Nikan Doosti

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Education

- **Iran University of Science and Technology (IUST)** — Tehran, Iran
  Master of Science in Computer Engineering - Artificial Intelligence — *Aug 2019 - Dec 2022*
  - **Thesis:** High Resolution Neural Topology Optimization via Differentiable Physics Engine
  - **Defense:** Achieved **maximum score** during defense on *Oct 22, 2022* with **GPA of 17.17/20.00**
  - **IUST:** This university is one of the most prestigious in the country, being in **top-4** consistently.
- **University of Guilan (UoG)** — Rasht, Iran
  Bachelor of Science in Computer Engineering — *Aug 2015 - Aug 2019*
  - **Final Project:** Descreening and Rescreening of Halftone Images via Data-Driven Deep Learning Methods
  - **Class Rank:** Graduated **3rd** out of 55 with a **GPA of 18.64/20.00**

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. (ACM)

Talks

- "Neural Design Representations." **Toronto Geometry Colloquium Advised by Alec Jacobson** - University of Toronto. March 4, 2022. toronto-geometry-colloquium.github.io. (Length: 10 mins., Video)

Research Experience

Max Planck Institute for Informatics — Saarbrücken, Germany

- ***Research Assistant (remote)*** — *Jul 2020 - Mar 2021*
  Artificial Intelligence aided Design and Manufacturing Group
  - Project Overview: **Neural Design Representation**: Novel self-supervised neural method for obtaining the optimum design showcased in Topology Optimization
  - Details: Utilized physics-informed deep learning by integrating analytical physical simulators into neural fields to handle sub-voxel(pixel) filtering to control the smoothness of designs without explicit smoothing filters
  - Skills: Using analytical physics and clasical numerical methods such as Finite Elements Methods (FEM) to simulate the objective function. Also, diving into various neural architectures and reproducing their results, from convolutional neural networks to modern neural fields to study potential of design representation via deep learning
  - Supervisors: Supervised by **Dr. Vahid Babaei** and collaborated with **Prof. Julian Panetta** from the University of California, Davis, USA.
  - Interdisciplinary Work: Successfully navigated and **mastered uncharted domains** beyond my primary field, including topics in mechanical engineering with no prior experience.
  - Experiment Management: Managed **large-scale experiments** by extending logging solutions such as MLFlow for model, experiment, config, and report **versioning and tracking**, integrated into Slurm workload manager on compute cluster, particularly enabling **easy follow-up near deadline**.
  - Group Collaboration: **Shared PyTorch expertise** with group members, focusing on low-level internals and **optimizing workflows with Slurm clusters**.
  - Manuscript Development: **Prepared all figures** and contributed approximately **65% to the manuscript**. Also, I oversaw all **administrative tasks** related to the paper's publication, including **handling revisions** and addressing **peer review feedback**.
  - Outcome: Resulted in a paper that was published and presented at the ACM Symposium on Computational Fabrication 2021 (see Publications). Also, being among only a handful of master's students with a thesis with international peer-reviewed publication in a valuable venue.

Teaching Experience

- **Head Teaching Assistant - Advanced Programming (AP)**
  Supervisor: Dr. Ghasem Mirroshandel - University of Guilan *Aug 2018 - Feb 2019*
- **Head Teaching Assistant - Algorithms Design (AD)**
  Supervisor: Dr. Mojtaba Shakeri - University of Guilan *Aug 2018 - Feb 2019*
- **Head Teaching Assistant - Computational Intelligence (CI)**
  Supervisor: Dr. Mojtaba Shakeri - University of Guilan *Feb 2018 - Jul 2018*

Taught Java in AP, designed and graded assignments, and **evaluated final projects**. Held **weekly Q&A sessions**, graded assignments, and **created programming tasks** for AD and CI courses.

