Bhuvan Madala

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Education

Northwestern University Evanston, IL

Bachelor of Science in Computer Science, Mathematics 3.9 GPA *Expected June 2026*

Coursework: Scalable Software Architectures, Operating Systems, Machine Learning, Data Structures and Algorithms

Professional Experience

Knobull Remote

Software Engineering Intern *December 2023 – April 2024*

- Developed RESTful API endpoints to enable seamless communication between frontend and backend services
- Utilized Docker to containerize indexing microservices and orchestrated them using AWS ECS, improving scalability and deployment efficiency
- Implemented Elasticsearch for efficient indexing and Redis to cache frequent queries, reducing data retrieval times and enhancing query response speeds

Beiersdorf Innovation Center Florham Park, NJ

R&D Intern *October 2022 – June 2023*

- Utilized data visualization and statistical models to analyze sunscreen ingredient efficacy, enhancing product development and supporting data-driven decision-making
- Managed datasets and streamlined data collection workflows using automated scripts, improving research productivity for machine learning applications
- Presented research findings on ingredient performance to the U.S. R&D team, influencing strategic development direction

Projects

Trading Engine Project | *C#, .Net 8.0, XUnit*

- Engineered a high-performance, scalable trading engine simulation in C# modeling complex real-world financial transactions, supporting multiple matching algorithms (FIFO and Pro-rata)
- Implemented efficient order book management using advanced data structures (SortedSet, ConcurrentDictionary), optimizing critical trading operations
- Designed a flexible architecture using SOLID principles, dependency injection, and advanced design patterns (Factory, Strategy, Observer), creating a modular and extensible system
- Incorporated unit and integration testing, ensuring reliable performance and accurate trade execution

AlgoAdversaries | *Next.js, React, Tailwind CSS, Node.js, Express.js, PostgreSQL*

- Created a competitive programming platform with React and Tailwind CSS frontend for responsive UI
- Engineered Node.js and Express.js backend with a RESTful API for real-time code execution and judging
- Integrated cloud-hosted PostgreSQL database for efficient data management and user authentication
- Implemented a live code editor with real-time HTTP polling for frequent updates and cross-browser support

Extracurriculars

Northwestern University Robotics Club Evanston, IL

Computer Vision Team Member *December 2023 – June 2024*

- Spearheaded the development of a binocular vision system for an autonomous lacrosse goalie robot, leveraging OpenCV and matrix transformations for 3D ball tracking and detection
- Developed a real-time ball detection algorithm and implemented a trajectory prediction model using recursive least squares, greatly improving spatial accuracy
- Optimized the computer vision pipeline, reducing ball interception time by 30% and enhancing overall detection performance

Technical Skills

Languages: C++, C, Python, C#, Java, JavaScript, TypeScript, SQL, Racket, Lua, Rust, Go
Web & Backend: Vue.js, React, Next.js, Spring, Node.js, Express.js, PostgreSQL
DevOps & ML: Git, Docker, AWS, PyTorch, NumPy
Core Competencies: Clean Code, Testing, OOP, Data Analysis, Agile Development