Dominic Roberts

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EDUCATION

07/2021 **PhD in Computer Science,** UIUC, Urbana, IL, USA.
- Advisors: David Forsyth and Mani Golparvar-Fard
- Thesis: Vision-based monitoring and design of built environments

09/2015 **MSc in Applied Mathematics,** Université de Lille 1, Lille, France

09/2015 **BSc/MSc in Data Science,** Centrale Lille, Lille, France

PROFESSIONAL EXPERIENCE

04/24 – present (**10 months**) **Machine Learning Scientist @ steg.ai,** Irvine, CA, USA
- Training and evaluating deep learning-based computer vision models for invisibly watermarking images and videos
- Reviewing and benchmarking state-of-the-art steganography methods
- Implementing and deploying software for visibly watermarking documents via CI/CD pipelines

07/2021 – 03/2024 (**2 years 8 months**) **Applied Scientist II @ Amazon**, Seattle, WA, USA
- Developed and deployed state-of-the-art machine learning methods for object recognition, object detection, semantic segmentation and action recognition in Amazon Fresh stores
- Collected, curated and annotated massive image datasets, both real-world and generated via generative AI
- Productionized research prototypes and integrated them into continuous improvement frameworks
- Measured and optimized latency of deep learning systems

01/2016 – 07/2021 (**5 years 6 months**) **Graduate Research Assistant @ UIUC,** Urbana, IL, USA
- Adapted and fine-tuned deep learning methods for object recognition, object detection, object tracking and action recognition of construction workers and heavy machinery
- Built tools for crowdsourcing and monitoring large-scale dataset creation and ground truth annotation
- Published research papers (500+ citations) and presented research findings at both computer vision and construction conferences

05/2020 – 08/2020 (**3 months**) **Research Intern @ Autodesk AI Lab**, Toronto, ON, Canada
- Designed RNN- and VAE-based autoregressive generative models for 3D part hierarchies using PyTorch
- Introduced the first generative model for 3D part hierarchies that can re-generate its outputs' parts (paper)

IT SKILL SET

Languages:	Python, C/C++, MATLAB, JavaScript, Java, R, Swift
Deep learning:	PyTorch, MXNet, TensorFlow, Caffe, MatConvNet
Other:	AWS S3, Google Cloud, Sagemaker, Unity, Google Tango, ROS, SQL, HTML, CSS

SELECTED PUBLICATIONS

2021 **LSD-StructureNet: Modeling Levels of Structural Detail in 3D Part Hierarchies**
D. Roberts, A. Danielyan, H. Chu, M. Golparvar-Fard, D. Forsyth
ICCV 2021

2020 **Synthesizing pose sequences from 3D assets for vision-based activity analysis**
W. Torres Calderon, *D. Roberts*, M. Golparvar-Fard
Journal of Computing in Civil Engineering

2020 **Vision-based construction worker activity analysis informed by body posture**
D. Roberts, S. Tang, W. Torres Calderon, M. Golparvar-Fard
Journal of Computing in Civil Engineering

2020 **Human-object interaction recognition for automatic construction site safety inspection**
S. Tang, *D. Roberts*, M. Golparvar-Fard
Automation in Construction

2019 **End-to-end vision-based detection, tracking and activity analysis of earthmoving equipment filmed at ground level**
D. Roberts, M. Golparvar-Fard
Automation in Construction

2019 **An annotation tool for benchmarking methods for automated construction resource pose estimation and activity analysis**
D. Roberts, M. Wang, W. Torres Calderon, M. Golparvar-Fard
2019 International Conference on Smart Infrastructure and Construction

2019 **Annotating 2D imagery with 3D kinematically configurable assets of construction equipment for training pose-informed activity analysis and safety monitoring algorithms**
D. Roberts, Y. Wang, A. Sabet, M. Golparvar-Fard
2019 ASCE International Conference on Computing in Civil Engineering