Sepand Ali Madad Soltani

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Education

K.N. Toosi University of Technology Tehran, Iran
Bachelor of Science in Electrical Engineering **Anticipated** in August 2023
Concentration: **Electronics Engineering**
GPA: 16.26/20 (Last two years: 17.29/20)
GPA 4.0 scale: 3.37 (Last two years: 3.72)

Research Interests

- Machine learning and artificial intelligence
- Neuroscience
- Biomedical Engineering

Bachelor Thesis

MedVisPy: Python-Based Medical Image Analysis Software

- Developed "MedVisPy" a Python-based medical image analysis software, from scratch utilizing Python, VTK, and PyQt5 packages.
- Implemented a user-friendly Python console and multiple interactive tools, including a shape tool, text tool, ruler tool, and two selection tools (polygon selection and intelligent scissor tool) for extracting Regions of Interest (ROIs) from 3D medical images.
- Enabled users to import custom modules and plugins, extending the functionality of MedVisPy for additional processing and actions.
- Conducted thorough testing and debugging to ensure the stability, reliability, and performance of the software.
- Documented the software design, implementation details, and user guide to facilitate user experience.
- Developed and successfully shipped the MedVisPy software for Linux and Windows

Research Experience

Detection of Alzheimer's Disease Patients using Deep Neural Network based on fMRI Functional Connectivity
Summer 2022 (Ongoing)

- Studied the previous works on this subjects for finding the gap (Still early stages of the project)
- Preproccesed the raw fMRI data using the FSL library

Skills

- **Programming Language:** Python, C++, MATLAB, VHDL, AVR C
- **Software:** PSpice, Proteus design suite, Altium Designer, FMRIB FSL library, PyQt, Visualization Toolkit (VTK)
- **Hardware:** Arduino, Various wireless communication modules (BLE, RF, GSM, IR and ESP8266)
- **Language:** Persian(Native), English(Fluent), French(Intermediate-A2)
- **Online Courses and Certificates:** Certificate of MATLAB from Sharif University, Certificate of Altium Designer from K.N. Toosi University of Technology

Academic Projects

Automated fMRI Preprocessing and Timeseries Extraction Pipeline for Large Datasets using FSL in Python Summer 2022

- Implemented brain extraction from structural reference MR image
- Implemented fMRI preprocessing including motion correction,slice timing correction,spatial smoothing and co-registration
- Implemented ROI timeseries extraction based on any atlases

- Implemented multiprocessing for all steps

Tetris AI bot using Deep Reinforcement Learning Summer 2022 (Ongoing)

- Developed the game from scratch using C++
- Created a custom C++ to Python API for the game using Pybind11 library
- Developed a Deep Q learning agent for training the AI to play the game

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++
- Added game functionalities, menus and text rendering capabilities to the engine
- Designed and implemented the game of Tetris using the said engine in Object Oriented C++

Implementation of Synthesizable A* Search Algorithm in FPGA-VHDL Spring 2021

- Developed a synthesizable VHDL code for A* algorithm capable of solving any 10x10 mazes
- Developed a python script for generating random mazes
- Simulated and tested the algorithm for solving random mazes using VHDL test bench

Smart Temperature Detection PCB Circuit Design Summer 2020

- Designed circuit schematic and PCB layout using Altium designer
  (Key components: ATMEGA64 and SIM800C)

Calculating the Magnetic Field Caused by a Spherical Solenoid Winter 2019

- Derived the formula for the magnetic field caused by a spherical solenoid
- Calculated and graphed the magnetic field on multiple plates
- Integrated the graphs and the calculator in a custom GUI developed using MATLAB App Designer

Work Experience

ETS, University of Quebec Montreal, Canada
Remote Research Assistant Internship Winter 2022

- Assisted in a project aiming to predict multiple cognitive traits and performances based on EEG using Deep Convolutional Neural Networks

Razeq Co. Tehran, Iran
Electronics Engineer Internship Summer 2021

- Researched the design and development process of a parametric speaker (directional speaker) and examined the feasibility of manufacturing it
- Implemented smart presence detection and remote-control support for the monitor stand in Valiasr Street Museum
- Developed and assembled various hardware for installation in Iranâ€™s pavilion in Dubai Expo 2020 (Electric control panel, wiring, lighting and presence detection system)