Mohammad Hossein Soltani

+98 993 614 2131 | hosoltani42@gmail.com | hossein-soltani | neotod | neotod.github.io

Research Interests

Machine Learning · Deep Learning · Computer Vision · Generative Models · Transformers
Object Detection · Self-Driving Cars · Signal and Image Processing

Publications

Alireza Morsali, Mohammad Javad Vaez, **Hossein Soltani**, Amirhossein Kazerouni, Morteza Mohammad-Noori **"STAF: Sinusoidal Trainable Activation Functions for Implicit Neural Representation"** (Submitted to NeurIPS 2024)

Education

Shahid Beheshti University (SBU) - Tehran, Iran — Sept 2019 - July 2024
Bachelor of Science, Electrical Engineering
– **GPA of Last Two Years: 3.92/4 – Cumulative GPA: 3.16/4**
– **Thesis Topic:** Small-Scale Autonomous Car: Design, Implementation, and Remote Monitoring · **Grade:** 20/20

Research Experience

University of Tehran - Tehran, Iran — Sept 2023 - Present
Top university for CS in Iran based on usnews.com
Research Assistant Under Supervision of Dr. Morsali and Dr. Mohammad-Noori, *Remote*

- Worked on the "STAF: Sinusoidal Trainable Activation Functions for Implicit Neural Representation" paper and led the implementation of the project codebase, including model architecture and experimental results setup.
- Conducted literature review on Neural Tangent Kernel (NTK) analysis of SOTA Implicit Neural Representations (INRs) and STAF.
- Currently I'm working on adding STAF to ENRP (Ensemble Neural Representation Networks).

Shahid Behehsti University, *Computer and Microprocessor Lab* - Tehran, Iran Oct 2023 - June 2024
Research Assistant Under Supervision of Dr. Asharioun, *In-Person*

- Worked on my Bachelor Thesis.
- Designed and built the test track.

Institute for Research in Fundamental Sciences (IPM) - Tehran, Iran — June 2023 - Sept 2023
Top research institute in Iran.
Summer Intern, *Remote*

- Worked on "Image Segmentation on Aerial Images of Natural Disasters" project.

Honors and Rewards

- **IUST ChillinWars AI Challenge** - Ranked 3^{rd} nationwide. 2019
- **National University Entrance Exam** - Ranked within the top 1% among approximately 164,000 participants. 2019

Teaching Assistant

- **Digital Systems 1** - Dr. Pouladi — Winter 2024
- **Artificial Intelligence** - Dr. Nabavi — Fall 2023
- **Linear Algebra** - Dr. Jahangiri — Winter 2023
- **Programming and Software Architecture** - Dr. Asharioun — Fall 2023
- **Probability and Statistics** - Dr. Mansouri — Winter 2022

Work Experience

Paya Communication Industries, *One of the largest providers of telecommunication infrastructure in the country*
Back-end developer — March 2022 – Sept 2022

- Worked on the **Masiryar**, an **Indoor Positioning project** which was deployed and being utilized in **HamrahAval(MCI)** main building.

Radar, *An innovative retail and shopping startup*
Back-end developer — Oct 2021 – March 2022

Selected Courses

Online: ML for Intelligent Systems (Cornel CS4780) · Deep Learning (NPTEL) · Artificial Intelligence (MIT) · DL for Computer Vision (Stanford CS231n) · Computer Vision and Image Processing (MaktabKhooneh) · Generative Vision Models (internet) · Probability and Statistics (MaktabKhooneh)

SBU: Signals and Systems · Linear Algebra (19.36/20) · Machine Learning (18.3/20) · Modern Control (20/20) · Introduction to AI (20/20) · Advanced Programming (19.5/20) · IoT (19/20 - Graduate)

OnGoing: Diffusion Models (Ali Ghodsi's Lectures)

Selected Projects

EBSE-Yolo - An implementation of the EBSE-Yolo paper.
Final project of Introduction To AI course under supervision of Prof. Aghaee.

Neo Pilot E2E - End-to-End Lane Follower AI.
Design and development of an End to End lane follower AI. Successfully implemented on Jetson Nano and tested on a test track.

Neo Pilot Modular - Small-scale navigation system based on Modular paradigm.
Designed in AVIS Engine simulation environment and tested successfully in real world on a test track.

Bicycle Dynamics - Stability analysis and designing state feedback controller for Bicycle.
Modern Control course final project. Selected as the course best project.

NeoDoorLock - IoT-based door lock using Raspberry Pi, Arduino, and ESP8266.
Secured using Face Recognition algorithms and Telegram bot.

Inverter AI Fault Detection - 5-level H-bridge cascaded inverter fault detection using AI.
Data collection pipeline in MATLAB/Simulink. FFT and Wavelet analysis for feature extraction.

Tron.AI - My submission for IUST ChillinWars AI challenge.

AVR Clock - Digital clock with date, alarm and temperature on AVR ATMEGA32.

Car Parking System - Car Parking System finite state machine (FSM) implemented in VHDL.

Volunteering

- **Summarizing webinar for Linear Algebra** - Held by EE Scientific Association of SBU.

Skills

Programming Skills: Git, C/C++, Python, JavaScript, TypeScript, MATLAB, VHDL

AI: NumPy, Pandas, Matplotlib, Scikit-learn, TensorFlow, PyTorch, Jax Ecosystem, OpenCV

Hardware: Arduino, RaspberryPi, Jetson Nano, AVR Atmega32, ESP8266, FPGA

Software: Simulink, Pspice, VHDPlus, Xilinx Vivado, CodeVision

Website Development: Flask, Django, Ubuntu server, Docker, HTML, CSS, Bootstrap

Databases: SQLite, MySQL, MongoDB, Redis

Languages: English (Professional, *TOEFL: to be taken in October 2024*), Persian (Native)