JOHN ROSE

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EDUCATION

University of Michigan **Ann Arbor, MI**

B.S. in Engineering in Computer Science, B.M. in Cello Performance, *Minor in Mathematics* *May 2025*

- GPA: 3.91 / 4.00
- Relevant coursework: Operating Systems, Distributed Systems, Machine Learning, Data Structures and Algorithms, Foundations of Computer Science, Computer Organization, Linear Algebra, Video Game Development

WORK EXPERIENCE

Dassault Systèmes **Royal Oak, MI**

DELMIA Simulation and Equipment Software Engineering Intern *May 2024 - August 2024*

- Added import and export support to 3DEXPERIENCE for the Unified Robot Description Format (URDF), an XML file format used to describe the kinematics and geometry of robots commonly used by ROS applications
- Physical products such as robots and other mechanical equipment can be converted between 3DEXPERIENCE and URDF while maintaining all kinematic (joint locations, limits, types, axes of rotation, etc.) and geometric features
- Gained experience with creating and using complex C++ APIs for manipulating physical products and their associated kinematics, working with XML data, and utilizing robust test frameworks

DELMIA Simulation and Equipment Software Engineering Intern *May 2023 - August 2023*

- Developed a ROS 2 package in C++ allowing a client to remotely control a Doosan-M1013 collaborative robot
- Implemented an external motion planner, also in C++, in the 3DEXPERIENCE application that connects with the ROS 2 package described previously, allowing tasks created in 3DEXPERIENCE to be executed on a real robot
- Transmitted the robot's movements and motion data back to 3DEXPERIENCE, updating the simulation in real time
- Gained experience with creating a communication protocol between two independent systems and writing optimized, multi-threaded C++ code

PROJECTS

Online Multiplayer Strategy Game (Work in Progress)

- Built a distributed state management system on top of the networking library Photon Fusion to ensure game state is properly replicated across the server and all clients and all client requests are properly validated; built in Unity with C#
- Developed an algorithm for procedurally generating a hex map consisting of equally distributed distinct continents

Distributed Key-Value Database with Primary/Backup Replication

- Built a distributed key-value database using primary/backup replication for fault tolerance; written in Go
- Implemented a view service to monitor the availability of all servers, replacing the primary and backup as needed

Predicting Survival in the ICU

- Trained a machine learning model to identify patients at risk of in-hospital mortality using publicly available data collected from patients admitted to ICU units; written in Python using scikit-learn
- Gained experience with data pre-processing, feature engineering, hyperparameter selection for regularized logistic regression models using cross-validation, and kernelized ridge regression models

Rent-a-Bot

- Developed a cooperative factory simulation game with a team of 3 other students in which players process resources, fabricate and deliver products, and fix various disasters as they occur
- Worked primarily as a gameplay programmer and level designer; built several core gameplay systems such as processors, resources, conveyor belts, item spawners, levers, and timers and designed all but one of the levels
- Won 2nd place out of over 15 games at the end-of-semester showcase; built in Unity with C#

Linear Algebra Library

- Built a fully templated linear algebra library in C++ supporting most standard vector and matrix operations
- Gained experience with numerical algorithms and the optimization and data storage decisions required to efficiently work with matrices, as well as writing comprehensive unit tests and creating tools for benchmarking

PROJECT TEAMS

University of Michigan Autonomous Robotic Vehicle Project Team **Ann Arbor, MI**

Navigation Assistant Lead *June 2024 - Present*

- Utilized VMware Hypervisor products to create pre-configured ROS development environments
- Designed and administered an onboarding project to teach the basics of autonomous navigation and ROS application development to over 30 members

Navigation Member *September 2022 - May 2024*

- Developed a resilient, efficient path-planning solution for navigating an autonomous vehicle through an obstacle course
- Utilized ROS to integrate the navigation stack with sensors, computer vision, and embedded systems stacks

SKILLS

- Languages: C/C++, C#, Go, Python**,** MATLAB
- Technologies: ROS, Unity, Git, Flask, MongoDB, PyTorch, VMware Hypervisors