

# Reyhaneh NESHATAVAR

## PERSONAL DATA

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## RESEARCH INTERESTS

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Computer Vision  
Deep Learning  
3D Vision  
Self-supervised Learning  
Graph Theory

## EDUCATION

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- 2020 - present Ph.D in Electrical and Computer Engineering, Seoul National University, Seoul, South Korea.
- 2015 - 2017 M.Sc in Mathematics and Computer Science-Graph Applications, Amirkabir University of Technology, Tehran, Iran.
- 2010 - 2014 B.Sc in Mathematics and it's Application in Industrial Engineering, Amirkabir University of Technology, Tehran, Iran.
- 2006 - 2009 Diploma in Mathematics and Physics, Zahraye Athar High School, Tehran, Iran.

## RESEARCH EXPERIENCE

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Summer 2018	Applications of Graph Coloring in Schedule Problem(Train Timetabling) <i>Adviser: Prof. Dariush Kiani</i> The goal of this research is to present a Graph algorithm to solve Train Timetabling problem. This algorithm uses the Maximum Flow to increase the number of trains in the urban scheduling with a minimum delay. Our algorithm provides the maximum number of trains (in spite of time interference) by creating a Time Maximum Flow. Then, eliminate the interactions of these trains by finding the Maximum Independent Set (MIS). Graduate Thesis
Fall 2014	Speed-up Benders Decomposition using new Cut <i>Adviser: Associate Prof. Mehdi Qatee</i> Undergraduate thesis

## PUBLICATIONS

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- Winter 2022* | **CVF-SID: Cyclic multi-Variate Function for Self-Supervised Image Denoising by Disentangling Noise from Image**  
*Reyhaneh Neshatavar, Mohsen Yavartanoo, Sanghyun Son, Kyoung Mu Lee*  
In this paper, we propose a novel and powerful self-supervised denoising method called CVF-SID based on a Cyclic multi-Variate Function (CVF) module and a self-supervised image disentangling (SID) framework. The CVF module can output multiple decomposed variables of the input and take a combination of the outputs back as an input in a cyclic manner. Our CVF-SID can disentangle a clean image and noise maps from the input by leveraging various self-supervised loss terms. Unlike several methods that only consider the signal-independent noise models, we also deal with signal-dependent noise components for real-world applications. Furthermore, we do not rely on any prior assumptions about the underlying noise distribution, making CVF-SID more generalizable toward realistic noise.  
This paper is accepted in CVPR2022.  
<https://arxiv.org/abs/2203.13009>
- Summer 2021* | **PolyNet: Polynomial Neural Network for 3D Shape Recognition with PolyShapeRepresentation**  
*Mohsen Yavartanoo, Shih-Hsuan Hung, Reyhaneh Neshatavar, Yue Zhang, Kyoung Mu Lee*  
In this paper, we propose PolyNet, a DNN-based method over a specific polygon mesh representation (PolyShape) with a multi-resolution structure. PolyNet contains two operations; (1) a polynomial convolution (PolyConv) operation with learnable coefficients, which learns continuous distributions as the convolutional filters to share the weights across different vertices, and (2) a polygonal pooling (PolyPool) procedure by utilizing the multi-resolution structure of PolyShape to aggregate the features in a much lower dimension.  
This paper is accepted in 3DV2021.  
<https://arxiv.org/abs/PolyNet>
- Summer 2021* | **3DIAS: 3D Shape Reconstruction with Implicit Algebraic Surfaces**  
*Mohsen Yavartanoo, JaeYoung Chung, Reyhaneh Neshatavar, Kyoung Mu Lee*  
In this paper, we propose an implicit algebraic surface with learnable coefficients to represent the surface of the 3D shape. This approach provides a differentiable and compact surface of 3D shapes, which can be polygonized, rendered, and transformed efficiently.  
This paper was accepted in ICCV2021.  
<https://openaccess.thecvf.com/content/ICCV2021/3DIAS>
- Winter 2021* | **3D Shape Reconstruction Using Multivariate Quartic Polynomial Surface Set (다변수 사차 다항 곡면 집합을 이용한 삼차원 형상 재구성)**  
*Mohsen Yavartanoo, Jaeyoung Chung, Reyhaneh Neshatavar, Kyoung Mu Lee*  
This paper is accepted in IPIU2021.

## TEACHING EXPERIENCE

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- Spring 2021 Seoul National University, Teaching Assistant, Department of Electrical and Computer Engineering, **Introduction to Computer Vision**
- Fall 2015-Winter 2017 Amirkabir University of Technology, Teaching Assistant, Department of Mathematics and Computer Science, **General Mathematics 1 and 2**.
- Winter 2013 Amirkabir University of Technology, Teaching Assistant, Department of Mathematics and Computer Science, **Optimization Research**.
- Teaching Painting as Student Working at Amirkabir University of Technology.

## AWARDS AND SCHOLARSHIPS

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- **Gold Prize** for the "3D Shape Reconstruction Using Multivariate Quartic Polynomial Functions" paper in the 33rd Workshop on Image Processing and Understanding (IPIU

2021). This award is given because it was selected as an excellent paper.

- Merit-based scholarship (Spring 2021) due to academic excellence and good grades.
- SNU Global Scholarship for one year (2020)

## OTHER ACADEMIC EXPERIENCES

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- 2022 Invited to serve as a expert reviewer for IEEE Transactions on Neural Networks and Learning Systems.

## WORKING EXPERINENCE

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- Jun.2019-Jan.2020 Seoul National University, [CVLab](#), **Research Intern**.
- 2014-2017 Jahan Pardaz Teb Company, Part Time Job, **Web Designer, Graphic Designer, Film Editor**.

## LANGUAGES

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PERSIAN: Native  
ENGLISH: Fluent  
KOREAN: Basic  
ARABIC: Basic

## COMPUTER SKILLS

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Python, Pytorch, Tensorflow, Matlab, C Programming, AIMMS, HTML, Wordpress CMS, Joomla CMS, Blender, Adobe Photoshop CS8, Illusterator, Corel Draw, Video Edition Edius 7,  $\text{\LaTeX}$

## ART SKILLS

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Painting with Oil Color, Creta Color, Water Color  
Playing Piano and Guitar

## BEHAVIORAL STRENGHTS

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Flexibility  
Perseverance  
Responsibility  
Commitment and Service Motive  
Problem Solving and Decision Making  
Creativity and Innovation  
Team Work

## REFERENCES

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- Professor Lee, Kyoung Mu, Professor of Computer Vision, Machine Learning, Artificial Intelligence, [kyoungmu@snu.ac.kr](mailto:kyoungmu@snu.ac.kr), Department of Electrical and Computer Engineering, College of Engineering, Seoul National University, Seoul, South Korea.
- Professor D. Kiani, Professor of Mathematics-Algebra, [dkiani@aut.ac.ir](mailto:dkiani@aut.ac.ir), Department of Computer science and Mathematics, Amirkabir University of Technology, Tehran, Iran.