

Armin Hadzic

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Research Interests

Developing unsupervised/self-supervised methods to address challenges in novel class discovery and latent information representation, especially across multiple modalities (e.g., imagery, audio, and point clouds). More generally, I am interested in **deep learning**, **computer vision**, **reinforcement learning**, **natural language**, and **artificial intelligence**.

Education

University of Kentucky

Master of Science in Computer Science, GPA – 4.0

Thesis: Estimating Free-Flow Speed with LiDAR and Overhead Imagery

2018-2020

Advisor: Nathan Jacobs

University of Kentucky

Bachelor of Science in Computer Engineering, GPA – 3.8

Graduated Magna Cum Laude

2016

University of Kentucky

Bachelor of Science in Electrical Engineering, GPA – 3.8

Graduated Magna Cum Laude, Minor in Computer Science

Computer Science Outstanding MS Student 2020.

Dean's List Fall 2010 to Spring 2013.

2009-2013

Professional Experience

Research.....

Computer Vision Research Scientist

DZYNE TECHNOLOGIES INC.

2021-Present

Fairfax, VA

- Researching and developing computer vision deep learning methods for overhead and ground-level imagery.
- Designed methods for addressing resolution mismatch between imagery and annotations in supervised learning.
- Led or contributed to writing 9 proposals (SBIR, STTR, BAA), winning one for a 5-year \$3M program.

Computer Vision Researcher

JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

2020-2021

Laurel, MD

- Designed and implemented deep learning methods for applied research in computer vision, remote sensing, medical imaging, and neuroscience.
- Developed models robust to bias in classification of skin diseases, reducing skin tone bias by 7% while maintaining 85% accuracy.
- Integrated geospatial products into artificial neural networks for high resolution building damage classification, structure localization, and green house gas regression.

Research Assistant

UK COMPUTER VISION LAB

2018-2020

Lexington, KY

- Advised by Associate Professor Nathan Jacobs.
- Designed multi-modal neural networks to leverage point clouds and satellite imagery to estimate free-flow speeds of roads.
- Developed Natural Language Processing (NLP) temporal convolutional and attention-based neural network models to estimate firm economic performance using public SEC text reports.

Machine Perception Intern

JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

2019

Laurel, MD

- Advised by Ryan Mukherjee and Dr. Gordon Christie.
- Regressed population of displaced communities for disaster relief efforts, utilizing overhead imagery and deep neural networks.

Volunteer Machine Learning Research Assistant

UK COMPUTER VISION LAB

2017-2018

Lexington, KY

- Automated the US Road Assessment Program (usRAP) road safety assessment using a deep convolutional neural network to directly estimate roadway safety based on street-level panorama images, reducing evaluation time to milliseconds per image.
- Integrated the roadway safety estimator into a GPS vehicle routing system to enhance navigation with the capability to identify a balanced, safe and fast, driving route.

- Industry.....**
- Software Development Engineer** **2017-2018**
 BELCAN ENGINEERING GROUP INC. *Lexington, KY*
 o Developed, maintained, and tested a jet engine diagnostic and fault resolution system, saving over \$100,000 by automating engine maintenance diagnostics.
 o Integrated and streamlined a legacy cross-platform build system with modern development tools, mitigating build errors and reducing development time.
- Embedded Software Engineer** **2016-2017**
 BELCAN ENGINEERING GROUP INC. *Lexington, KY*
 o Streamlined the user interface and reduced diagnostic time of jet engines by identifying, isolating, and purging Onboard Maintenance System inefficiencies and defects.
- Software Test Engineer** **2015-2016**
 BELCAN ENGINEERING GROUP INC. *Lexington, KY*
 o Designed and implemented Control and Diagnostic System Verification and Validation Tests for 4 P&W Turbofan Jet Engines.
 o Discovered mission critical control logic, software, and documentation defects through root-cause analysis, informal testing, regression testing and system testing; leading to best in class, safe, and high performance jet engines.
- Software Engineering Co-op** **2013-2014**
 TEMPUR SEALY INTERNATIONAL INC *Lexington, KY*
 o Pioneered and developed a GUI and 3D topography mapping application to visually analyze large datapoint datasets, generating streamlined product testing, seamless user experience, and refined product quality.
- Software Engineering Intern** **2012**
 JOHNSON CONTROLS INC *Florence, KY*
 o Designed and implemented a software algorithm for streamlined Automated Guided Vehicle (AGV) routing, saving \$57,000 per year in scrap reduction and transportation costs.

