Manmeet Kaur

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Education

University of British Columbia Vancouver, BC
Engineering Physics Dean's Honour List *Sept. 2019 - May 2024*
Coursework: Data Structures and Algorithms, Engineering Physics Project I, Engineering Instrument Design, Software Construction, Signals and Systems, Applied Linear Algebra

Technical Skills

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

Work Experience

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.
- Delivered Professional Development workshops on the Engineering Design process for teachers teaching K-12.

Projects

Connect-4 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.

Autonomous Parking Regulation | *Python, Linux, ROS, OpenCV, Tensorflow* Nov. 2021 – Dec. 2021

- Implemented a CNN for a car simulated in Gazebo to extract parking IDs of the parked vehicles while autonomously navigating around a parking lot.
- Verified the performance of the trained agent using a validation data set and plotting a confusion matrix.
- Implemented PID using OpenCV and live camera feed from the car as the principle navigation system.
- Designed a pedestrian detection algorithm using OpenCV HSV thresholding and background subtraction.

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

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

Virtual Worlds Simulation | *Java, JUnit, Git, IntelliJ* Nov. 2020

- Designed an artificial intelligence program for a virtual world in which fox and rabbit entities interact with each other and optimize their own survival rate.
- Performed thorough unit testing with JUnit and achieved 95% test coverage and 97% line coverage.

Interests

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