

# NIKAN DOOSTI | RESUME

- **Status:** M.Sc. Computer Engineering, Artificial Intelligence
- **Tech:** PyTorch, Python, Scipy/Numpy
- **Fields:** Deep Learning, Computational Fabrication, Visual Computing, Computer Graphics



## Summary

I am a final-year master student in computer engineering at IUST focusing on *applications of artificial intelligence in science*. Before that, I was mainly focused on computer vision particularly *image processing* and applications of machine learning in technology.

Generally I love to do *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)!

My responsibilities:

- Studying numerical simulation concepts such as FEM for solving Topology Optimization (TO) problem
- Studying and evaluating recent papers in implicit neural networks and solving PDEs using deep learning
- Implementing and reproducing results of the main references
- Developing a new system 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 CAM group)

Aug, 2016 - Jun, 2020

**Freelancer**

**Independent**

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

My responsibilities:

- Writing small pieces of software for desktop computers mostly in C#
- Designing, consulting and implementing standard algorithms and data structures for designing efficient systems
- Designing, consulting and implementing evolutionary algorithms such as genetics for developing efficient systems in different topics
- Designing, consulting and implementing classical computer vision and deep learning based models for different topics from reading car plates, tracking speed of cars, counting objects and measuring surfaces.

## 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](#))

## Education

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

Related coursework:

- ▶ Algorithms and data structure
- ▶ Artificial Intelligence and Computational Intelligence
- ▶ Classical computer vision, statistical NLP
- ▶ Signal and systems
- ▶ Digital electronics and computer aided design (VHDL)

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.

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)

## ▶▶▶ Voluntary Activities

Oct, 2018 - Present

**Lecturer**

**Rasht School of AI ([schoolofai.ir](https://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.

You can find the material here: [github.com/rasht-school-of-ai](https://github.com/rasht-school-of-ai)

Sep, 2020- Aug, 2021

**Maintainer and Developer**

**IUST Projects ([iust-projects.ir](https://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 website and its *organization is maintained by its true owners, the students* and the contributors outside of the university, so no, this is not an official university website and it is open to anybody who wants to join!

You can find all the materials here: [github.com/iust-projects](https://github.com/iust-projects)

Main works:

- ▶ Assignments and solutions in form of blog posts for better readability
- ▶ Hosts course notes, curriculum, etc of AI major

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, 10000 read posts and 184 solutions (All-time 15th)*

View the summary: [discuss.pytorch.org/u/nikronic/summary](https://discuss.pytorch.org/u/nikronic/summary)

## Selected Projects

2016	Paper Implementation	Open Source
Implementation of <i>Using Genetic Algorithms for Multi-depot Vehicle Routing</i> (Ombuki-Berman et al. 2009) using Python as part of <i>Computational Intelligence</i> course. You can find the source code here: <a href="https://github.com/Nikronic/Optimized-MDVRP">github.com/Nikronic/Optimized-MDVRP</a>		
Main contributions:		
<ul style="list-style-type: none"><li>➤ Only open-source implementation with reproducability</li><li>➤ Improving mutation and replacement modules of Genetics optimizer</li><li>➤ Outperforming the original paper</li></ul>		

2018	Paper Implementation	Open Source
Implementation of <i>Deep Context-aware Descreening and Rescreening of Halftone Images</i> (Kim, T.H et al. 2018) using PyTorch. This was the my first project using PyTorch where I learned this framework. You can find the source code here: <a href="https://github.com/Nikronic/Deep-Halftoning">github.com/Nikronic/Deep-Halftoning</a>		
Main contributions:		
<ul style="list-style-type: none"><li>➤ Only open source implementation</li><li>➤ The implementation can be divided into below separate projects:<ul style="list-style-type: none"><li>➤ <b>CoarseNet</b>: Modified U-Net as a low-pass filter to remove halftone patterns</li><li>➤ <b>DetailsNet</b>: A CNN generator and two discriminators for adding details</li><li>➤ <b>EdgeNet</b>: A simple CNN to extract Canny edge features to preserve details</li><li>➤ <b>Halftoning Algorithms</b>: Implementation of some of the halftone algorithms provided in most recent digital color halftoning books as ground truth</li></ul></li></ul>		

## Languages

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|------------------|------------|
| ➤ Persian/Farsi: | Native     |
| ➤ English:       | Proficient |

## References

Available upon request.