Publications

- Conferences.....**
- [1] Scott Workman, Armin Hadzic, and M. Usman Rafique. "Handling Image and Label Resolution Mismatch in Remote Sensing". In: *IEEE Winter Conference on Applications of Computer Vision (WACV)*. January 2023.
 - [2] Elise Buckley, Joseph D Monaco, Kevin M Schultz, Robert Chalmers, Armin Hadzic, Kechen Zhang, Grace M Hwang, and M Dwight Carr. "An interdisciplinary approach to high school curriculum development: Swarming Powered by Neuroscience". In: *Proceedings 2022 IEEE Integrated STEM Education Conference (ISEC)*. **Best Paper Award**. March 2022.
 - [3] Armin Hadzic, Gordon Christie, Jeffrey Freeman, Amber Dismer, Stevan Bullard, Ashley Greiner, Nathan Jacobs, and Ryan Mukherjee. "Estimation Displaced Populations from Overhead". In: *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*. September 2020.
 - [4] Weilian Song, Scott Workman, Armin Hadzic, Xu Zhang, Eric Green, Mei Chen, Reginald Souleyrette, and Nathan Jacobs. "FARSA: Fully Automated Roadway Safety Assessment". In: *IEEE Winter Conference on Applications of Computer Vision (WACV)*. March 2018.

- Journals.....**
- [1] Armin Hadzic, Grace M Hwang, Kechen Zhang, Kevin M Schultz, and Joseph D Monaco. "Bayesian optimization of distributed neurodynamical controller models for spatial navigation". In: *Array* (2022), p. 100218.
 - [2] William Paul, Armin Hadzic, Neil Joshi, Fady Alajaji, and Philippe Burlina. "TARA: Training and Representation Alteration for AI Fairness and Domain Generalization". In: *Neural Computation* (2022), pp. 1–38.

- Workshops.....**
- [1] Mei Chen, Armin Hadzic, Weilian Song, and Nathan Jacobs. "Applications of Deep Machine Learning to Highway Safety and Usage Assessment". In: *Transportation Research Board Workshop*. (oral). January 2021.
 - [2] Ryan Mukherjee, Derek Rollend, Gordon Christie, Armin Hadzic, Sally Matson, Anshu Saxena, and Marisa Hughes. "Towards Indirect Top-Down Road Transport Emissions Estimation". In: *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION)*. **Best Paper Award**. June 2021.

- [3] Armin Hadzic, Hunter Blanton, Weilian Song, Mei Chen, Scott Workman, and Nathan Jacobs. “RasterNet: Modeling Free-Flow Speed using LiDAR and Overhead Imagery”. In: *IEEE/ISPRS Workshop: Large Scale Computer Vision for Remote Sensing Imagery (EARTHVISION)*. June 2020.

Under Review.....

- [1] Scott Workman and Armin Hadzic. “Image-Driven Traffic Modeling”. In: *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. June 2023.

Technical skills

Programming Languages	C/C++, Python, Verilog, Java, \LaTeX , Assembly, Make
Libraries	PyTorch, Scikit-Learn, Keras, Tensorflow
Operating Systems	Unix/Linux, Windows, OSX, Android
Development Environments	Linux Toolchain, Jupyter, PyCharm, Visual Studio, Android Studio, Xilinx

Service

Technical Committee.....

- o 2021 University of Maryland Honor’s program Gemstone thesis defense.

Program Committee/Reviewing.....

- o ECCV: 2022
- o CVPR: 2023
- o WACV Round 1 and 2: 2023
- o CVPR Workshop EARTHVISION: 2022