

Tahereh Zarrat Ehsan

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RESEARCH INTERESTS

- Deep Learning (including Unsupervised, self-supervised, Probabilistic Learning)
- Machine learning
- Pattern Recognition
- Image and Video Processing
- Generative Modeling
- Medical Image Analysis
- Generalizability and explainability of machine Learning

PUBLICATIONS

- **Ehsan, T.Z.**, Nahvi, M and Mohtavipour, S.M., “Learning Deep Latent Space for Unsupervised Violence Detection”, *Multimedia Tools and Applications*, **2023**. DOI: <https://doi.org/10.1007/s11042-022-13827-7>
- **Ehsan, T.Z.**, Nahvi, M and Mohtavipour, S.M., “An Accurate Violence Detection Framework Using Unsupervised Spatio-Temporal Action Translation Network”, *Visual Computer journal*, **2023**. DOI: <https://doi.org/10.1007/s00371-023-02865-3>
- **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>
- **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>
- **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 (ICCCKE), **2018**. DOI: <https://doi.org/10.1109/ICCCKE.2018.8566460>
- **Ehsan, T.Z.**, Nahvi, M., Mohtavipour, S.M., “Violence Detection in Video: A review on handcrafted and deep learning techniques”, **2023**. (Submitted a book chapter in IET journal)
- Mohtavipour, S.M., **Ehsan, T.Z.**, Abeshoori, HJ, Mollajafari, M., “Smooth Longitudinal Driving Strategy with Adjustable Non-linear Reference Model for Autonomous Vehicle”, *International Journal of Dynamics and Control*, **2023**. DOI: <https://doi.org/10.1007/s40435-023-01142-4>
- **Ehsan, T.Z.**, Mohtavipour, S.M., “ A deep CNN-based framework for chicken behavior analysis”, Ready for submission to computers and electronics in agriculter journal.

EDUCATION

University of Guilan

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

Rasht, Iran

2015 - 2019

- Thesis: Abnormal human behavior recognition in video sequences using machine learning techniques, Defended with the score of A⁺, GPA: 3.36/4.00

University of Guilan

B.Sc., Electrical engineering

Rasht, Iran

2009 - 2014

- Thesis: Analysis and design of a PID controller for regulating blood glucose of diabetic patients, Last two years GPA: 3.14/4.00

RESEARCH EXPERIENCE

Researcher

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

Research Assistant at Dr. Mollajafari Lab

2020 - 2021

- Research and python implementation of:
 - Car and pedestrian detection, tracking, motion estimation, and segmentation using deep learning and computer vision techniques such as YOLO, DeepSORT, and Optical flow

Master's Researcher at Dr. Nahvi Lab

2016 - 2019

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

TECHNICAL SKILLS

- Programming languages: Proficient in Python
- Deep learning Frameworks:
 - Proficient in Tensorflow, Tensorflow Probability, Keras, Numpy, Scipy, Pandas, OpenCV, Colab, Jupyter, Anaconda
 - Familiar with Pytorch
- Digital experiences: Embedded systems such as Arduino
- Research Writing and visualization, Microsoft word, Microsoft Powerpoint, Microsoft Visio

HONOR & AWARDS

- **Winner of Scientific-Industrial** Computer Vision Competition in 12th International Conference on Computer and Knowledge Engineering (Second Place), 2022. The goal of this competition was to propose a machine learning framework for chicken behavior analysis and the framework must comprise the following parts: 1- Chicken detection in crowded challenging poultry environment 2- Tracker to find the trajectory of detected chickens 3- Chicken behavior analysis based on the trajectory evaluation. [Certificate](#) [Video of the result](#)
- 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 3%** of the participants in Mathematics Olympiad stage 1, Iran, 2006.

LANGUAGES

- English: 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.
- Probabilistic Deep Learning Book by Prof. Beate Sick and Oliver Duerr