "Violence detection in indoor surveillance cameras using motion trajectory and differential histogram of optical flow", IEEE 8th International Conference on Computer and Knowledge Engineering (ICCKE), **2018**. DOI: https://doi.org/10.1109/ICCKE.2018.8566460
6. Mohtavipour, S.M., **Ehsan, T.Z.**, Abeshoori, HJ, Mollajafari, M., "Smooth Longitudinal Driving Strategy with Adjustable Non-linear Reference Model for Autonomous Vehicle (self-driving car)", *International Journal of Dynamics and Control*. **2023**. DOI: https://doi.org/10.1007/s40435-023-01142-4
7. **Ehsan, T.Z**., Nahvi, M., Mohtavipour, S.M., "A Review on Violence Detection in Video Sequences", **2023.** (Ready for Submission)

RESEARCH EXPERIENCE

Researcher- Freelancer 2019 - Present

- Research and python implementation of:
  - Advanced deep learning methods such as Transformer, Attention, GNN, and AE using customized loss function and maximum likelihood principle
  - *Probabilistic* deep learning, *unsupervised* learning, and *generative modeling* such as VAE, GAN, pix2pix, Cycle GAN, Normalizing flows, PixelCNN and WaveNet

Master's Researcher 2015 - 2019

- Research and application of machine learning, deep learning, pattern recognition and its application for computer vision
- Programming implementation of various image and video processing techniques such as object detection, motion estimation, image segmentation, feature extraction, and optimization.

TECHNICAL SKILLS

- Programming languages: Proficient: Python, Object-Oriented, MATLAB
- Deep learning Frameworks: Tensorflow, Tensorflow Probability, Keras, Numpy, Scipy, Pandas, OpenCV, Colab, Jupyter, Anaconda
- Digital experiences: Embedded systems such as Arduino and Raspberry pi

LANGUAGES

- TOEFL iBT: 92

PROFESSIONAL DEVELOPMENT

- TensorFlow 2 for Deep Learning Specialization, a 3-course specialization by Imperial College London on Coursera. Certificate earned in 2022.
- Generative Adversarial Networks (GANs) Specialization, a 3-course specialization by DeepLearning.AI on Coursera. Certificate earned in 2022.
- DeepLearning.AI TensorFlow Developer Professional, a 2-course specialization by Google AI engineer Laurence Moroney on Coursera. Certificate earned in 2021.

HONOR & AWARDS

- **Second winner** of industrial-scientific computer vision and machine learning competition that was held by ferdosi university of Mashhad (qs: 101-150), Certificate earned in 2023.
- Ranked among the **top 2%** in the National University Entrance Exam among over 50,000 participants in the Electrical Engineering field, Iran, 2016.
- Ranked among the **top 1%** in the National University Entrance Exam among over 300,000 participants in the Mathematics and Physics field, Iran, 2009.
- Accepted to participate in Mathematics Olympiad stage 2 from the **top 1%** of the participants in Mathematics Olympiad stage 1, Iran, 2006.

REFERENCE

- Manoochehr Nahvi, Associate Professor (M.Sc. Supervisor), University of Guilan, nahvi@guilan.ac.ir