Hadi Ghahremannezhad

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EDUCATION

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

Shahid Beheshti University — Tehran, Iran
Master of Science in Software Engineering — Sep 2017
Relevant coursework: Neural Networks, Image Processing, Artificial Intelligence

Khajeh Nasir Toosi University of Technology — Tehran, Iran
Bachelor of Science in Software Engineering — Sep 2014
Relevant coursework: Advanced Programming, Probability & Statistics, Linear Algebra, Multimedia Systems

SKILLS

- **Languages**: Python, C++
- **Others**: PyTorch, OpenCV, NumPy, TensorFlow, Keras, LaTeX, C, JAVA, Linux, Git, VSCode, PyCharm, JavaScript, HTML, Ajax, jQuery, CSS, SQL, MATLAB, Adobe Photoshop, Adobe Illustrator, MS Office Suite, OpenGL, Android

EXPERIENCE

Innovative AI Technologies — New Jersey, USA
Area Technology Director of Machine Learning — Jun 2022 – Sep 2022

- Developed a real-time system for detection of dilemma zone conflicts at signal-controlled intersections using edge computing and 5G. Won the U.S. DOT SBIR Phase I Award. (link)
- Assembled a smart Unmanned Aircraft System (UAS) for missing person search and rescue in heavily dense forested areas using drones. Advanced to the final stage of NIST's First Responder UAS Triple Challenge. (link)

NJIT Ying Wu College of Computing — New Jersey, USA
Research and Teaching Assistant — Sep 2018 – Dec 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)
- Led weekly lectures, office hours, and recitations; homework assistant, problem solving, and code testing in Java, C++, Python, and Matlab.

PROJECTS

Smart Traffic Video Analytics System | Software Developer | Team of 8 **|** C++ — View Project

- This project is funded by NJDOT and it is featured on the NJDOT Technology Transfer website. (link)
  - Automated the road segmentation module which achieved 91% accuracy. (link)
  - Enabled automatic accident detection in the highway surveillance sub-system. (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 | Software Developer | Team of 3 **|** Python — View Project

- Built a responsive vision system to help first responders with automatic person detection and pose estimation using body worn cameras.

Unsupervised Video Object Detection | Software Developer | Solo Project **|** C++ View Project

- 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.

Ammunition Component Classification | Team Leader | Team of 3 **|** C, C++ View Project

- 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.

Object Detection in Aerial Imagery | Software Developer | Solo Project **|** Python View Project

- 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.

Brain Tumor Segmentation | Software Developer | Solo Project **|** Python View Project

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

Android App Development | Team Leader | Team of 2 **|** Java, C++

- Developed a Graphical Mobile Application system using OpenGL to construct a 3D image from two 2D images.

AWARDS

U.S. DOT SBIR Phase I Award (link) 2022

- Won the Small Business Innovation Research for proposing Innovative AI Video Analysis of Dilemma Zone Conflicts at Signal-Controlled Intersections using Edge Computing and 5G. Led the machine learning tasks in a team of 3.

NIST's First Responder Unmanned Aircraft System (UAS) Indoor Challenge (link) 2022

- Earned the prize for the first stage of the NIST First Responder UAS Indoor Challenge and will be competing for the following stages. Software Developer in a team of 2.

NIST's First Responder UAS Triple Challenge Prize (link) 2021

- Advanced to the final stage of the NIST First Responder UAS Triple Challenge: FastFind for enhancing search & rescue in densely forested areas. Aggregated visible and thermal imagery for improved drone object detection & navigation system in a team of 2.

NIST's Enhancing Computer Vision for Public Safety Challenge Prize (link) 2020

- Selected among the 6 winners of the final stage in the NIST Enhancing Computer Vision for Public Safety Challenge for a Video Quality Assessment Method and constructing an Impairment Video Dataset.

Ying Wu '88 Endowed Fellowship (NJIT) 2019

- Recipient of the Ying Wu '88 Endowed Fellowship

Graduate Award (NJIT) 2018 - 2022

- Granted Graduate Stipend Award and Graduate Tuition Award

CERTIFICATIONS

Advanced Software Engineering (link) Aug 2022

- CodePath

PUBLICATIONS

- "Object Detection in Traffic Videos: A Survey", TechRxiv, 2022 (link)
- "Intelligent Traffic Video Analytics", Intelligent Video Analytics: Clustering and Classification Applications, CRC Press, Taylor & Francis Group, Boca Raton, FL, U.S.A., 2021 (Submitted)
- "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)