Sepand AliMadadSoltani

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Education

Master 2 in Medical Device Engineering — Lyon, France
Polytech Lyon, Claude Bernard University Lyon 1 — 2024-2025

- **GPA:** 15.31/20
- **Courses:** Magnetic Resonance Imaging, Segmentation & Registration, Artificial Intelligence in Medical Imaging, Image Reconstruction & Inverse Problems
- **€10,000** Excellence Scholarship awarded for excellent academic background

Bachelor of Science in Electrical Engineering — Tehran, Iran
K.N. Toosi University of Technology — 2018-2023

- **Concentration:** Biomedical Engineering
- **GPA:** 16.33/20
- **Courses:** Statistical Pattern Recognition, Signals & Systems, C Programming, Engineering Math, Engineering Probability

Research Interests

- Functional Imaging
- Positron Emission Tomography (PET) and Kinetic Modelling
- Magnetic Resonance Imaging (MRI)
- Machine Learning and Artificial Intelligence in Health

Research Experience

Master's Internship: Bayesian Inference of Image-Derived Input Function in Dynamic PET/MR Brain Imaging — Lyon, France
CERMEP — March 2025-August 2025

- Built an automatic carotid-artery segmentation pipeline on MR angiography in Python
- Implemented a **Markov chain Monte Carlo** Bayesian inference algorithm for partial volume correction
- Achieved lower quantification bias than alternative methods (MAPE 13% vs 24% and 37%)
- Collaborated with Paris-Saclay to independently validate the method and demonstrate reusability
- Performed realistic **Monte Carlo PET simulations** to support and strengthen evaluation outcomes
- Developed new tools and improved existing ones for efficient processing of PET and MRI data in C and Python

Bachelor's Thesis: Interactive and Intelligent Tissue Boundary Segmentation Desktop App — Tehran, Iran
Machine Vision & Medical Image Processing Laboratory (MVMIP), KNTU — January-June 2023

- Developed a **Python-based medical image analysis** software, from scratch utilizing VTK and PyQt libraries
- Implemented multiple interactive tools (ruler, shapes, and text insertion tools)
- Developed an image processing algorithm for detecting tissue boundaries
- Designed a smart interactive scissor tool for fast, semi-automatic **tissue segmentation**
- Enabled users to import custom plugins to extend the functionality of the software based on their needs
- Successfully shipped the software for Linux and Windows operating systems

Skills

- **Programming:** Python, C, C++, CMake, Bash, QML
- **Software and Tools:** GNU/Linux, Git, FMRIB FSL, 3D Slicer, TPCCLIB
- **Libraries:** Tensorflow, PyTorch, NumPy, pandas, scikit-learn, Matplotlib, ITK, VTK, Qt, PyQt
- **Languages:** English (fluent, TOEFL score:101/120), French (Intermediate), Persian (Native)

Work Experience

Sharif University Science & Technology Park — Tehran, Iran
Junior C++ & QML Software developer — October 2023-July 2024

- Designed and developed a modern interface using the Qt Framework's QML language
- Built and optimized backend logic in C++ to handle large volumes of data efficiently

TECVICO Vancouver, Canada (Remote)
Medical Image Visualization Software (Freelance Project) July-September 2023

- Created a **Python-based medical analysis software** focusing on user-friendliness and user experience
- Designed and implemented a workflow user interface and logic for designing custom pipelines using the Qt framework
- **Worked with a team** of engineers to integrate various machine learning algorithms into the workflow
- Designed and integrated a medical image visualizer using VTK
- Integrated multiple visualization tools and utilities such as colormaps, image thresholding and interactive segmentation

Razeq Co. Tehran, Iran
Electronics Engineer Internship June- August 2021

- Implemented smart presence detection and remote-control support for the monitor stand in Valiasr Street Museum

Projects

Image-based Persian and English Character Sequence Recognition using Recurrent Convolutional Neural Networks(RCNN) Winter 2023

- Implemented the network based on a paper using the Tensorflow library in Python
- Synthesized images of Persian text of different variety
- Applied data augmentation techniques such as rotating, translating, adding distortion, and adding noise to images
- Successfully trained the model for both languages using the self-made synthesized Persian dataset and public English datasets
- Achieved +85% accuracy for both languages

Exploring Possibility of Alzheimer's Disease Detection using Deep Neural Network based on fMRI Functional Connectivity Maps and Time-series Data Fall 2022-Winter 2023

- Pre-processed and processed raw fMRI and MRI data from the ADNI database using the FSL library to extract time-series data to calculate functional connectivity maps of the subjects' brains
- Studied the previous works on this subject to find the gap
- Experimented with RCNN & CNN networks using Tensorflow to extract temporal and spatial features from images
- Gained hands-on experience with image pre-processing, neural network architecture, and deep learning principles
- Although a full model was not achieved, a lot of experience and insight were gained into medical imaging and deep learning concepts

Automated fMRI Pre-processing and Time-series Extraction Pipeline for Large Datasets using FSL in Python

- Implemented brain extraction from structural reference MR image Summer 2022
- Implemented **fMRI pre-processing** including motion correction, slice timing correction, spatial smoothing, and co-registration
- Implemented atlas-based ROI time-series extraction
- Enabled parallel processing to accelerate computation for large datasets
- Utilized the program for processing fMRI data from the ADNI dataset

The Game of Tetris with a Custom Game Engine Using OpenGL in C++ Spring 2022

- Developed a custom 2D graphics renderer completely from scratch using the OpenGL graphics API in C++
- Implemented user input handling, navigatable menus, and text rendering capabilities to the engine
- Designed and implemented the game of Tetris using the said engine in Object Oriented C++