HAMED HAGHIGHI

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ABOUT ME

Machine learning and **computer vision researcher** with 8+ years of experience in academia and industry. Specialising in exploring deep generative models for different tasks, ranging from realistic image and 3D point cloud simulation to drug molecule generation. With hands-on experience deploying state-of-the-art visual perception models for real-world challenges, particularly in autonomous driving.

EDUCATION

University of Warwick
2020 - 2024 | Coventry, UK

- PhD in Engineering
- **Thesis**: “Data-driven Simulation of Perception Sensors for Autonomous Vehicles”

University of Tehran
2016 - 2019 | Tehran, Iran

- M.Sc. in Artificial Intelligence (GPA: 18.85/20)
- **Thesis**: “Ambient VAE: An Unsupervised Method for Image Restoration"
- Ranked 2^{nd} in the major based on the GPA.

Isfahan University of Technology
2012 - 2016 | Isfahan, Iran

- B.Sc. in Software Engineering (GPA: 17.45/20)
- Ranked 2^{nd} in the major based on the GPA.

EXPERIENCE

ML Engineer (part-time)
March 2022 - Feb 2024 | Coventry, UK

- Hi-Drive
- Developed a semi-automatic data annotation tool (ML-ADA) for 2D/3D object detection tasks. ML-ADA resulted in reducing the manual labelling effort in autonomous driving. (repository link)
- Designed experiments to approximate the manual annotation effort needed at various levels of automation.

Teaching Assistant

- University of Warwick
  2021 - 2024 | Coventry, UK
  Machine Intelligence and Data Science (MIDS) | Dr. Mehrdad Dianati
- Assisted in designing and delivering tutorials for the module, with a focus on implementing fundamental deep learning models using the PyTorch library.
- Assisted in designing post-module assessments and marking students.

- University of Tehran
  2017 - 2019 | Tehran, Iran
  Pattern Recognition, Computer Vision, Data Analytics | Dr. Babak Nadjar Aarabi, Dr. Reshad Hosseini, Dr. Mohammad Amin Sadeghi
- Assisted in designing and marking course final projects, as well as grading final exams.

Freelance
Feb 2020 - May 2020 | Remote

- Collaboration with Dr. Peyman Gifani @ University of Cambridge
- Successfully reproduced the results of the outstanding paper on generating hit-like molecules from gene-expression using deep generative models.
- Adapted techniques from Podda *et al.* and Yang *et al.* to use fragment graphs, a more expressive molecule representation, instead of SMILES. This change resulted in generating more unique and valid molecules.

Summer Intern

Summer 2016 | Isfahan, Iran

- Medical Image and Signal Processing Research Centre

- Developed innovative software using image processing techniques to automate the evaluation of crown preparation. This tool is designed to assist students in comparing their crown work against standard parameters during preclinical tooth preparation.
- Assisted in writing a paper on the evaluation of the software's effectiveness by comparing it with the expert crown preparation. (paper link)

SELECTED PUBLICATIONS

Published

- **H. Haghighi**, M. Dianati, V. Donzella and K. Debattista, (2023) " Accelerating Stereo Image Simulation for Automotive Applications Using Neural Stereo Super Resolution ," in *IEEE Transactions on Intelligent Transportation Systems*.
- Tahani, B.;Rashno, A.;**Haghighi, H.**; Kafieh, R. (2019) "Automatic Evaluation of Crown Preparation using Image Processing Technique: A substitute to Faculty Scoring in Dental Education" in *Journal of Medical Signals & Sensors*.

Under-Review

- **H. Haghighi**, A. Samadi, M. Dianati, V. Donzella and K. Debattista, (2024) " Taming Transformers for Realistic Lidar Point Cloud Generation ", in arXiv: 2404.05505.
- **H. Haghighi**, M. Dianati, V. Donzella and K. Debattista, (2023) " Contrastive Learning-based Framework for Sim-to-Real Mapping of Lidar Point Clouds in Autonomous Driving Systems ", in arXiv: 2312.15817.
- **H. Haghighi**, X. Wang, H. Jing, M. Dianati, (2024) " Review of the Learning-based Camera and Lidar Simulation Methods for Autonomous Driving Systems ", in arXiv: 2402.10079.

AWARDS AND HONOURS

- ***Awarded full funding*** for the PhD program in Engineering, University of Warwick, 2020–2024.
- ***Ranked*** 2^{nd} out of students of Artificial Intelligence major, University of Tehran, 2018.
- ***Placed*** 29^{th} among 15000 students in Computer Science National University Entrance Exam for M.Sc. Degree, 2016.
- ***Ranked*** 2^{nd} out of students of Software Engineering major, Isfahan University of Technology, 2016.
- ***Accepted as an exceptional talent*** in NODET high school and intermediate school entrance exam in Iran, 2005–2012.

RESEARCH INTERESTS

- Deep Generative Models
- Computer Graphics
- Neural Rendering
- Machine Learning
- Computer Vision
- Deep Learning

TECHNICAL SKILLS

Python, Pytorch, C/C++, CARLA Simulation, Latex	●●●●○
Tensorflow, R, VueJS, Javascript, SQL, C#, Java	●●●○○
OpenGL, PHP, Unity, Android Development	●●○○○

REFERENCES

Dr. Mehrdad Dianati	@ m.dianati@warwick.ac.uk	WMG Department, University of Warwick
Dr. Kurt Debattista	@ k.debattista@warwick.ac.uk	WMG Department, University of Warwick
Dr. Valentina Donzella	@ valentina.donzella@warwick.ac.uk	WMG Department, University of Warwick