

Armin Hadzic

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Research Interests

Developing **deep learning** methods to address challenges in latent information representation from varying sources, such as point clouds, images, and audio. More generally, I am interested in **deep learning, computer vision, reinforcement learning, artificial intelligence, remote sensing, and robotics**.

Education

University of Kentucky

2018-2020

Master of Science in Computer Science, GPA – 4.0

Advisor: Nathan Jacobs

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

University of Kentucky

2016

Bachelor of Science in Computer Engineering, GPA – 3.8

Graduated Magna Cum Laude

University of Kentucky

2009-2013

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.

Professional Experience

Research.....

Computer Vision Research Scientist

2021-Present

DZYNE TECHNOLOGIES INC.

Fairfax, VA

- Researching and developing computer vision deep learning methods for overhead and ground-level imagery.

Computer Vision Researcher

2020-2021

JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

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

2018-2020

UK COMPUTER VISION LAB

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

2019

JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY

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

2017-2018

UK COMPUTER VISION LAB

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 BELCAN ENGINEERING GROUP INC.	2017-2018 <i>Lexington, KY</i>
<ul style="list-style-type: none"> 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 BELCAN ENGINEERING GROUP INC.	2016-2017 <i>Lexington, KY</i>
<ul style="list-style-type: none"> 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 BELCAN ENGINEERING GROUP INC.	2015-2016 <i>Lexington, KY</i>
<ul style="list-style-type: none"> 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. 	
Founder and Software Developer CHANGING TABLE APP	2015 <i>Lexington, KY</i>
<ul style="list-style-type: none"> o Developed an Android application to aid users in locating men's washrooms containing changing tables in order to alleviate the stress of searching for baby friendly environments. 	
Software Engineering Co-op TEMPUR SEALY INTERNATIONAL INC	2013-2014 <i>Lexington, KY</i>
<ul style="list-style-type: none"> 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 JOHNSON CONTROLS INC	2012 <i>Florence, KY</i>
<ul style="list-style-type: none"> 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] Armin Hadzic, Gordon Christie, Jeffrey Freeman, Amber Dismar, Stevan Bullard, Ashley Greiner, Nathan Jacobs, and Ryan Mukherjee. "Estimation Displaced Populations from Overhead". In: *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*. Waikoloa Village, Hawaii, September 2020.
 - [2] 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)*. Lake Tahoe, Nevada, March 2018.

- Journals.....**
- [1] 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 (Sponsored by AED50)*. (oral). January 2021.
 - [2] Ryan Mukherjee, Derek Rollend, Gordon Christie, Armin Hadzic, Sally Matson, Anshu Saksena, 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**. Nashville, Tennessee, 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)*. Seattle, Washington, June 2020.

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

- 2021 Technical Committee member for University of Maryland Honor's program Gemstone thesis defense.
- 2022 CVPR Workshop EARTHVISION Reviewer
- 2022 ECCV Reviewer