

Seyed Hosseini

Email: seyed.hsseini@gmail.com

Phone: +1 4167315996

Toronto, Canada

Portfolio | Github | LinkedIn

Education

MASc. in Electrical and Computer Engineering, York University (2022 - Present) - GPA: 4.0

Thesis: *"Metric Depth Estimation via Semantic Segmentation and Ground Geometry"*

BSc. in Electrical Engineering, University of Tehran (2016 - 2021) - GPA: 3.6

Thesis: *"Single-view 3D Reconstruction of Surface of Revolution"*

Research Experience

Graduate Research Assistant, Elder Lab, York University (2022 - Present) | Toronto, Canada

- Developed a novel semantic and geometry-based algorithm, achieving a sub 0.3 relative error in metric depth estimation on the challenging KITTI and SYNS datasets.
- Presented at CVPR 2024 as an invited speaker, showcasing our algorithm's performance in the Monocular Depth Estimation Challenge workshop.

Research Assistant, NBIC Lab, Tehran University (2021 - 2022) | Tehran, Iran

- Engineered a CNN-Transformer model, achieving a sub-10° angular error in brain fiber orientation estimation.
- Applied the model to white matter fiber tractography, contributing to improved accuracy and efficiency in dMRI analysis.

Summer Intern, DAHA tech, Sharif University of Technology (Summer 2019) | Tehran, Iran

- Designed and implemented a clustering-based wireless indoor positioning system, delivering sub-meter accuracy in real-world environments.
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Publications

1. **Spencer, et al.**, "The third monocular depth estimation challenge," *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2024. [Link]
 2. **Hosseini, et al.**, "CTtrack: A CNN+Transformer-based framework for fiber orientation estimation & tractography," *Neuroscience Informatics*, 2022. [Link]
 3. **Hosseini, et al.**, "Single-view 3D reconstruction of surface of revolution," (Under Review) 2023. [Link]
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Projects

Metric Depth Estimation

- Developed a zero-shot metric depth estimation model by integrating state-of-the-art architectures.
- Trained and validated the model on multiple datasets, achieving robust and generalizable performance across various environments.

FSRE Reproduction

- Reproduced and validated the results of the "Fine-grained Semantics-aware Representation Enhancement" on the Kitti dataset.

Single-view 3D Reconstruction of SOR

- Developed an algorithm to reconstruct axially symmetric objects from single images.
- Achieved an angular error of only 7 degrees in determining the main 3D axis.

Brain Fiber 3D Reconstruction

- Engineered a deep network to estimate 3D orientations of brain fibers from MRI data.
- Performed deterministic fiber tracking using the estimated orientations.

YOLO for Chess Piece Detection

- Fine-tuned YOLO model to detect chess pieces with mAP of 97.6%.

Skills

Programming Languages: Python, MATLAB, C, C++, SQL, Bash

Frameworks and Libraries: PyTorch, TensorFlow/Keras, OpenCV, PIL

Tools and Platforms: Ubuntu, CUDA, AVR, Git

Soft Skills: Teamwork

Teaching Experience

- Intro to Prog. (Python), York University - 2023
- Procedural Prog. Through Mechatronics (Matlab), York University - 2022
- Engineering Mathematics, University of Tehran - 2020
- Linear Control Systems , University of Tehran - 2019

Honors and Awards

Exceptional Talent Scholarship, Supporters Foundation of Tehran University (2017)

- Awarded to national university entrance exam top 0.1% ranks.