Denny Cao

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Education

Harvard University — Cambridge, MA
Bachelor of Arts in Computer Science, Neuroscience, and Economics — Aug. 2023 — May 2027 (Projected)

Julia R. Masterman High School — Philadelphia, PA
High School Diploma — Aug. 2019 — June 2023

- Relevant Coursework: MATH 163 and 263: Discrete Mathematics 1 and 2, MATH 1410: Multivariable Calculus, MATH 1700: Ideas in Mathematics, MGMT 0004: Work, Power and Inequality, FNCE 0002: Essentials of Personal Finance, AP Computer Science A, AP Physics C: Mechanics and Electricity & Magnetism, AP Calculus BC
- GPA: 3.9/4.0

Experience

Marketing & Fundraising Manager/Programming Lead — Sept. 2019 — June 2023
SLAM Robotics Team — Philadelphia, PA

- Led team of 5 in rebranding the team, including designing a new website and creating a fresh logo
- Wrote comprehensive documentation for team's codebase to facilitate onboarding of new members
- Utilized Java and OpenCV to program robot's autonomous and teleop code, incorporating AprilTag detection
- Reached Pennsylvania Championship in 2023

Robotics Research Assistant — June 2022 — Aug. 2022
University of Pennsylvania — Philadelphia, PA

- Developed a Python script to generate heightmaps for environments in the Gazebo simulator, enabling the creation of diverse training data
- Created realistic simulations of objects on a desk using procedural generation techniques, allowing for practical scenarios and real-world testing
- Provided visualization tools in RViz that facilitated the understanding of the robot's current and target positions, aiding in error analysis and fine-tuning of robotic movements

Projects

Trash Collector | Java, Python, TensorFlow, pandas, CAD, Git — May 2023

- Collaborated with a team of 7 to develop a robot that can autonomously collect trash and sort it into recyclables and non-recyclables
- Utilized TensorFlow to train an object detection model to detect trash and recyclables
- Implemented a PID controller to control the robot's movements
- Worked with team using Git for version control, enabling efficient and organized collaboration

RoboDog | C, Java, Arduino, CAD, KiCad — June 2022 — Dec. 2022

- Built a robot guide dog to assist visually impaired for MIT Online Science, Technology, and Engineering Community (MOSTEC) 2022 Capstone Project
- Implemented a communication system using Bluetooth to establish a connection between the robot and an Android phone, allowing for real-time exchange of GPS coordinates and goal information
- CADed using OnShape to design the robot's chassis
- Employed KiCad to map out schematics and for Arduino-based control systems

Awards and Accomplishments

- **2023 Wharton Global High School Investment Competition Semifinalist**: Selected for as one of 55 teams out of rougly 1,400 teams competing in 53 countries
- **2023 MathWorks Math Modeling Challenge Second Round Qualifier**: Top 25% of submissions, creating a Vector Autoreggresion (VAR) model to predict future sales of e-bikes

Technical Skills

Languages: Python, Java, C/C++, SQL, JavaScript, HTML/CSS, LaTeX
Software: OnShape, Fusion360, KiCad, Arduino, Salesforce, Git, Linux, ROS, Gazebo, RViz
Libraries: TensorFlow, OpenCV, pandas, NumPy, Matplotlib, PIL