Hadi Ghahremannezhad

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EDUCATION

New Jersey Institute of Technology — New Jersey, USA
Ph.D. in Computer Science (GPA: 3.9/4.0) — Expected Dec 2022
- Coursework: Data Mining, Machine Learning, Data Structures & Algorithms, Pattern Recognition

Shahid Beheshti University — Tehran, Iran
MSc. in Software Engineering (GPA: 3.44/4.0) — Sep 2014 – Sep 2017
- Coursework: Neural Networks, Image Processing, Artificial Intelligence

K.N. Toosi University of Technology — Tehran, Iran
BSc. in Software Engineering — Sep 2009 – Sep 2014
- Coursework: Advanced Programming, Probability & Statistics, Linear Algebra, Multimedia Systems

SKILLS

Recent Experience: Python, C++, LaTeX
Others: JAVA, JavaScript, SQL, MATLAB
Frameworks: PyTorch, OpenCV, NumPy, TensorFlow, Keras

PROFESSIONAL EXPERIENCE

Innovative AI Technologies (iAItech) — New Jersey, USA
Machine Learning Scientist — June 2022 – Aug 2022
- Developed a real-time system for detection of dilemma zone conflicts at signal-controlled intersections using edge computing and 5G. Won U.S. DOT SBIR Phase I Award. (C++, Python, Linux)
- Assembled a smart Unmanned Aircraft System (UAS) for missing person search and rescue in heavily dense forested areas using drones. Advanced to the final phase of NIST's First Responder UAS Triple Challenge. (PyTorch, OpenCV)

SELECTED PROJECTS

Smart Traffic Video Analytics (STVA) system — Sep 2018 – May 2022
- This project is funded by NJDOT and it is featured on the NJDOT Technology Transfer website.
  - Automated the road segmentation module which achieved 91% accuracy. (link)
  - Enabled automatic accident detection in the highway surveillance pipeline. (link)
  - Solved the cast shadow problem with an automatic shadow suppression method. (link)
  - Enhanced the performance of traffic volume counting which attained nearly one order of magnitude improvement over Radar. (link)

First Responder's Visual Aid — Feb 2022 - May 2022
- Built a responsive vision system to help first responders with automatic person detection and pose estimation using body worn cameras. (link)

Ammunition Component Classification — Oct 2021 - Dec 2021

- Deployed a three-tier architecture for Ammunition Component Classification using YOLOv4 and a statistical framework. Our system captures the energetic threats in munition scraps in visible and x-ray images with 95% precision. (link)

Unsupervised Video Object Detection May 2021 - Dec 2021

- Applied statistical modeling to detect foreground objects in videos captured by moving cameras. Improved the average F-score to 0.87 while maintaining the real-time performance. (link)

Object Detection and Classification in Aerial Imagery July 2021 – Oct 2021

- Boosted the precision of small object detection with Faster R-CNN in remote sensing and aerial images by 24% tested on VEDAI and NWPU datasets. (link)

Brain Tumor Segmentation Jan 2018 - May 2018

- Implemented a brain tumor segmentation model based on UNet for MRI images that reached to 98% accuracy when tested on BRATS dataset. (link)

SELECTED RESEARCH EXPERIENCE

New Jersey Institute of Technology New Jersey, USA

Research Assistant - Advisor: Prof. Chengjun Liu Sep 2018 – May 2022

- Assembled an automatic labeling pipeline based on active learning and semi-supervised learning tested on the xView satellite imagery dataset. (link)
- Devised a vehicle detection and classification tool using YOLOv3 and Faster R-CNN models with an average classification success rate of 95% in a self-collected dataset. (link)

Shahid Beheshti University Tehran, Iran

Research Assistant - Advisor: Prof. Ali Zakerolhosseini Sep 2015 – July 2017

- Engineered an object detection system for remote sensing data using TensorFlow.

K.N. Toosi University of Technology Tehran, Iran

Research Assistant - Advisor: Prof. Davud Asemani Nov 2013 – Sep 2014

- Designed a 3D Graphical Mobile Application using OpenGL in Java.

SELECTED TEACHING EXPERIENCE

New Jersey Institute of Technology New Jersey, USA

Teaching Assistant Sep 2018 – Sep 2022

- Artificial Intelligence (Python, PyTorch) – Mentor: Prof. Pantelis Monogioudis
- Data Structures and Algorithms (Java) – Mentor: Prof. James Calvin
- Concepts of Programming Languages (C++) – Mentor: Dr. Bassel Arafeh
- Roadmap to Computing for Engineers (Python)
- Introduction to Computer Science (C++)

PUBLICATIONS

- "Real-Time Accident Detection in Traffic Surveillance Using Deep Learning", IEEE International Conference on Imaging Systems and Techniques, 2022 (link)
- "Unsupervised Anomaly Detection in Traffic Surveillance Based on Global Foreground Modeling", IEEE International Conference on Imaging Systems and Techniques, 2022 (link)
- "Illumination-Aware Image Segmentation for Real-Time Moving Cast Shadow Suppression", IEEE International Conference on Imaging Systems and Techniques, 2022 (link)
- "Real-Time Hysteresis Foreground Detection in Video Captured by Moving Cameras", IEEE International Conference on Imaging Systems and Techniques, 2022 (link)
- "Ammunition Component Classification Using Deep Learning", International Conference on Machine Learning and Data Mining, 2022 (link)
- "Traffic Surveillance Video Analytics: A Concise Survey", International Conference on Machine Learning and Data Mining, 2022 (link)
- "A New Online Approach for Moving Cast Shadow Suppression in Traffic Videos", IEEE International Conference on Intelligent Transportation Systems, 2021 (link)
- "Anomalous Driving Detection for Traffic Surveillance Video Analysis", IEEE International Conference on Imaging Systems and Techniques, 2021 (link)
- "Robust Road Region Extraction in Video Under Various Illumination and Weather Conditions", IEEE International Conference on Image Processing, Applications and Systems, 2020 (link)
- "A Statistical Modeling Method for Road Recognition in Traffic Video Analytics", IEEE International Conference on Cognitive Info communications, 2020 (link)
- "Automatic Road Detection in Traffic Videos", IEEE International Conference on Big Data and Cloud Computing, 2020 (link)
- "A Real Time Accident Detection Framework for Traffic Video Analysis", 16th International Conference on Machine Learning and Data Mining, 2020 (link)
- "A New Adaptive Bidirectional Region-of-Interest Detection Method for Intelligent Traffic Video Analysis", IEEE International Conference on Artificial Intelligence and Knowledge Engineering, 2020 (link)
- "Vehicle Classification in Video Using Deep Learning", International Conference on Machine Learning and Data Mining, 2019 (link)
- “Improving Vehicle Detection in Aerial Images Using Deep Neural Networks”, M.Sc. thesis, 2017 (link)

AWARDS

- 2022 - U.S. DOT SBIR Phase I Award (link)
- 2021 - NIST’s First Responder UAS Triple Challenge Prize (link)
- 2020 - NIST’s Enhancing Computer Vision for Public Safety Challenge Prize (link).
- 2019 - Ying Wu ’88 Endowed Fellowship (NJIT)
- 2018 - Graduate Stipend Award, Graduate Tuition Award (NJIT)

CERTIFICATIONS

CodePath

- Certificate in Advanced Software Engineering — Aug 2022