HAMED HAGHIGHI

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PROFESSIONAL SUMMARY

- **Machine Learning**, **Computer Vision** and **generative AI** scientist with **+8 years** of cumulative experience in both academia and industry.
- Concluding my **PhD** on "**Generative AI for Sensor Simulation in Autonomous Driving**" at **University of Warwick**, with publications in top-tier journals and conferences (**2 IEEE Transactions** and **1 CVPR papers**).
- Successfully streamlined the **data annotation process** as an **ML Engineer** for the **Hi-Drive** (flagship **€60M EU project**), partnering with leading automotive manufacturers such as **BMW**, **Volkswagen**, and **Ford**.
- Expertise in various generative AI and deep learning frameworks/architectures including **transformers**, **diffusion models**, **GANs**, **VAEs**, **CNNs**, **RNNs**, **GNNs**, and **LSTM**, as well as programming languages/libraries, e.g., **Python**, **PyTorch**, **TensorFlow**, **C/C++**, **SQL**, **Pandas**, **OpenCV**, and **QT**.

EXPERIENCE

ML Engineer (part-time)

Mar 2022 - Mar 2024 Coventry, UK

- Hi-Drive (Flagship **€60M EU project** partnering with top OEMs, *e.g.* **BMW**, **Volkswagen**, and **Ford**)
- Streamlined **data annotation** process by developing the **ML-Assisted** Data Annotation (ML-ADA) tool for **2D/3D object detection** tasks, resulting in **12%** reduction in manual effort (github).
- Developed a **web-based user interface** to support **visualisation** of piloting data across the project.
- Engaged in **international meetings** and **workshops** with key partners to fulfil project requirements and present results.
- Technologies: **Python**, **PyTorch**, **PyQT**, **Docker**, **YOLO**, **CVAT.ai**, **Active learning**, **VueJS**, **JavaScript**, **Confluence**

Data Scientist (hourly contract)

Feb 2020 - May 2020 Remote

- EngBio Research Centre @ University of Cambridge
- Successfully reproduced the results of the outstanding paper on **generating** hit-like **molecules** from gene-expression using **deep generative models** (*i.e.* **GAN**, **VAE**) and **Graph Neural Networks** (**GNNs**).
- Technologies: **Python**, **PyTorch**, **GNNs**, **GANs**,**VAEs**, **AWS**, **Comet ML**

Research Assistant

Sep 2018 - Sep 2020 Tehran, Iran

- Computational Modelling and Machine Learning, University of Tehran
- Developed an innovative and efficient **lossless image compression** model utilising **RNN** and **attention mechanisms**, achieving a superior bits-per-pixel (bpp)/time trade-off compared to SOTA methods (github).
- Developed a novel **transformer**-based **music generative model**, extending audio sampling to 8 seconds, **4 times** the length of SOTA models (github).
- Technologies: **Python**, **PyTorch**, **Tensorflow**, **Librosa**, **Transformers**, **RNNs**, **Time series**

Summer Intern

Jun 2016 - Sep 2016 Isfahan, Iran

- Medical Image and Signal Processing Research Centre
- Developed innovative software using **image processing** techniques to automate the evaluation of crown preparation. Achieving an average of **0.89 IOU** in **segmentation** tasks, this tool significantly assisted students in comparing their crown work against standard parameters during preclinical tooth preparation (link).
- Technologies: **C++**, **OpenCV**, **QT**

EDUCATION

University of Warwick

Aug 2020 - Aug 2024 Coventry, UK

- PhD in Computer Science (Topic:"Generative AI for Sensor Simulation in Autonomous Driving")
- Developed 3 novel **generative models** based on **transformers**, **VAE**, and **GANs** to bridge the **sim-to-real** gap in **sensor simulation** for autonomous driving. Validated on **semantic-KITTI**, **KITTI-360** datasets, and **CARLA simulator**, with publications in top-tier journals and conferences (**2 IEEE Transactions** papers, and **1 CVPR paper**).
- Assisted in delivering **deep learning tutorials** and designing post-module assessments as a **teaching assistant** for the **"Machine Intelligence and Data Science"** module for **3 years**.

University of Tehran

Sep 2016 - Sep 2019 | Tehran, Iran

- M.Sc. in Artificial Intelligence (**GPA: 18.85/20**, ranked in the **top 10%**)

- Developed a novel **image generative** model based on the **VAE-GAN** framework for the **unsupervised image restoration** task. Validated on the **CelebA** dataset, it achieved an inference speed **200x** faster than the SOTA model (github).
- Assisted in **tutoring** and **marking** for **4 courses**, including **Computer Vision**, **Pattern Recognition**, **Data Analytics**, and **Bio-Inspired Computing**.

Isfahan University of Technology

Sep 2012 - Sep 2016 | Isfahan, Iran

- B.Sc. in Software Engineering (**GPA: 17.45/20**, ranked in the **top 10%**)

SELECTED PUBLICATIONS (Scholar)

- **H. Haghighi**, A. Samadi, M. Dianati, V. Donzella and K. Debattista, (2024) " Taming Transformers for Realistic Lidar Point Cloud Generation ," in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*.
- **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*.
- **H. Haghighi**, X. Wang, H. Jing, M. Dianati, (2024) " Review of the Learning-based Camera and Lidar Simulation Methods for Autonomous Driving Systems ," in *IEEE Transactions on Intelligent Vehicles*.
- A. Capello, M. Fresta, F. Bellotti, **H. Haghighi**, J. Hiller, S. Mozaffari, R. Berta, (2023) " Exploiting Big Data for Experiment Reporting: The Hi-Drive Collaborative Research Project Case in Sensors.
- B. Tahani, A. Rashno, **H. Haghighi**, R. Kafieh (2019) "Automatic Evaluation of Crown Preparation using Image Processing Technique: A substitute to Faculty Scoring in Dental Education," in *Journal of Medical Signals & Sensors*.
- **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 ," preprinted in arXiv.

AWARDS AND HONOURS

- ***Awarded full funding*** for the PhD program in Computer Science, University of Warwick, 2020–2024.
- ***Ranked in the top 10%*** of students majoring in Artificial Intelligence at the University of Tehran in 2019, based on overall GPA.
- ***Placed*** 29^{th} among 15000 students in Computer Science National University Entrance Exam for M.Sc. Degree, 2016.
- ***Ranked in the top 10%*** of students majoring in Software Engineering at the Isfahan University of Technology in 2016, based on overall GPA, and awarded merit-based admission to the MSc program.
- ***Accepted as an exceptional talent*** in NODET high school and intermediate school entrance exam in Iran, 2005–2012.

TECHNICAL SKILLS

- **Languages**: Python, C/C++, SQL, R, VueJS, JavaScript, C#, Java, PHP, Latex
- **Libraries**: PyTorch, TensorFlow, Keras, Pandas, Scikit-learn, NumPy, SciPy, OpenCV, OpenGL, Weight & Biases, Tensorboard, Matplotlib, PyTorch-lightning
- **Machine learning techniques**: Transformers, GANs, VAEs, Diffusion Models, GPT, GNNs, CNNs, RNNs, LSTM, GRU, YOLO
- **Tools**: Git, Github, GitLab, CARLA, AirSim, Unity, Unreal Engine, Webots, Overleaf, ChatGPT, CVAT.ai, Confluence, Microsoft Planner
- **Platforms**: Jupyter Notebook, Linux, Amazon Web Services (AWS), Docker, Google Cloud, Google Colaboratory (Colab)
- **Paradigms**: Continuous Delivery (CD), Continuous Integration (CI), Data Science, REST

REFERENCES

References are available upon request.