BINHAO QIN

Prospective Computer Engineer

@ bhqin@umich.edu +1 734-210-2451 1853 Lake Lila Ln., Ann Arbor, MI, 48105
in https://www.linkedin.com/in/binhao-qin-84a047235/ github.com/BinhaoQin

RESEARCH

SafeDigit: RTD Safe Locomotion

Robotics and Optimization for Analysis of Human Motion Lab

May 2022 - Ongoing University of Michigan

Abstract: Online RTD (Reachability Trajectory Design) path-planner with extra safety, robustness and performance for bipedal robot Digit.

- Develop efficient algorithms for GPU in CUDA C++, e.g, forward kinematics, multi-linear Bezier interpolation, and polytope collision checking
- Develop API with strict compile-time checking for robustness, e.g., type safety, RAII, memory management, etc.
- Deploy and optimize for performance further online

PROJECTS

Visually Interactive Vlog Autosystem

Autonomous Robotics (MDE)

Aug. 2022 - Dec. 2022 University of Michigan

- Implemented PID controller, SLAM and particle filter, and A-star
- Implemented object-tracking using RGBD camera and OpenCV
- Implemented PWM on Raspberry Pi for camera tilting using file mapped I/O in embedded Linux
- Designed communication message in ROS (Robot Operating System)

Sharded Key-Value Storage using Paxos in Go

Introduction to Distributed Systems

Aug. 2022 - Dec. 2022 University of Michigan

- Implemented peer-to-peer Paxos layer with performance optimizations
- Designed an RSM that supports concurrent operations using Paxos
- Designed a shardmaster service as a Paxos cluster with linearizability and partition-tolerance that supports load balancing and configuration override
- Designed servers and clients for sharded storage using consistent hashing and DHT (Distributed Hash Table) with linearizability and partition-tolerance

Adaptive Cruise Control

Embedded Control Systems

Aug. 2022 - Dec. 2022 University of Michigan

- Designed ACC system with speed and distance control and haptic wheel for steering simulation
- Designed PID controller for automatic steering of the haptic wheel
- Implemented for multiple vehicle scenario with CAN bus communication
- Simulated the project using MATLAB Simulink and automatic code generation for NXP microcontroller

Autonomous Ping Pong Collector

Embedded System Design

Jan. 2022 - Apr. 2022 University of Michigan

- Bit-bang of 1-Wire serial protocol for N64 controller on STM32
- Implemented motor and servo control using STM32 HAL
- Implemented recognition in HSV color scheme in OpenCV

EDUCATION

B.SE. Computer Engineering

University of Michigan, Ann Arbor

Expected Apr. 2023 United States

B.S Electrical and Computer Engineering

Shanghai Jiao Tong University

Expected Aug. 2023 China

EXPERIENCES

Instructor Aide

Introduction to Operating Systems

Jan. - Apr. 2023 University of Michigan

COURSES

OS | Distributed System | Embedded System | Control | Autonomous Robotics | Machine Learning | Compiler | Data Structure and Algorithm | Logic Design | Analog Circuit | EM

SKILLS

Programming Languages

- C/C++
- Rust
- Go
- Python
- Lua
- MATLAB

Circuits & Design Tools

- Oscilloscope
- Vector Network Analyzer
- Verilog HDL
- Cadence
- Keysight ADS

LANGUAGES

- Chinese
- English
- Japanese