# Narges Baba Ahmadi

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## Education

- **University of Tehran**                                                                                  Tehran, Iran
  *Bachelor of Computer Science; GPA: 3.61/4 (17.55/20)*                               *Sep 2019 - Present*
- **Yekan High School**                                                                                      Rasht, Iran
  *Diploma of Mathematics and Physics; GPA: 4/4 (19.5/20)*                           *Sep 2016 - June 2019*

## Research Experiences and Internships

**Research Assistant at LT Research Group**                         **University of Hamburg, Germany**
Under Prof. Chriss Beimann and Florian Schneider

- State-of-the-Art Multi-Modal LLMs for Text-Video Retrieval                              *May 2023 - Present*
  The plan is to implement a Retrieval-Augmented Generation (RAG) system with Video-LLAMA as the LLM for zero-shot retrieval and/or VQA. Further, we want to try XCLIP and encoders from Video-LLAMA.

- **Video Retrieval Application**                                                                       *Feb 2023 - Apr 2023*
  I designed a video retrieval application. The goal of this application was to provide the user with the first $k$ videos that are most relevant to a given input text with user's selected model.

**Visiting Scholar at ESAT**                                                                 **KU Leuven, Belgium**
Under Prof. Hugo Van Hamme                                                                      *July 2022 - Sep 2022*
Project title: **Relating Output Symbol Probabilities With Confidence in an End-to-End Speech Recognizer**
Given the results of a speech recognition network, we evaluated the accuracy of this network's predicted probabilities. The network was uncertain about its predictions, although it shouldn't have been, as these low probabilities had high accuracy. In this paper, we tried to solve this problem by giving the prediction patterns to a designed model and enhance the probability evaluation per character.

## Selected Courses

- Image Processing (Graduate Course) (4/4)
- Data Mining (4/4)
- Deep Learning (4/4)
- Advanced Information Retrieval (4/4)
- Artificial Intelligence (4/4)
- Design and Analysis of Algorithms (4/4)

## Projects

**Classifying Grapevine Leaves**                              *Python, Scikit-Learn, TensorFlow, Matplotlib, NumPy*
*Data Mining course Final Project*
Implemented various pre-trained and custom CNN models for grapevine leaves classification. In order to achieve better results, data augmentation with data generator is implemented.

**Histopathology Image Classification**                  *Python, Keras, OpenCV, Pandas, Scikit-Learn, PIL, Seaborn*
*Image Processing course Project*
Developed and compared Deep Learning models for Image Classification. Achieved competitive performance with a custom CNN model, an enhanced CNN architecture, and fine-tuned ResNet50.

**Vowel Finding on Persian Dataset**                         *Python, Scikit-Learn, Persian Stemmer, NumPy, Pandas*
*Information Retrieval course Mini-project*
Used the Bijankhan corpus dataset to find the vowel of each Persian word. I added features and trained my model.

**Parkinson's Disease Classification**                       *Python, Scikit-Learn, Seaborn, NumPy, Pandas, SciPy*
*Data Mining course Mini-project*
This project focuses on classifying Parkinson's disease using Machine Learning. I applied Decision Trees, KNN, SVM, and Random Forest. I also used Principal Component Analysis.

**Sentiment Analysis**                                                  *Python, Scikit-Learn, NLTK, NumPy, Pandas*
*Information Retrieval course Mini-project*
Using Naive Bayes method and with the help of stemming and lemmatization and TF-IDF vectorization, I labeled tweets of the SandersPosNeg dataset.

**Bio-Computing Projects**                                            *Python, NumPy, Matplotlib, Pandas*
N Agents using Ant Colony , TSP using Genetic Algorithm, TSP using Self-Organizing Map ,Cutting Stock Problem using Simulated Annealing ,N Queens Puzzle using Memetic Algorithm

### Multi-Flag Maze Q-Learning
*Python, NumPy, NetworkX, Matplotlib*

*Artificial Intelligence course Project*

Developed a Q-Learning system for flag collection in complex mazes. Custom mazes with flags and obstacles were designed, and Q-Learning parameters were optimized. The project also included graphical Q-table representations.

### Database Design
*SQL*

*Database course Final Project*

In this project, I designed a DBMS for an online shop.

### AI-Enhanced Connect Four Game
*Python, NumPy, Pygame, sTensorFlow*

*Artificial Intelligence course Project*

I developed a dynamic Connect Four game featuring an AI opponent utilizing the Minimax algorithm with alpha-beta pruning. It also includes a neural network-based AI opponent. This project leverages the Pygame library for visuals and user engagement.

## Teaching Assistant Experience

Department of Mathematics, Statistics and Computer Science, **University of Tehran**

- **Fundamentals of Computer Science and Programming**                    *Fall 2021, Spring 2021, Fall 2022*
  Responsibilities: Designing assignments, assessing students' works, and providing feedback. I also orchestrated the final project, evaluating all student presentations.

- **Data Structures and Algorithms**                    *Spring 2021, Fall 2022*
  Responsibilities: Contributing significantly by designing assignments, conducting tutorials, and serving as the Head Teaching Assistant. This role involved evaluating the work of other teaching assistants and collaborating closely with the course professor to improve the teaching process.

- **Fundamentals of Combinatorics**                    *Spring 2021*
  Responsibilities: Supporting student learning by creating tutorials and crafting homework assignments.

- **Design and Analysis of Algorithms**                    *Fall 2022*
  Responsibilities: Reviewing and providing feedback on students' answers to assignments, as well as offering assistance to students facing challenges related to the course material.

## Online Notable Courses

- **Machine Learning** (Coursera)                    *October 2021*
  Topics include: Supervised learning (SVM, Kernels, Neural Networks), Unsupervised learning (Clustering, Dimensionality Reduction, Recommender Systems, Deep Learning)

- **Deep Learning Specialization (Coursera)**                    *March 2022 - December 2022*
  Neural Networks and Deep Learning, Improving Deep Neural Networks, Structuring Machine Learning Projects.

## Honors and Awards

- **Achieved Six Out of Eight Semesters of Excellence in Term**                    University of Tehran
  An official title given by the University of Tehran to students with academic excellence.

- **Awarded Undergraduate Tuition Fee Waiver**                    *2019 - 2023*
  Ranked top 1% among 164,000 students in the national university entrance exam.

## Skills Summary

- **Programming Languages:**
  - Experienced in Python, C++
  - Familiar with R, Octave, SQL

- **Tools and Libraries:** Pytorch, MySQL, Keras, TensorFlow, Scikit-Learn, Docker, Git, LaTeX

## Languages

- **English:** Fluent
- **Persian:** Native