Kasra Davoodi

K. N. Toosi University of Technology
Dept. of Electrical Engineering
Tehran, Iran

Pages: Webpage, LinkedIn
Email: s.kasradavoodi@gmail.com
davoodikasra3@gmail.com

RESEARCH INTERESTS

- Computer Vision
- Machine Learning
- Robotics
- Biomedical Imaging and Signals
- Autonomous Systems
- Embedded Systems

EDUCATION

K. N. Toosi University of Technology — Tehran, Iran
B. Sc. in Electrical Engineering (minor in Electronics) — 2020 – 2025

GPA: A+ (3.84/4 - TOP 6% of my entrance)
Bachelor Project: "Segmentation & Classification of ICH in Brain CT Scan via Deep Learning"
Supervisor: Prof. Amirhossein Nikoofard

RESEARCH EXPERIENCE

K. N. Toosi University of Technology — Tehran, Iran
Research Assistant (Prof. Amirhossein Nikoofard, Prof. Mahdi Aliyari at APAC) — October 2023 - present

• **Project**: Classification and Segmentation of ICH in Brain CT scans.
- Engineering DL models to diagnose bleeding lesions in brain CT scan.
- Pipeline development through PyTorch and SMP, utilizing Google Colab.
- Hyper-parameter tuning to optimize model performance.
- Dataset gathering through a cooperation with clinics.
- Provided writing and technical mentorship for fellow AI researchers.

K. N. Toosi University of Technology — Tehran, Iran
Research Assistant (with Prof. Hossein Hosseini-Nejad, at Zistel company) — Dec 2022 - Sep 2023

• **Project**: Clinical Pulse Oximeter Enhancement.
- Developing novel algorithm for SPO2 and Heart rate assessment in PPG Signal.
- Implementing the algorithm on nRF and STM32 microcontrollers.
- Conducting real-world scenarios evaluation
- Applied ML approaches to classify low-quality signals in PPG.

INDUSTRIAL EXPERIENCE

Parto Dadeh Company:
Intern (under the supervision of Mr. Arash Malek and Mr. Kaveh Manafi)
Project: Software Design for a Telecommunication Device
- Full-stack application development using QT
- taking OOP and advanced C++ masterclass needed for sophisticated software development
- GUI design for a low-end display

AryaVakav Company:
Intern (under the supervision of Mr. Arash Karimi)
Project: Designing an AI-driven controlling assistance in factories using machine learning.
- Cleaning and analysis of data collected from PLC devices.
- Feature selection process and model tuning.

(NOTE: I Strongly Encourage You to Explore my **Webpage (click)** for Detailed Technical information of my Publications and projects.)

PUBLICATIONS

Conference Papers

1. Mohammad Hoseyni, Kasra Davoodi¸ Fatemeh Pakdaman, Mahdi Aliyari shoorehdeli, Amirhossein Nikoofard*, "Comprehensive Hyperparameter Tuning to Enhance Deep Learning Performance for Intracranial Hemorrhage Classification in Head CT Scans" *Int. Conf. Biomedical Engineering. (ICBME)*, Tehran, Iran. (**accepted, oral presentation at November 29th**)

Journal papers

2. Zahra Ghafari, Kasra Davoodi¸ Danial Katoozian, Hossein Hosseini-Nejad*, "An Innovative Approach for Beat Detection and Quality Assessment in PPG Signals", (**under review**).

3. Zahra Hasani, Maryam Mahdavimoghdam, Razieh Mohammadi, Zahra Shirmohammadi, Amirhossein Nikofard*, Eesa Nikahd, Kasra Davoodi, "Deep Reinforcement Learning-based Mechanism to Improve the Throughput of WSNs", (**under review**).

4. Mohammad Hosseini, Kasra Davoodi, Amirreza Parvahan, Fatemeh Pakdamn, Amirhossein Nikofard*, "Advanced Segmentation of ICH in Brain CT Scans via Using a Two-Step Deep Learning Approach and Fuzzy Decision Policy", (**in preparation**).

PROJECTS

Biomedical projects:

• **ICH Brain CT Segmentation via Deep Learning (July 2024 – present)**
Developing a two-step model (convolutional and sequential) using PyTorch for ICH lesion segmentation in collaboration with Iran Medical University.

• **ICH Brain CT Classification via Deep Learning**: finding a generalizable set of hyper-parameters, enhancing ResNet, VGG16, DenseNet, and MobileNet, modeling the clinical scenarios.

• **Quality Assessment of PPG Signals (under review paper)**: Utilizing peak/valley detection as a pre-process for a ML method, eliminating low-quality segments from the signal.

• **Heart Rate & SpO2 Detection**: Created a lightweight, adaptive , 4-step peak/valley detection algorithm for clinical pulse oximeter.

Autonomous Driving:

• **Autonomous Driving – Vehicle & Human Detection**: Utilized YOLOv8s for live vehicle and human detection with preprocessing, augmentation, and class balancing.

• **License Plate Recognition**: Designed a 6-step educational project for a computer vision course as a TA, focusing on deep learning fundamentals for students, from labeling to NN design.

Course Projects:

• **AM Modulator Design**: Designed and assembled a Gilbert circuit AM modulator using Altium Designer, including PCB printing and lab assembly. *(May 2024 – Electronics 3 Lab)*

• **Chessboard Piece Detection**: Developed a 4-step method using CNN and YOLOv5 to map chessboard arrangements to digital images. *(May 2023 – Fundamentals of Computer Vision)*

• **Four-State Counter Design**: Designed a Gray and Excess-3 code-based counter with 7-segment display for multiple configurations. *(Dec 2022 – Digital Systems 1)*

• **Car Interior Light Controller**: Programmed an Atmega64 microcontroller for multi-scenario control, simulated in Proteus. *(May 2023 – Digital Systems 2)*

TECHNICAL & RESEARCH SKILLS

Programming skills	Artificial Intelligence	Embedded systems	Research Skills
• Python, C, C++, Matlab	• ML, DL, Computer Vision	• STM32, nRF, AVR	• Literature Review
• Pandas, SQL	• Optimization, Dataset Analysis	• Digital Signal Processing	• Documentation
• QT, Cube MX, Code Vision	• PyTorch, Scikit-learn	• Algorithm Development	• Planning
• HTML, CSS	• SMP, Hugging Face	• Device Optimization	• team work

IELTS & COURSE CERTIFICATES

English: **IELTS Score = 8.0** (Listening = 9, speaking = 7.5, Reading = 8.5, writing = 7). click for report form
Deep Learning Course and Project (128 hours - Neuromatch Academy – July 2024). View Credential

TEACHING EXPERIENCE

- Head TA for "**Fundamentals of Computer Programming**." Prof. Behrooz Nasihatkon
- TA for "**Fundamentals of Computer Vision**." Prof. Behrooz Nasihatkon
- Head TA for "**Electronics 1**." Prof. Amir Masoud Sodagar
- Co-Head TA for "**Electronics 2**." Prof. Ebrahim Nadimi
- TA for "**Electronics 1**." Prof. Amir Masoud Sodagar
- TA for "**Fundamentals of Computer Programming**." Prof. Hamed Khanmirza

VOLUNTARY WORK

Manager of Education Section in IEEE KNTU Student Branch

- Led the IEEE KNTU Education Section, organizing workshops, courses, and seminars.
- Received recognition for exceptional performance and team leadership by Prof. Granpayeh (View certification of appreciation)
- creating multiple part-time jobs for graduate instructors.
- Delivered both technical and soft skills training for undergraduates.