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# Nikan Doosti

- **Status:** MSc, Deep Learning Engineer
- **Tech:** PyTorch, Python, Numpy, Scipy, SKlearn
- **Fields:** Deep Learning, Visual Computing, Computer Graphics

## Summary

I am a final-year master's student in computer engineering at IUST focusing on *applications of artificial intelligence in science*. Furthermore, I was mainly focused on classic and deep computer vision particularly *image processing* and applications of machine learning in technology.
Generally, *I highly appreciate interdisciplinary work* between AI and science and actualize *digital twin*.

## Experience

Jul, 2020 - Mar, 2021 **Research Assistant (Remote)** **Max Planck Institute for Informatics**

This was my first multidisciplinary work which led to publication of my first-ever academic paper at ACM Symposium on Computational Fabrication (SCF21)!

- Studying numerical simulation methods such as Finite Element Method (FEM) for solving Topology Optimization (TO) problem
- Studying and reproducing recent papers in implicit neural representation, neural radiance fields, neural PDEs, and Fourier neural operators
- Studying different projection(activation)/smoothing filters and their effect on optimization and mesh-based solutions
- Developing a novel frequency aware model to solve TO in fully self-supervised manner via neural fields

Supervisor: Dr. Vahid Babaei (Computational manufacturing researcher at Max Planck Institute for Informatics and group leader at AIDAM)

Aug, 2016 - Jun, 2020 **Freelancer** **Independent**

To help with the expenses and learn more, during my study in BSc and earlier stages of MSc, I was working as a freelancer partially.

- Occasionally teaching university courses as a private tutor
- Designing, participating and implementing evolutionary algorithms such as genetics for routing problem in university research projects
- Designing, participating and implementing classical computer vision and deep learning based models for different topics from reading car plates, image classification, counting objects, etc.

## Publications and Talks

Publications:

- Doosti, Nikan, Julian Panetta, and Vahid Babaei. "Topology Optimization via Frequency Tuning of Neural Design Representations." In *Symposium on Computational Fabrication*, pp. 1-9. 2021 (Abstract/PDF)

Invited Talks:

- Doosti, Nikan. 2022. "Neural Design Representations." Toronto Geometry Colloquium. March 4, 2022. toronto-geometry-colloquium.github.io. (Video-Poster)

## Education

Aug, 2019 - Present **MSc Computer Engineering** **Iran University of Sc. and Tech. (IUST)**

Awards:

- Full tuition fee waiver
- Overall grades (so far): 17.17/20
- Accepted as an exceptional talent (no entry exam)

Thesis: Toward super-resolution neural topology optimization (in progress)
Supervisor: Dr. Nasser Mozayani (Associate professor of department of computer engineering)

Aug, 2015 - Aug, 2019 **BSc Computer Engineering** **University of Guilan**

Awards:

- Full tuition fee waiver
- Overall grade: 18.63/20 (Ranked **3rd)**
- Exceptional talent at Department of Computer Engineering

Teacher assistant experience:

- Advanced programming (Head TA), instructor: *Dr. Mirroshandel*, Fall 2018
- Algorithms, instructor: *Dr. Shakeri*, Spring 2017
- Algorithms (Head TA), instructor: *Dr. Shakeri*, Fall 2018
- Computational Intelligence (Head TA), instructor: *Dr. Shakeri*, Spring 2018

My primary responsibilities as the TA were assessing and designing assignments and teaching as the head TA.

## Selected Projects

2017 **Paper Implementation** **Open Source**

Sole open source implementation of *Using Genetic Algorithms for Multi-depot Vehicle Routing (Ombuki-Berman et al. 2009)* via Python as part of *Computational Intelligence* course. (github.com/Nikronic/Optimized-MDVRP)

2019 **Paper Implementation** **Open Source**

Sole open source implementation of *Deep Context-aware Descreening and Rescreening of Halftone Images (Kim, T.H et al. 2018)* via PyTorch. This was the my first-ever PyTorch project.( github.com/Nikronic/Deep-Halftoning)

- CoarseNet: Modified U-Net as a low-pass filter to remove halftone patterns
- DetailsNet: A GAN for improving details
- EdgeNet: A simple CNN to extract Canny edge features to preserve details
- Halftoning Algorithms: Implementation of some of the halftone algorithms provided in digital color halftoning books as the ground truth

## Voluntary Activities

Oct, 2018 - Present **Lecturer** **Rasht School of AI (schoolofai.ir)**

School of AI is a community of passionate people about learning and teaching AI, mostly enabled by students from different fields of study. In this community, we would like to personalize learning paths and create a network to learn more about machine learning and deep learning and their applications. All sessions are free and recordings are available publicly. (github.com/rasht-school-of-ai)

Sep, 2020- Aug, 2021 **Maintainer and Developer** **IUST Projects (iust-projects.ir)**

IUST Projects is an open GitHub organization with a focus on showcasing and maintaining projects created at Iran University of Science and Technology. This *organization is maintained by its true owners, the students of any institute.* This was an attempt to overcome the siloed culture of university and show that everyone can be competitive and improve in a engaging and friendly environment. (github.com/iust-projects)
Topics: Imbalance learning, ensembles, feature extraction, NN architectures, Hough transform, edge detection, shape fitting, Fourier/Cosine transform, geometrical/textural feature engineering, and more)

Nov, 2018 - Present **Member** **PyTorch Discuss Forum**

Since the day I started deep learning with PyTorch, I started reading topics around my questions and tried to answer questions that I was not familiar with which helped me to dive deeper into the framework, learn many of hacks and return the favor! At the time of writing, *I've visited the forum for 851 days, 563 posted replies, 3000 read topics and 184 solutions (All-time 15th)*( discuss.pytorch.org/u/nikronic/summary)

## Languages

- Persian: Native
- English: Proficient

## References

Available upon request.