MUHAMMAD AHSAN KALEEM

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EXPERIENCE

Work Study Position at the Interactive Media Lab

June - August 2021

- I had a work study position at the Interactive Media Lab at UofT (with Dr. Mark Chignell) where I worked on further developing software for an interactive machine learning tool for risk factor analysis (used Python, HTML, flask, plotly, pandas profiling, seaborn, sklearn, numpy, etc.).

Member of the University of Toronto Robotics Association

September 2020 - December 2020

- I was a member of the University of Toronto Robotics Association's Autonomous Rover Team (the Computer Vision subteam). I worked on various tasks related to lane detection.

Member of the University of Toronto Hyperloop Team

September 2020 - December 2020

- I was a member of the University of Toronto Hyperloop Team's electronics subteam where I worked on several tasks such as vibration analysis using Arduino.

ACHIEVEMENTS

- Second and third place at 2 national level Rubik's Cube competitions (Pakistan Open 2018, Pakistan Winter 2019) - Official best time for 3x3 of 9.70 seconds, unofficial best time of 5.77 seconds
- Through a series of tests and training camps for the International Mathematics Olympiad, got selected in the top 11 in Pakistan
- Regularly participated in the Tournament of Towns math contest (Olympiad level math problems), scoring highly multiple times.

TECHNICAL SKILLS

- Machine Learning, Arduino, MATLAB, Premiere Pro, circuits, soldering, etc.
- Python (including many libraries), C, C++, LaTeX (beginner), Verilog, Assembly

RESEARCH

I have done research on the mathematics of the Rubik's Cube and have written an article on this:

- On Algorithms for Solving the Rubik's Cube https://arxiv.org/pdf/2007.10829.pdf

EDUCATION

Engineering Science (Machine Intelligence Major, Robotics and Mechatronics Minor, Physics Minor (Planned)) - 3.47 cGPA

University of Toronto

Septermber 2020 - Currently

High School

Homeschooled

2016-2020

PROJECTS

AI for the board game Gomoku

- A RL agent using ResNet and MCTS to master the game of Gomoku through self-play inspired by the algorithm of Alpha-zero and AlphaGo. Made this with a partner and used Python and C. Read and implemented algorithms from papers.

LSTM for Currency Prediction

- A LSTM to predict the future value of a currency. Wrote this in Python, and used libraries such as pandas, numpy, matplotlib, keras, and sklearn

Virtual Interpreter for Deaf People

- A pair of glasses with an OLED display attached to it which, using Arduino and Python, displays sign language images for words that are detected using speech recognition.

YouTube Comments Analysis

- The goal of this project is to analyze YouTube comments using various techniques such as sentiment analysis or other data analysis techniques. I have created a dataset containing almost 200,000 YouTube comments using Python and the YouTube API, and am currently in the process of analyzing it.

Spotify Bot

- This is a bot that I made to start to learn how to use APIs; it uses the Spotify API and Python to mute the device when an ad is played on Spotify.

AI for Miniclip Game

- Used Python to collect data for a relatively basic Miniclip game (Cricket Defend the Wicket) and then trained a CNN to play the game.

Manual Image Augmentation

- To get more experience in OpenCV, wrote a code to manually perform image augmentation.

Sign Language Interpreter Glove

- Used an Arduino with flex sensors and a gyro sensor to make a smart glove capable of interpreting sign language.