Hadi Ghahremannezhad

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EDUCATION

PhD in Computer Science @ New Jersey Institute of Technology, Newark, NJ — Sep 2018 – May 2023
- Relevant Coursework: Data Structures & Algorithms, Operating Systems; Artificial Intelligence; System Design

MSc in Software Engineering @ Shahid Beheshti University, Tehran, Iran — Sep 2014 – Sep 2017
- Relevant Coursework: Software Test, Specification & Verification of Software, Formal Methods in Software Development

BSc in Software Engineering @ K.N. Toosi University of Technology, Tehran, Iran — Sep 2009 – Sep 2014
- Relevant Coursework: Software Engineering, Software Architecture, Database, Computer Networks, Compiler Design

SKILLS

Advanced: C++, Python, VSCode, PyCharm, Git
Intermediate: Java, JavaScript, AJAX, HTML/CSS, SQL, MySQL, Linux, AWS, GCP, Docker, OpenGL, OpenCV, WordPress

EXPERIENCE

Research/Teaching Assistant @ NJIT Ying Wu College of Computing, Newark, NJ — Sep 2018 – May 2023
Developed efficient video analytics algorithms, resulting in peer reviewed papers
- Developed low-latency algorithms for processing videos at over **30** fps using **OpenCV** and **C++.**
- Enhanced the performance of traffic volume counting by over **10%** accuracy compared to radar systems using **C++.**
- Crafted an unsupervised anomaly detection algorithm addressing the low video resolution challenge using **C++.**
- Led weekly lectures, office hours, and recitations; problem solving, and code testing in **C++**, **Java**, **Python**, and **MATLAB**.

Software Development Intern @ Innovative AI Technologies, Newark, NJ — Jun 2022 – Dec 2022
Designed, developed, and deployed real time video processing software
- Designed an edge computing system architecture capable of processing **12** live video streams in real time.
- Implemented a dilemma zone conflict detection system on a **Linux** edge server using **Python** and **C++.**
- Developed a hybrid algorithm using deep learning and statistical modeling, reducing computational complexity by **50%**.

Front-End Development Intern @ Tebyan Smart, Tehran, Iran — Jun 2013 – Sep 2013
Created compact responsive webpages for representing company news and updates
- Built and maintained various web pages with **HTML**, **CSS**, **JQuery**, and **JavaScript** to create an intuitive user experience.

PROJECTS

Real-Time Moving Cast Shadow Suppression | Software Developer
- Resolved the cast shadow problem to enhance the overall performance of surveillance systems using **C++.**
- Devised a robust algorithm capable of processing **189** frames per second while achieving **90%** accuracy.

Adaptive Bidirectional Region-of-Interest Detection | Software Developer
- Automated the RoI detection task in surveillance systems with **91%** accuracy and real-time performance using **C++.**

Fast Unsupervised Video Object Detection | Sole Contributor
- Improved the average F-score of foreground detection to **87%** while spending only **9.4 ms** per frame using **C++.**

Smartphone App Development | Team Lead
- Deployed a graphical mobile application to construct a 3D image from two 2D images using **OpenGL** and **Java/C++.**

CERTIFICATIONS

- Advanced Software Engineering (link) — CodePath
- Git and GitHub (link) — Google
- Neural Networks and Deep Learning (link) — DeepLearning.AI
- AI Programming with Python (link) — Udacity

PUBLICATIONS

- "Object Detection in Traffic Videos: A Survey", IEEE Transactions on Intelligent Transportation Systems, 2023
- "Intelligent Traffic Video Analytics", Intelligent Video Analytics: Clustering and Classification Applications, CRC Press, Taylor & Francis Group, Boca Raton, FL, U.S.A., 2023
- "Real-Time Accident Detection in Traffic Surveillance Using Deep Learning", IEEE International Conference on Imaging Systems and Techniques, 2022
- "Unsupervised Anomaly Detection in Traffic Surveillance Based on Global Foreground Modeling", IEEE International Conference on Imaging Systems and Techniques, 2022
- "Illumination-Aware Image Segmentation for Real-Time Moving Cast Shadow Suppression", IEEE International Conference on Imaging Systems and Techniques, 2022
- "Real-Time Hysteresis Foreground Detection in Video Captured by Moving Cameras", IEEE International Conference on Imaging Systems and Techniques, 2022
- "Ammunition Component Classification Using Deep Learning", International Conference on Machine Learning and Data Mining, 2022
- "Traffic Surveillance Video Analytics: A Concise Survey", International Conference on Machine Learning and Data Mining, 2022
- "A New Online Approach for Moving Cast Shadow Suppression in Traffic Videos", IEEE International Conference on Intelligent Transportation Systems, 2021
- "Anomalous Driving Detection for Traffic Surveillance Video Analysis", IEEE International Conference on Imaging Systems and Techniques, 2021
- "Robust Road Region Extraction in Video Under Various Illumination and Weather Conditions", IEEE International Conference on Image Processing, Applications and Systems, 2020
- "A Statistical Modeling Method for Road Recognition in Traffic Video Analytics", IEEE International Conference on Cognitive Info communications, 2020
- "Automatic Road Detection in Traffic Videos", IEEE International Conference on Big Data and Cloud Computing, 2020
- "A Real Time Accident Detection Framework for Traffic Video Analysis", 16th International Conference on Machine Learning and Data Mining, 2020
- "A New Adaptive Bidirectional Region-of-Interest Detection Method for Intelligent Traffic Video Analysis", IEEE International Conference on Artificial Intelligence and Knowledge Engineering, 2020
- "Vehicle Classification in Video Using Deep Learning", International Conference on Machine Learning and Data Mining, 2019

AWARDS

- NIST's An AI for IoT (AI3) Challenge (link) 2023
- U.S. DOT SBIR Phase I Award (link) 2022
- NIST's First Responder Unmanned Aircraft System (UAS) Indoor Challenge (link) 2022
- NIST's First Responder UAS Triple Challenge Prize (link) 2021
- NIST's Enhancing Computer Vision for Public Safety Challenge Prize (link) 2020