Korosh Roohi

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Research Interests

- **Computer Vision**
- **Gait Analysis**
- **Pose Estimation**
- **Object Detection**
- **Generative Models**

Education

- **Amirkabir University of Technology, (Tehran Polytechnic)** — Tehran, Iran
  B.Sc. in Computer Engineering — *Sep 2018 - Present*
  - **GPA**: **3.82**/4 ≈ **18.19**/20
  - **Courses**: Data mining (18.9/20), Signals and Systems (19.5/20), Principles of Computational Intelligence (18/20), Computer Networks (19.2/20), Principles & Applications of Artificial Intelligence (16.3/20)
- **Alborz High School** — Tehran, Iran
  Mathematics & Physics — *Sep 2015 - Jul 2018*
  - **GPA**: **19.5**/20

Research & Work Experiences

- **Research Assistant at Amirkabir University of Technology** — Tehran, Iran
  Under the supervision of Prof. Safabakhsh — *Dec 2021 - Present*

  Working on a project about the re-identification of persons using each subject's **gait** (unique walking pattern) from their specific **estimated pose**. This project utilizes deep learning approaches like **convolutional**, **pooling**, and **HPM** layers. Also, **triplet loss** is used for training procedures, and **DeepSort** & **YoloV5** models used for tracking and extracting each person in real-world usage.
- **Software Engineer at Crouse Company's Research & Innovation department** — Tehran, Iran
  Computer vision specialist (Part-time) — *Apr 2022 - Jul 2022*

  Implemented a project for **detecting defects** of car's multimedia displays in the production line, which uses **Image processing** methods like **thresholding**, **dilation**, and **erosion** with the help of the **OpenCV** library. Also, it utilizes some **machine learning** approaches like the **Tesseract** engine for **OCR** tasks and the **isolation forest** algorithm to identify outlier pixels on displays.
- **Client Developer at Quiz of Kings Studio** — Tehran, Iran
  Unity game engine developer (Part-time) — *Nov 2019 - Nov 2021*

  Participated in the client-side team of the Quiz of Kings game - the most popular mobile game in iran - and working with both **Unity** & **Corona** game engines to develop the game on these platforms. The main project was migrating legacy code from the **Corona** game engine to the **Unity** platform.

Projects

- **Image colorizer (Computer Vision, GAN)**: Implemented a model with **CycleGAN** & **pix2pix** architectures for translating black & white images into colorized images. This model uses **Cycle** & **Identity** loss functions because it aims to translate a picture's attributes to another domain and keep the main characteristics from the source domain. This model has trained on the **CelebA** dataset to colorize face parts. This project is available on my **GitHub**.
- **InceptionV3 Transfer Learning (Computer vision, Image recognition)**: Developed a **cat vs. dog** classifier by **fine-tuning** the **InceptionV3** model. This model is trained by freezing the convolutional layers and adding some dense layers to train them on the specific dataset. Also, this model uses the **Dropout** layer to prevent overfitting problems.. This project is available on my **GitHub**.
- **Evolutionary Games (Genetic Algorithm, Neural Networks)**: Implemented a **genetic algorithm** project to find an appropriate agent to play specific games. This genetic algorithm consists of the **fitness function**, **selection**, **crossover**, and **mutation** steps. Also, this model uses inputs in a **neural network** structure. The game has three different modes and a unique input structure for each. This project is available on my **GitHub**.
- **MNIST Handwritten Digits Classifier (Neural Networks, Linear Algebra)**: Implemented a **neural network** from scratch without using frameworks like **TensorFlow** and **PyTorch**. This model has flexible layers and neurons on each layer and has the **Momentum** feature to improve the training procedure's speed and accuracy. This project is based on the **MNIST handwritten digits** dataset. This project is available on my **GitHub**.
- **Search Engine (Information Retreival, Indexing & Tokenizing)**: Developed a search engine for Persian news that uses the **TF-IDF** algorithm for processing user queries and finding the results in the **vector space** by the **Cosine** similarity function. One of the main features is **stemming** verbs as a part of normalization. Also, the indexing and tokenizing section remove frequent terms, punctuations, postfixes, and numbers. This project is available on my **GitHub**.

Skills Summary

- **Programming Languages**: Python, C#, Java, C/C++, Kotlin, Go
- **Deep Learning Frameworks**: TensorFlow, PyTorch, Keras, scikit-learn, OpenCV, Pandas
- **Database Systems**: MySQL, MongoDB, ObjectBox
- **Operating Systems**: Windows, Linux (Ubuntu)
- **Web Development**: HTML, CSS, Java Script, flask, XML

Teaching Experiences

- **Teaching Assistant, Principles & Applications of Artificial Intelligence** — **Prof. Javanmardi**
  Team coordinating + Holding classes + Designing and grading assignments & projects — *Spring 2022, Fall 2022*
- **Teaching Assistant, Algorithm Design** — **Prof. Bagheri**
  Designing and grading assignments — *Fall 2021*
- **Teaching Assistant, Advanced Programming** — **Prof. Zeinali**
  Holding classes + Head of content team — *Spring 2021*
- **Teaching Assistant, Fundamentals of Computer Programming Lab.** — **Prof. Bakhshi**
  Revising laboratory's syllabus & content — *Winter 2021*
- **Teaching Assistant, Fundamentals of Computer Programming** — **Prof. Bakhshi**
  Designing assignments — *Fall 2020*

Online Courses

- **TensorFlow: Advanced Techniques specialization from DeepLearning.AI** — **Certificate**
  *The lecturer of this course was **Laurence Moroney*** — *Nov 2021*
  This specialization had courses about **custom and exotic models & custom training loops**, **model interpretability**, **generative machine learning**, and **object detection**
- **TensorFlow Developer specialization from DeepLearning.AI** — **Certificate**
  *The lecturer of this course was **Laurence Moroney*** — *Aug 2021*
  This specialization had courses about **computer vision**, **convolutional neural network**, **machine learning**, and **natural language processing**
- **CS50 (Computer Science course of Harvard University)** — **Certificate**
  *The lecturer of this course was **David J. Malan*** — *Jan 2022*

Volunteer Experiences

- **Unity game engine instructor at Gamecraft Event**
  Participated as an instructor in the Unity game engine development workshop — *May 2022*
- **Gamecraft event organizer at Amirkabir University of Technology**
  *Organized the **first** game development event at the Amirkabir University of Technology* — *Dec 2020 - Apr 2021*
- **Member of Student's Guild Council at Computer Engineering Faculty**
  ***Cultural** responsible of the council* — *Jun 2019 - Jul 2021*
- **Director of Pouyesh Magazine**
  *Directed the **primary** publication of the computer engineering faculty for six numbers* — *Jun 2019 - Jul 2021*

Honors and Awards

- Ranked in top **0.2%** among **140,000** applicants of the **Nationwide University Entrance Exam** - Jul 2018
- Awarded the **Best Publication** award in the Amirkabir University for Directing the **Pouyesh** magazine - Sep, 2020

Languages

- **English**: Professional working proficiency
- **Persian**: Native