Voluntary Activities

- **Mentor, Lecturer, and Organizer**
  Rasht School of AI, IUST Projects, and PyTorch Forum *2018 - 2022*
  - **Lecturing:** Delivered talks on AI applications, focusing on digital image processing (Slides)
  - **Mentorship:** Guided students in AI and M.Sc thesis processes, from ideation to publication
  - **Organizing:** Facilitated open discussions at IUST to promote collaboration and challenge the siloed culture
  - **Community Engagement:** Active in the PyTorch Forum, ranking 15th with 183 solutions and 566 posts (summary); praised for insightful contributions by Thomas Viehmann

Work Experience

Self-Funded AI Venture Tehran, Iran

- ***Founder and Engineer*** *Mar 2024 - Jul 2024*
  Specializing in Automated Document Image Analysis
  - The problem: Many small to medium companies, **lack structured data pipelines** and use local layout for their documents which degrades inter-company interactions.
  - Developed an automated document image analysis platform to **transform unstructured, denormalized documents into accessible, structured data**, semantically searchable.
  - Created a **no-code/low-code configuration system** for easy customization and business logic validation
  - Outcome and Insights: While the venture **did not achieve commercial success**, it provided valuable learnings:
    * Impact of **infrastructural inertia** toward data standardization
    * Effects of **regulatory environments** on innovation
    * **Bureaucratic preferences** for transparency prevention in process management

Panafor Karaj, Iran

- ***Full-time Machine Learning Researcher*** *Apr 2022 - Jan 2024*
  Specializing in Data-driven Decision Making for Business Optimization
  - The Problem: When number of customers increases, assigning experts to each customers becomes critical as only a few result in a contract. So, an "operator" that can monitor all customers simultaneously in real-time, to find high-value customers, and the assignment of experts to them based on the fitness, would prevent wasted effort.
  - The Solution: 1. Screening customer input (text, voice call), 2. Finding potential via tabular machine learning methods, 3. Reporting potential and fitness to expert to human domain expert via explainableAI, 4. Experts are only engaged with the most=likely customers.
  - Impact: Decreased personnel error by 10%, and I established myself as **the primary person for onboarding and training** new team members.
  - Developed a **comprehensive screening process automation** from customer communication to profiles prioritization, filtering calls based on the complexity of inquiries, **reducing manual workload by 40%.**
  - Oversaw the development of a proprietary data extraction and preprocessing pipeline, resulting in a **35% reduction in poor-quality data**.

- Deployed **classical machine learning** models alongside **deep learning** methods, coupled with **explainable AI** techniques to prioritize profiles and provide transparent reasoning for each decision.
- Exhibited **proactive problem-solving** by **manually preparing years of "analog data" within the first 2.5 months**, a critical task which I prioritize over my role-specific duties to ensure project success.
- **Managed a 15,000-line codebase**, ensuring maintainability and performance. **Designed 7 modules, with 3 adopted by other projects**, enhancing reusability and impact.

Technical Skills

Deeply Involved:	Python, PyTorch, Tensorflow, Git, Windows, Linux/Debian, MLFlow, DVC, ExplainableAI, Sphinx Doc, "why you should care"
Have Experience With:	Docker, DevOps, CI/CD, Slurm, PostgreSQL, FastAPI, Shell Scripting, HTML/CSS

Research Interests

- Deep Learning and Machine Learning
- Computer Graphics and Physics-based Simulation
- AI for Engineering and Science

Awards and Certificates

- Awarded for **dedication and leadership** at Panafor 2023
- Completed **training in Workplace Professionalism**, Organizational Behavior, etc. 2023
- Accepted in M.Sc program as a **National Exceptional Talent**, with **Tuition Waiver** at IUST 2019
- **Ranked 3rd** among B.Sc graduates in Computer Engineering, with **Tuition Waiver** at the UoG 2019
- Participated in the Deep Learning Summer School at Gdańsk University of Technology 2020

Referees

Dr. Vahid Babaei (Research Scientist) Saarbrücken, Germany
- *Role: Research project supervisor* *vbabaei@mpi-inf.mpg.de*
  Max Planck Institute for Informatics

Prof. Julian Panetta (Assistant Professor) Davis, USA
- *Role: Research project supervisor* *jpanetta@ucdavis.edu*
  University of California, Davis

Dr. Mojtaba Shakeri (Research Scientist) Los Angeles, USA
- *Role: Undergraduate mentor and instructor* *mojtaba.shakeri@gmail.com*
  MercuryGate (prev. Assistant Professor at University of Guilan, Rasht, Iran)