Leili Goli

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Research Interests

Machine Learning | Deep Learning | Artificial Intelligence
Computer Vision | Computer Graphics | Robotics

Education

University of Toronto — Toronto, Canada
Ph.D. (Direct Entry) in Computer Science — Sept. 2021 – Expected Nov. 2026

- **Current GPA 4/4**

Sharif University of Technology — Tehran, Iran
B.Sc. in Computer Engineering — Sept. 2017 – Jun. 2021

- **GPA 19.35/20** (equivalent to major GPA of 4/4)

Research Experience

Ph.D. Graduate Research Assistant in University of Toronto — Sept. 2021 - Present
Dynamic Graphics Project (DGP), Department of Computer Science — Toronto, Canada
Supervisor: Professor Alec Jacobson, Professor Andrea Tagliasacchi

- Implicit Neural Fields applications in 3D vision

Student Researcher — Sept. 2021 - Present
Vector Institute, Department of Computer Science — Toronto, Canada

Summer Internship in Technical University of Munich (TUM) — Jun. 2020 - Mar. 2021
Interdisziplinäres Forschungslabor (IFL), Computer Aided Medical Procedures (CAMP) — Munich, Germany
Supervisor: Professor Nassir Navab

- My research is focused on segmentation of longitudinal chest CT scans of COVID-19 patients and prediction of clinical information.

Summer Research Program in University of British Columbia (UBC) — Jun. 2019 - Sept. 2019
Robotics and Control Laboratory, Department of Electrical and Computer Engineering — Vancouver, Canada
Supervisor: Professor Purang Abolmaesumi

- I devised experiments in deep learning applications in medical image analysis, with particular focus on ultrasound probe navigation using cardiac ultrasound images.

Research Assistant in Sharif University of Technology — Sept. 2019 - Mar. 2021
Image Processing Laboratory (IPL), Department of Computer Engineering — Tehran, Iran
Supervisor: Professor Shohreh Kasaei

- I investigated Adversarial Attacks and Defenses against Deep Neural Networks, specifically focusing on robustness against rotation and scale transformations.

Publications

L. Goli, C. Reading, S. Sellán, A. Jacobson, A. Tagliasacchi, "**Bayes' Rays: Uncertainty Quantification for Neural Radiance Fields**", preprint

L. Goli, D. Rebain, S. Sabour, A. Garg, A. Tagliasacchi, "**nerf2nerf: Pairwise Registration of Neural Radiance Fields**", Accepted to IEEE International Conference on Robotics and Automation (ICRA) 2023, Computer Vision and Pattern Recognition (CVPR) Workshop XRNeRF 2023

L. Goli, ST. Kim, A. Khakzar, N. Navab, "**Longitudinal Quantitative Assessment of COVID-19 Infection Progression from Chest CTs**", Accepted to Medical Image Computing and Computer Assisted Intervention (MICCAI) 2021.

H. Naderi, **L. Goli**, S. Kasaei, "**Generating Unrestricted Adversarial Examples via Three Parameters**", Accepted to Multimedia Tools and Applications 2021.

H. Naderi, **L. Goli**, S. Kasaei, "**Scale Equivariant CNNs with Scale Steerable Filters**", Accepted to Machine Vision and Image Processing (MVIP) 2020.

Press Coverage

Cover of the Computer Vision News: nerf2nerf with Lily Goli

Honors and Awards

Ranked $\underline{38^{th}}$ in the Iranian National Universities Entrance Exam for Bachelor of Science Aug. 2017
among more than 150,000 participants.
National Elite Foundation Fellowship 2017

Work and Teaching Experience

Teaching Assistant at University of Toronto, Toronto, Canada Fall 2021 - Present

- Foundations of Computer Science course (CSC110)
- Data Science I (JSC270)
- Introduction to Image Understanding (CSC420)
- Introduction to Machine Learning (CSC311)

Intern at Arsh, Tehran, Iran Spring 2020

- Developing an age detection network using noisy labels in Pytorch framework.
- Visualizing and presenting hundreds of processed and classified mining reports in an understandable and effective manner.

Teaching Assistant at Sharif University of Technology, Tehran, Iran Fall 2019 - Spring 2021

- Artificial Intelligence - Linear Algebra - Engineering Probability and Statistics

Skills

Programming Languages: Python (Proficient), C (Proficient), Java (Proficient), R, MATLAB, HTML, CSS

Frameworks: PyTorch, Keras, Django, QT

Tools: Blender, CLion, PyCharm, IntelliJ, Proteus, Quartus

Operating Systems: Windows, Linux

Relevant Coursework

Introduction to Machine Learning (4/4), Physics-based Animation (4/4), Probabilistic Learning (4/4), Neural Radiance Field Reading Course (4/4), Imitation Learning, Image Processing (20/20), Artificial Intelligence (20/20), Modern Information Retrieval (18.2/20), Probability and Statistics for Computer Engineering (20/20), Linear Algebra (19.4/20), Numerical Computations (20/20), Design of Algorithms (20/20), Data Structures and Algorithms (20/20), Fundamentals of Programming: C (20/20), Advanced Programming: Java (20/20), General Math 1 (19/20), General Math 2 (19.5/20), Discrete Mathematics (18/20)

Notable Projects

nerf2nerf: Pairwise Registration of Neural Radiance Fields, a PyTorch implementation. GitHub repository

Longitudinal COVID CT Scan Assessment: A project on quantitative assessment of longitudinal COVID chest CT scans, using deep neural networks. GitHub repository