Sepand Ali Madad Soltani

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Education

K.N. Toosi University of Technology Tehran, Iran
Bachelor of Science in Electrical Engineering September 2023
Concentration: **Electronics Engineering**
GPA: 16.33/20 (Last two years: 17.29/20)
GPA 4.0 scale: 3.41 (Last two years: 3.73)

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 multiple interactive tools (ruler, shapes and text insertion tools)
- Developed a smart interactive scissor tool for assisted semi-automated 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

Research Experience

Detection of Alzheimer's Disease Patients using Deep Neural Network based on fMRI Functional Connectivity June 2022 - Ongoing

- Studied the previous works on this subjects for finding the gap
- Preproccesed the raw fMRI and MRI data using the FSL library to extract timeseries data

Skills

- **Programming Language:** Python, C++, MATLAB, VHDL
- **Software:** PSpice, Proteus design suite, Altium Designer, FMRIB FSL library, PyQt/PySide, Visualization Toolkit (VTK)
- **Hardware:** Arduino, Various wireless communication modules (BLE, RF, GSM, IR and ESP8266)
- **Language:** Persian(Native), English(Fluent), French(Intermediate-A2)

Academic Projects

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

- Implemented the network and using the Tensorflow library in Python
- Synthesized images of Persian text of different variety
- Applied data augmentation tecnhniques such as adding distortion and noise to images
- Successfully trained the model for both languages
- Achieved +95% accuracy for both languages

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 atlas-based ROI timeseries extraction
- Enabled multiprocessing to accelerate computation for large datasets

Tetris player bot using Deep Reinforcement Learning Summer 2022

- 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 player 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 Iran's pavilion in Dubai Expo 2020 (Electric control panel, wiring, lighting and presence detection system)