

Abbas Nosrat

AI RESEARCHER

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About

I am a passionate AI researcher/instructor with expertise in deep learning and machine learning with a strong mathematical foundation due to my control engineering background and extensive hands-on experience in projects related to Computer Vision, NLP, DSP, and Computer Audition. I strive to solve complex problems. My academic journey includes a Master's degree from the University of Tehran, where I focused on meta-system identification, and practical experience in industries ranging from pharmaceuticals to Entertainment tech innovations. I am dedicated to continuous learning and research, aiming to contribute to the cutting edge of artificial intelligence and its applications.

Education

University of Tehran

Tehran - Iran

MSC CONTROL ENGINEERING

2020 - 2023

- Supervisors: Dr. Ahmad Kalhor, Dr. Babak N Araabi
- Advisor: Dr. Mohammad Reza Nayeri
- Thesis: Meta System Identification
- GPA: 17.06/20

Imam Khomeini International University

Qazvin-iran

BS ELECTRICAL ENGINEERING

2015 - 2020

- Advisor: Dr. Hasan Zarabadipour
- GPA: 13.15/20

Research Interests

Computer Vision, Deep Learning, Signal Processing, Natural Language Processing

Professional Experience

2024-
Present **Instructor (Part-Time)**, Tehran Institute of Technology

2024-
Present **AI Researcher**, Independent Contractor

2023-2024 **Data Scientist**, Ronak Pharmaceutical Co

2023-
Present **Reviewer**, International Journal of Industrial Electronics Control and Optimization

2021-2023 **Research Assistant**, Machine Learning and Computational Modeling Lab

2021-2023 **Graduate Teaching Assistant**, Electrical and Computer Engineering Department, University of Tehran

Projects

University of Tehran

Completed

TFNET

This is my main master's project in which I developed a method for parametric and structural identification of industrial systems from a non-persistent excitation and a handful of I/O data.

Ongoing

TFNET 2

This project is an improvement on TFNet. In this project, I am utilizing multi-task learning methods to combine the classifier and the parameter estimator to improve TFNet's accuracy and scalability.

COURSEWORK PROJECTS

- [Implementation of UNet](#)
- [Implementation of CycleGan and VQVAE](#)
- [Implementation of rotation prediction method](#)
- [Adversarial attacks and explainability](#)
- [Few-shot classification and person reidentification using contrastive learning](#)

Ronak Pharmaceutical Co

Completed

NLP-BASED PERFORMANCE EVALUATION OF MEDICAL SALES REPRESENTATIVES

In this project, I used NLP techniques to find the most similar sales invoice to each visit record and if that invoice was created within 40 days after the visit, that visit is considered successful.

Completed

NLP-BASED UNIFICATION OF SALES DATABASE

Since different distribution centers use different naming conventions for naming their customers, entities appear with different names in the database resulting in incorrect analysis. In this project, I used NLP techniques to clean and cluster entities with similar names for database unification.

Completed

MARKET SIZE PREDICTION

In this Project, I used FBProphet, XGBoost, and Bayesian optimization to predict the market size for each product for the following year. [This](#) will lead you to the Streamlit app

Completed

PRODUCTION PLANNING USING DISCRETE OPTIMIZATION

In this Project, I used Google's ORTools and FastAPI to develop a discrete optimization for production planning using a user input list of products, the production cost and the profit of each product.

Idpendent Contracts

Ongoing

ZERO-SHOT VOICE CONVERSION USING NON-PARALLEL AUDIO

I am currently developing a framework for Persian VC for a Multi-Media company in Iran.

Hobby Projects

Completed

FLOW MATCHING FOR GENERATIVE MODELING

Since my Voice Conversion project required this paper and there was no intuitive tutorial for this paper, I decided to share my simple implementation on GitHub.

Completed

COMPARISON OF MTL LOSS-BALANCING STRATEGIES

While working on TFNet 2, I had to compare different loss-balancing strategies in MTL. Here is my implementation of Three methods in this field.

Publications

TFNet: Few-Shot Identification of LTI Systems Based on Convolutional Neural Networks

- Journal of Process Control
- Authors: **Abbas Nosrat**, Ahmad Kalhor, Mohammad Reza Nayeri, Babak N Araabi
- Impact Factor: 3.3

- Cite Score: 7

Languages

Persian, Native Tongue

English, IELTS 8 (Listening 9, Reading 8.5, Speaking 7.5, Writing 6.5)

Honors and Awards

2020 **24th rank**, Iran's National University Entrance for Control Engineering Masters Degree

2024 **Member**, Iranian National Elite Foundation

Technical Background

AREAS OF EXPERTISE

* The parentheses indicate where I have learned the skill

Deep Learning **Multi-Task Learning (TFNet 2), Self-Supervised Learning (Advanced Deep Learning), Contrastive Learning (Analysis and Design of Neural Networks), Meta-Learning (TFNet), Fairness and Explainability (Advanced Deep Learning), Adversarial Attacks (Advanced Deep Learning),**

Computer Vision **Transfer Learning, CNN Architectures, Object Detection (Neural Networks and Deep Learning), Object Segmentation (Neural Networks and Deep Learning), GAN (Neural Networks and Deep Learning, VC project), VAE (Neural Networks and Deep Learning), Diffusion (VC project),**

Audio/Signal/Time Series **Deep Signal Processing (TFNet and VC project), Auto-Regressive Models (System Identification), Recursive Neural Networks (Neural Networks and Deep Learning), TSTransformers (Ronak), Speech Conversion (VC project), Speech Synthesis (VC project),**
NLP **Text Preprocessing (Ronak), Bert (Neural Networks and Deep Learning), GPT (Ronak), Prompt Engineering (Ronak), RAG (Self-Study), Langchain/Virtual Agents (Self-Study),**

Control Theory **Linear Feedback Control, System Identification, Robust Control, Optimal Control, Non-Linear Control, Model Predictive Control, RL,**

*University of
Tehran and
IKIU*

PROGRAMMING LANGUAGES

Python, Matlab, Bash, Julia, R,

MACHINE LEARNING FRAMEWORKS

Scikit-learn, Pytorch, Tensorflow, Flux.jl,

DEVELOPMENT TOOLS

Linux (Debian-Based, RedHat-Based and Arch-Based Systems), Git, SQL, Figma, Jira,

MODEL DEPLOYMENT TOOLS

Streamlit, FastAPI, Docker,

WRITING TOOLS

\LaTeX , Lyx,

Teaching Experience

Tehran Institute of Technology

INSTRUCTOR

- Data Analysis
- Machine Learning
- Deep Learning

University of Tehran

GRADUATE TEACHING ASSISTANT

- Trustworthy AI
- Analysis and Design of Neural Networks
- Linear Control Systems Lab
- System Identification
- Machine Learning

Coursework

UNIVERSITY OF TEHRAN

- Machine Learning
- Neural Networks and Deep Learning
- Advanced Deep Learning
- Analysis and Design of Neural Networks
- Statistical Inference
- System Identification
- Optimal Control
- Non-Linear Control Systems

IMAM KHOMEINI INTERNATIONAL UNIVERSITY

- Linear Algebra
- Linear Control Systems
- Digital Signal Processing
- Signals and Systems

Personal Interests

- Guitar playing, singing and making music.
- Motorcycles
- Playing video games.
- Watching Movies and anime.
- Reading comics and manga.
- Reading about AI, computer hardware, and Linux topics.