



Kooshan Maleki

Senior Student in Computer Engineering

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Kooshan-Maleki

Education

Bachelor of Science in Computer Engineering

Amirkabir University of Technology

2021 – Present B.Sc.

Tehran, Iran

- GPA: 19.00/20 (Ranked 4th among more than 100 students)

Diploma

Allameh Helli High School (NODET¹)

2017 – 2021

Tehran, Iran

- GPA: 19.40/20

Research Experience

Developing Quantum Algorithms for Robotic Planning

Under Supervision of Prof. Farrokh Janabi-Sharifi and Negar Ashari Astani

November 2024 – Present

- Investigating novel quantum algorithms to optimize robotic motion planning and pathfinding.
- Exploring the application of quantum computing to improve decision-making processes in autonomous robotic systems.
- Collaborating with multidisciplinary teams to integrate quantum-enhanced solutions into traditional robotic frameworks.
- Analyzing quantum algorithms' computational complexity and scalability in real-world robotic environments.
- Contributing to quantum robotics's theoretical and practical aspects, aiming to reduce planning time and increase efficiency.

Work Experience

AI Vision and Software Developer Intern

SIMUT

June 2024 – Present

<https://mfp.co.ir>

- Developed a machine vision system for analyzing heart ultrasound images to enhance the accuracy and efficiency of medical diagnostics.
- Implemented AI algorithms using OpenCV and machine learning techniques to automate image segmentation and contour detection in medical imaging.
- Collaborated with Shahid Rajaei Hospital to collect and process real-world medical data, ensuring high accuracy in AI-driven analysis.
- Worked with technologies like PySide6 and Matplotlib to build interactive user interfaces and visualize medical data.
- Contributed to the localization of cardiac ultrasound equipment, reducing dependency on foreign technologies through innovative AI solutions.
- Developed algorithms for precise measurement of heart muscle strain and ejection fraction (EF) using advanced image processing techniques.

Projects

Quantum Machine Learning

Amirkabir University of Technology

2024

¹National Organization for Development of Exceptional Talents of Iran

- Combined quantum computing principles with machine learning models to develop hybrid quantum-classical algorithms.
- Explored quantum support vector machines (QSVMs) and quantum variational classifiers for classification tasks.
- Implemented quantum-enhanced machine learning models using frameworks like Qiskit and TensorFlow Quantum.

Kolmogorov-Arnold Neural Network (KAN) Implementation from Scratch

Personal Project

📅 2024

- Developed a fully functional neural network from scratch, manually implementing key components such as backpropagation, activation functions, and gradient descent.
- Applied spline interpolation techniques to enhance smoothness in the learning curve and improve convergence.
- Used the neural network to solve classification problems and benchmarked its performance against pre-built libraries.

Animal Detection using Convolutional Neural Networks

Personal Project

📅 2023

- Developed and trained Convolutional Neural Networks (CNNs) to classify and detect different animals from image datasets.
- Utilized TensorFlow and Keras to build models, achieving high accuracy through data augmentation and transfer learning.
- Automated data preprocessing and model evaluation pipelines for improved workflow efficiency.

Teaching Experience

Teaching Assistant

Amirkabir University of Technology

📅 2021 - Present

📍 Tehran, Iran

- Computer Networks course under the supervision of Dr. Sabaei Fall 2024
- Applied Linear Algebra course under the supervision of Dr. Nazerfard Fall 2024
- Computer Architecture course under the supervision of Dr. Zarandi Spring 2024
- Algorithm Design course under the supervision of Dr. Dolati Malekabad Spring 2023
- Logic Circuits course under the supervision of Dr. Sedighi and Dr. Saheb Zamani Spring 2023

Physics Instructor

Allameh Helli High School

📅 2021 - 2023

📍 Tehran, Iran

- Taught physics to a classroom of 30-35 NODET students preparing for the Physics Olympiad of Iran.

Certified Courses

QubitXQubit Quantum Computing Course

The Coding School

📅 2023-2024

- Gained foundational knowledge of quantum computing concepts such as qubits, superposition, and entanglement.
- Implemented basic quantum algorithms like the Deutsch-Jozsa algorithm using quantum simulators.

Special Topics in Quantum Computing

Amirkabir University of Technology

📅 2023

- Focused on advanced topics in quantum algorithms and error correction.

- Worked with quantum circuits for optimization problems, exploring both theory and practical applications.

Machine Learning using Quantum Computers

[Amirkabir University of Technology](#)

📅 2023

- Explored the intersection of machine learning and quantum computing, focusing on hybrid algorithms.
- Implemented quantum-assisted machine learning models for classification and optimization tasks.

Supervised Machine Learning

[Stanford University \(Coursera\)](#)

📅 2022

- Learned key concepts in supervised learning, including regression, classification, and regularization techniques.
- Worked on hands-on projects, using libraries like Scikit-Learn to implement machine learning models.

Neural Networks and Deep Learning

[Coursera](#)

📅 2022

- Mastered the fundamentals of deep learning, focusing on neural network architectures and optimization techniques.
- Implemented deep learning models using TensorFlow and Keras for image and text classification tasks.

Honors and Awards

- Achieved Top 1% out of over 142,000 participants in the nationwide Iranian Universities Entrance Examination (2021).
- Awarded the QubitXQubit course scholarship held by MIT and Stanford Ph.D.
- Attended the 32nd Physics Olympiad of Iran.
- Winner of the 2017 SamCode Programming Competition in Data Analysis, excelling among 200 NODET students.

Skills and Competencies

- **Programming Languages:** Python, Java, C, C++, Verilog, VHDL
- **Libraries and Frameworks:** PyTorch, TensorFlow, NumPy, Pandas, PyGame, Cirq, Qiskit, Scikit-Learn
- **Platforms and Tools:** GitHub, PySide6, OpenCV, Matplotlib
- **AI and Machine Learning:** Convolutional Neural Networks (CNNs), Quantum Machine Learning, Deep Learning
- **Quantum Computing:** Quantum Circuits, Quantum Algorithms, Hybrid Quantum-Classical Models

Languages

English Fluent (TOEFL Score of 106)

Persian Native Speaker

Hobbies and Interests

Sports Interests

- **Hiking:** Enjoy exploring nature and going on hiking trips in different terrains.
- **Tennis:** Competed in amateur tennis tournaments and hold a certification in tennis.

Other Interests

- **Cooking:** Passionate about culinary arts and experimenting with new recipes. **Certified in Cooking.**
- **Video Games:** Enthusiast of various video game genres, especially strategy and adventure games.