Manmeet Kaur

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Education

University of British Columbia Vancouver, BC

Engineering Physics; GPA: 3.95/4.33 *Sept. 2019 - May 2024*

Coursework: Data Structures and Algorithms, Machine Learning Project Course, Engineering Design using sensors and actuators, Microcomputers, Object-Oriented program design, Signals and Systems

Technical Skills

Languages: Java, Python, C++, C, HTML/CSS, Matlab, Assembly, VHDL
Tools/Environment: Git, JUnit, PyCharm, VS Code, IntelliJ, PlatformIO
Electrical: Microcontrollers, Circuit Design, Soldering, Oscilloscope

Work Experience

NSERC Machine Learning Research Intern May 2022 – Current

UBC Electrical and Computer Engineering Department *Vancouver, BC*

- Develop an AI deep learning model to automate analysis of CT images of cancer affected lymph nodes.
- Extend the current architecture from 2D to 3D image analysis using computer vision and implement the calculation of total lymph node volume from labelled data of CT images.

Coding Workshops Instructor Jan. 2021 – Apr. 2021

UBC Geering Up *Vancouver, BC*

- Delivered 100+ workshops to 1,700+ K-12 students on coding, robotics, and machine-learning using Python.
- Developed an interactive coding curriculum for students in grade 4-7 introducing topics such as machine-learning and AI using Scratch and Python.

Projects

Au-Dela: Semantics based Code-grader | *Python, OpenAI API, Flask, HTML/CSS* Jan. 2022

- Developed a fully-functional semantics code-grader website using OpenAI's Codex AI to help professors award part marks to a student's code.
- Programmed the back-end in python using OpenAI's API and AI Codex and used Flask to integrate the front and back-end smoothly.
- Achieved second position out of 122 participating teams in OpenAI's challenge and won the sponsor prize of $60 worth of API calls.

Connect-4 Reinforcement Learning Agent | *Python, Tensorflow, Keras, NumPy* Dec. 2021 – Present

- Currently training the model using reinforcement learning and multi-processing using self-played games as data-points.
- Implemented residual neural network architecture based on the AlphaGo Zero paper by DeepMind.
- Implemented MCTS and Alpha-Beta pruning search algorithms to efficiently find and execute the best action in a game of connect-4 in under 10s.
- Both MCTS and Alpha-Beta pruning search won 100% of the games played against a human.

Computer Vision Autonomous Vehicle | *Python, Linux, ROS, OpenCV, Tensorflow* Nov. 2021 – Dec. 2021

- Implemented a CNN for a car simulated in Gazebo to extract license plates of the parked vehicles while autonomously navigating around a parking lot.
- Verified the performance of the trained agent using a validation data set of 2000 images.
- Achieved a training accuracy of 99.1% and validation accuracy of 94.9%.

Automated Recovery System Robot | *C++, STM32, OnShape, VS Code* Jul. 2021 - Aug. 2021

- Designed and manufactured an autonomous can-collecting robot capable of traversing an 8m x 8m path, detecting, picking up, and storing up to 5 cans all within 45 seconds.
- Programmed a PID algorithm as the principle navigation system to traverse an 8m x 8m tape path in 21s.
- Constructed a damping motion sky crane to autonomously land the robot and start the robot's motion within 10s.

Interests

• Machine-Learning • Artificial Intelligence • Robotics • Hiking • Painting