Miguel Farinha

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Research Summary

My research focuses on machine learning for **3D computer vision**, with a particular interest in building **foundation models for 3D understanding**. I develop methods that learn from large-scale visual data to improve tasks such as 3D reconstruction, novel view synthesis, and relighting. Recently, I have worked on finetuning diffusion models to recover geometry and materials of real-world scenes, and on designing learning-based alternatives to classical Structure-from-Motion pipelines. I aim to develop scalable models that generalize across diverse 3D tasks and domains.

Academic Qualifications

Current — Doctor of Philosophy Candidate in Computer Science
University of Oxford, Oxford
Supervised by Prof. Ronald Clark

Sept. 2019 - Dec. 2021 — Master of Science in Probability & Statistics
Instituto Superior Técnico, Lisbon
Distinction

Sept. 2016 - Jun. 2019 — Bachelor of Science in Biomedical Engineering
Instituto Superior Técnico, Lisbon
Average Grade: 17/20

Work Experience

Current — PhD Candidate at University of Oxford, Oxford
- Finetuned video diffusion models to generate 3D geometry and material properties from multi-view data.
- Developed learning-based alternatives to traditional SfM pipelines using dense optical flow correspondences.

Current — Teaching Assistant at University of Oxford, Oxford
- Teaching assistant for Deep Neural Networks and Computer Vision courses (MSc Software Engineering).
- Led practical classes for 30+ students.

Nov. 2022 - Nov. 2023 — Student Researcher at OxAI Labs, Oxford
- Benchmarked bias in vision-language models with a team of 6 researchers.
- Co-designed a dataset debiasing pipeline and published at our findings at the NeurIPS 2023 Workshop SyntheticData4ML.

Jan. 2022 - Sept. 2022 — Research Technician at University of Minho, Braga
- Rewrote the Leading Eigenvector Dynamics Analysis (LEiDA) method as a toolbox for functional Magnetic Resonance Imaging (fMRI) analysis for neuroscience practitioners using MATLAB.

Summer 2022 — AI Engineering Intern at PeekMed, Braga
- Implemented multi-task ResNet50 classifier for anatomical image analysis.
- Improved classification accuracy to enhance software reliability in surgical planning.

Publications

*(co-)first authorship

Published

Volumetric Cloud-Field Reconstruction
J. Lin, **M. Farinha**, E. Gryspeerdt, R. Clark
Arxiv Preprint 2023

Balancing the Picture: Debiasing Vision-Language Datasets with Synthetic Contrast Sets
B.A. Smith*, **M. Farinha***, S.M. Hall, H.R Kirk, A. Shtedritski, M. Bain
NeurIPS 2023 Workshop on Synthetic Data Generation with Generative AI

Increased excursions to functional networks in schizophrenia in the absence of task
M. Farinha, C. Amado, P. Morgado, J. Cabral
Frontiers in Neuroscience 16 (2022)

Awards & Scholarships

2022-2023 Portuguese Science Foundation PhD Research Studentship
2017-2021 Merit Award for outstanding academic performance

Skills & Interests

Programming: Python (PyTorch, TensorFlow, NumPy, scikit-learn), MATLAB, R, SQL, LaTeX
Languages: Portuguese (Native); English (Fluent, IELTS Band 8.0); French (Basic)