Zachary Hoffman

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Education

Liberty University: B.S. Computer Science, Mathematics Minor — Lynchburg, VA
GPA : **4.0** — *Aug. 2022 – May 2026*

Relevant classes: Data Structures and Algorithms, Advanced C++, Discrete Math, Calculus III, Matrix and Linear Algebra, Database Design and Management

Experience

JAARS, Inc. — Lynchburg, VA
Software Engineer Intern — *Jan. 2025 – Present*

- Collaborating with a team of 5 engineers in an agile environment to design and develop a client/provider web portal using Salesforce Experience Builder, which will be integrated into JAARS' existing system
- Developing a comprehensive project management plan and proposals that will establish a HIPAA-compliant solution designed to streamline communication, scheduling, and data organization
- Implementing secure authentication, a patient appointment scheduler, and secure file transfer for medical documents that will enhance overall system security and functionality replacing the existing system

Liberty University — Lynchburg, VA
Competitive Programming Club — *Aug. 2022 – Present*

- Placed **2nd** in the **2023 ACM ICPC Div. II Mid-Atlantic Region**, utilizing algorithms such as dynamic programming, greedy algorithms, and graph traversal (DFS/BFS)
- Collaborated in a team environment to solve advanced algorithmic challenges under timed conditions

French Creek Golf Club — Elverson, PA
Bagroom Attendant — *Aug. 2020 – Aug. 2024*

- Led a team of **5** employees, utilizing **communication** and **leadership** skills to maintain smooth daily operations, delivering high-quality customer service to 100+ golfers daily, ensuring prompt assistance and issue resolution

Projects

Chess Robot | *Python, OpenCV, PyTorch, Fusion 360* — *Nov. 2024 – Present*

- Designed and 3D-printed a 20-inch articulated robotic arm using Autodesk Fusion 360, optimized for precise chess piece manipulation
- Developed a real-time **computer vision** system on a Raspberry Pi 4B with a Pi AI Camera, implementing OpenCV for board detection and a PyTorch-based **neural network** for piece classification
- Implementing motion control through PCA9685 PWM driver interfacing with high-torque 270° metal gear servos (40KG-60KG), utilizing inverse kinematics for accurate piece movement and placement

Machine Learning Racing Simulation | *Python, NEAT-Python* — *Oct. 2024*

- Developed a machine learning model using NEAT (NeuroEvolution of Augmenting Topologies) to optimize vehicle behavior, achieving **96%** of the fastest lap time in under 25 generations
- Built a robust **custom physics engine** that models 10 key vehicle dynamics (e.g., wheelbase, traction, downforce) to accurately simulate real-world driving conditions and improve race performance
- Created an interactive simulation using Pygame and Tkinter, enabling real-time track creation, vehicle adjustments, and live **AI performance visualization** to showcase dynamic optimization results

Technical Skills

Languages: Python, C++, Java, SQL, JavaScript, CSS, HTML, Assembly
Frameworks/Tools: OpenCV, PyTorch, Git, Docker, MongoDB, Azure, Arduino
Software: Linux, SQL Server Management Studio, Mathematica, Autodesk Fusion, ER Assistant