Niloofar Azizi
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RESEARCH INTEREST

- Graph Neural Network
- Machine Learning/Deep Learning

EDUCATION

- **Ph.D. Computer Science**
  `Supervisor` **Prof. Horst Bischof**
  ICG, Graz University of Technology
  Topic: Expressivity in Graph Neural Networks
  Focus: Graph Neural Networks, 3D Human Pose Estimation
  Apr. 2024 | Graz, Austria
- **M.Sc. Computer Science**
  `Supervisor` **Prof. Sven Behnke**
  AIS, Bonn University
  Topic: Video prediction and feature extraction for human-robot interaction
  Focus: Deep Learning, Machine Learning
  Mar. 2018 | Bonn, Germany
- **B.Sc. Computer Engineering**
  Shiraz University
  Focus: Hardware
  Oct. 2013 | Shiraz, Iran

SKILLS

- `Programming Languages:` Python (PyTorch Geometric, PyTorch/TensorFlow Framework)
- `Course Work:` Graph Neural Network, Machine Learning, Random Graphs, Advanced Linear Algebra, Spectral Graph Theory

AWARDS & SERVICES

- `Inventor Awards:` For MöbiusGCN innovation, among 60 patents at Graz University of Technology, July 2021-June 2023.
  Nov. 2023| Graz, Austria
- `Invitee Speaker:` ETH Zurich
  May 2024| Zurich, Switzerland
  University of Vienna **Apr. 2024| Vienna, Austria**
- `Break Time In University:` Organized yearly workshops
  2009-2013| Shiraz, Iran

PATENT

- Möbius Graph Convolutional Networks, Date Issued: Jan. 2022, Inventor: Niloofar Azizi

SELECTED PUBLICATIONS

[1] **N. Azizi**, H. Farazi, and S. Behnke. Location Dependency in Video Prediction (Oral). In *ICANN*, 2018.

[2] **N. Azizi**, M. Fayyaz, and H. Bischof. Occlusion Handling in 3D Human Pose Estimation with Perturbed Positional Encoding. In ***ECCV***, **2024**.

[3] **N. Azizi**, N. Kriege, M. Fayyaz, and H. Bischof. Enhanced Expressivity in Graph Neural Networks (submitted). In *NeurIPS*, 2024.

[4] **N. Azizi**, H. Possegger, E. Rodola, and H. Bischof. 3D Human Pose Estimation Using Möbius Graph Convolutional Networks. In ***ECCV***, **2022**.

[5] **N. Azizi**, N. Wandel, and S. Behnke. Complex-valued Gated Auto-encoder for Video Frame Prediction (Oral). In *ESANN*, 2019.

SELECTED PROJECTS

- **MöbiusGCN** 3D Human Pose Estimation
  - A novel spectral GCN by proposing Möbius Transformation
  - Lightest State-of-the-art 3D human pose estimation with **90-98%** fewer parameters
  - State-of-the-art performance compared to semi-supervised methods
- **LLwLC** Lanczos Layer with Linear Constraints
  - A novel eigenbasis by proposing encoding induced subgraph directly into it, enhancing graph neural network expressivity
  - State-of-the-art Link Prediction task achieves **20x** and **10x** speedup by requiring **95%** and **90%** fewer data from the benchmark datasets.
  - Vertex-deleted Subgraph Extraction Policy: establishes a universal approximator conjecture, offering efficient time complexity
- **PerturbPE** Occlusion handling in 3D human pose estimation
  - A novel positional encoding to improve graph neural network expressivity, addressing missing edges.
  - **12%** state-of-the-art performance improvement on benchmark dataset with occlusion.

WORK EXPERIENCE

- Graz University of Technology | Researcher| **Jan. 2020 – Jun. 2024 | Graz, Austria**
  | Austrian Research Promotion Agency **(FFG)**
- Dortmund University | Researcher| **Mar. 2019 – Dec. 2019 | Dortmund, Germany**
  | German Research Foundation **(DFG)**
- Bonn University | Researcher| **Mar. 2018 – Mar. 2019 | Bonn, Germany**
  | German Research Foundation **(DFG)**
- Bonn University | Student Researcher| **Mar. 2017 – Mar. 2018 | Bonn, Germany**
  | German Research Foundation **(DFG)**

EXTRACURRICULAR

- `Advanced Ping Pong Player` Won over 20 national/regional championships, Led training sessions, Organized community ping pong events