Taeyoon Kim

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Education

University of California, Davis — Davis, CA
Bachelor of Science in Computer Science — *Jun 2024*

De Anza College — Cupertino, CA
Associate's in Computer Science

Experience

UC Davis EcoCAR, Connected and Autonomous Vehicle Team — Jun 2024 – Present
Cohda Radio/Simulation Engineer — *Davis, CA*

- Utilized MATLAB, dSPACE, and AURELION to collect and modify data needed by the hardware, software, and scenario teams related to autonomous driving using RTMaps, enabling the simulation of each system.
- Configured data transfer using UDP Ethernet connections to ensure smooth interaction between various software and simulations required by each team.
- Enabled communication between vehicles and road environments(e.g traffic lights) using Cohda radios installed in each vehicle. Each vehicle was equipped with receiving and sending radios, and data transitions between the receiving and sending radios were configured to communicate via Ethernet cables and UDP.

Projects

"F1-Tenth" Autonomous Race Car Team | *C++, Python, ROS2, SLAM, Jetson Nano* — Jan 2024 – Jun 2024

- Developed self-driving algorithms for a one-tenth-scale autonomous race car, enabling adaptation to dynamically changing environments.
- Implemented critical functionalities and autonomous algorithms in C++ and Python, including emergency braking, SLAM-based mapping, optimal pathfinding (pure-pursuit), obstacle detection, and obstacle avoidance using the gap-following algorithm.
- Implemented an occurrence detection box for obstacle detection to activate gap following only when obstacles were detected, increasing the accuracy of obstacle avoidance from 60% to 90%. Additionally, ensured that the fastest path derived from an optimal path planning algorithm was followed when no obstacles were present.

Connect 4 AI | *Python, Pygame, numpy, threads* — May 2024

- Developed an AI agent for Connect 4 using the minimax algorithm (based on Q-Learning) to optimize game strategy and performance.
- Designed a graphical user interface (GUI) using Pygame, providing an interactive and user-friendly platform for playing Connect 4.
- Reduced computation time by 60% using hash-based caching of previously computed states and the alpha-beta pruning method.

YouTube Controller using Hand Gesture Recognition | *Python, Java, OpenCV, MediaPipe* — Jan 2024

- Implemented hand gesture detection using Python, OpenCV, and MediaPipe, enabling real-time data collection through a camera. The ML model is built using TensorFlow, where an NN was constructed and trained using feedforward and backpropagation techniques.
- Developed a user interaction software using Java and connected it to a Python hand gesture detection software using ProcessBuilder. Utilized threads to enable real-time operation of both software simultaneously as separate processes.

Enigma Machine | *C, Memory Management* — Jan 2024

- Created an Enigma machine using C programming language that can encrypt and decrypt given strings.
- Implemented stable data structures for each component and effectively managed memory to prevent leaks.

Big-num Calculator | *C, Memory Management*neow — Jan 2024

- Implemented hand gesture detection using Python, OpenCV, and MediaPipe, enabling real-time data collection through a camera. The ML model is built using TensorFlow, where an NN was constructed and trained using feed-forward and backpropagation techniques.
- Developed a user interaction software using Java and connected it to a Python hand gesture detection software using ProcessBuilder. Utilized threads to enable real-time operation of both software simultaneously as separate processes.

Technical Skills

Languages: C/C++, Python, Java, HTML/CSS, JavaScript, R
Developer Tools: Git, Docker, ROS2, MATLAB, SLAM, Visual Studio
Libraries: Pandas, NumPy, Matplotlib, OpenCV, MediaPipe
Courses: Operating Systems, Modern Programming, Software Engineering, Machine Learning, AI Introduction, Computer Networks, Computer Security, Classical Physics, Statistic Probability