ChaoLiu

Robotics Researcher

contact

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ModLab://ChaoLiu
GitHub://ChaoLiu

languages

Chinese (native)
English (professional)

courses

Learning in Robotics, Machine Learning, Digital Signal Processing, Embedded Systems, Control, Mechatronics

strengths

Embedded Systems, PCB (Eagle, Altium), CAD (SolidWorks, Pro/E), C/C++, Python, Matlab, Control, Motors, Git, SVN

education

Sept '15 - Now — **Ph.D Candidate** in Mechanical Engineering and Applied Mechanics — 3.78/4.00
School of Engineering & Applied Science, *University of Pennsylvania*

Sept '12 - May '14 — **Master** of Science in Engineering in Robotics — 3.61/4.00
School of Engineering & Applied Science, *University of Pennsylvania*

Sept '08 -June '12 — **Bachelor** of Science in Mechanical Engineering and Automation — 89.5/100
School of Mechanical Engineering, *Dalian Jiaotong University*
Specialization in Mechatronics, Minor in Business Administration

Working Experiences

Oct '12 - June '14 — **Research Assistant in ModLab (UPenn GRASP Laboratory)** — Robotics
Focus on Embedded Systems Design and Control

SMORES Robot — Embedded Systems and Control
- Designed main CPU board with STM32F303(Cortex-M4), including JTAG interface, IIC interface, SPI interface for a Wifi chip and motor drivers;
- Designed face board with ATmega88a, coil-driving circuit by MOSFETs, coil communication circuit with a RF Power Detector and 2 ADCs for encoders.
- Designed programming environment for AVR microcontrollers in Unix and Windows and designed all embedded codes and MATLAB interface.

Persona Robot — Mechatronics and Control
- Designed infrared-based force sensor and associated PCB;
- Implemented servo controller for tablet-driven motor;
- Designed PID controllers for base motion and mast rotation.

Low-cost Laser Range Finder — Embedded Systems
- Simulated SCCB protocol on STM32F373(Cortex-M4) and configured the camera(OV7670) in Raw RGB mode with VGA resolution;
- Designed the PCB including microcontroller, camera and laser;
- Transmitted the data to the master via SPI.

Aug '13 - Dec '13 — **Teaching Assistant for Design of Mechatronics Systems (MEAM 510)** — Mechatronics

projects

Apr '14 - Apr '14 — **Cost Learning and Path Planning** — Robotics and Machine Learning
- Built a route planner for the Penn campus;
- Selected features based on an aerial photograph and implemented reinforcement learning method to lear the cost associated with each feature;
- Used Dijkstra's algorithm to find the optimal path.

Mar '14 - Apr '14 — **Localization and Mapping(SLAM)** — Robotics and Machine Learning
- Leveraged mobile-robot-mounted IMU and LIDAR to map indoor environment;
- Constructed 2D map using a particle filter and occupancy grid algorithm.

Nov '13 - Dec '13 — **PhanToM Robot Control System(Our Own Myo)** — Mechatronics and Machine Learning
- Designed wearable device using IMU and EMG(read muscle signals) to measure muscle activation and motion to control robots;
- Designed mobile robot with Omni-wheels and holonomic control;
- Designed board with IMU, xBee and low-level PID controller for a quadrotor.