

PEIJIE XU

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EDUCATION

University of Southern California

M.S. in Computer Science

➤ Overall GPA: 4.0 / 4.0

Los Angeles, USA

Aug. 2021 ~ Present

Chongqing University (CQU)

B.Eng. in Electrical Engineering / Hong-Shen Honors Program

➤ Overall GPA: 3.63 / 4.0 (top 10%) CS Courses Score: 94.0 / 100 Average Score: 87.9 / 100

Chongqing, China

Sept. 2017 ~ Jun. 2021

RESEARCH EXPERIENCE

Humanoid Robot V-SLAM and Control System Development

Research Assistant / Supervisor: Prof. Yongduan Song & Niu Wang

- Control the humanoid robot Roban to finish a sequence of tasks required by [BOTECH](#)
- Developed a localization, mapping, and navigation system based on ORB, OctoMap, and move_base
- Built the robot's model in CoppeliaSim/V-REP to simulated the control algorithm; controlled the gait using a dynamic model which derived from Lagrangian dynamics when it stands on one leg

CQU

Aug. 2021 ~ Present

Robot Arm Control System Programming and Transplantation

Research Assistant / Supervisor: Prof. Yongduan Song & Niu Wang

- Built a C++ library to realize OOP control of an old Denso robot arm which used to can only be manually controlled by teaching pendant; the project uses socket programming to communicate with the arm
- Transplanted the library to ROS, used MoveIt!-based motion planning method to achieve real-time robot arm control; the project includes URDF model building, rviz visualization, inter-node communication, etc.

CQU

Jul. 2021

Deep Reinforcement Learning (DRL) - Guided Offshore Wind Farm Voltage Control

Undergraduate Thesis Project / Supervisor: Prof. Hui Li / Lab: [SKL-PES](#)

- Applied DRL to minimize the Average Voltage Deviation (AVD) of the offshore wind farm; the work was awarded the outstanding undergraduate thesis of CQU (**top 1.5%** in the university)
- Built reactive power-voltage optimization model and formulated it as a Markov Decision Process; established the agents' actor & critic's Deep Neural Network and the interactive environment of RL; trained the agents with adapted Deep Deterministic Policy Gradient (DDPG) and Multi-Agent DDPG
- Decreased AVD by 11.48% after adding the forward difference of active power into observation; decreased AVD to 5.4×10^{-4} p.u. and 3.6×10^{-4} p.u. using policy trained by DDPG and Multi-Agent DDPG respectively, which means the proposed multi-agent-based method improves the control performance by 33.33%

CQU

Mar. 2021 ~ Jun. 2021

HONORS & AWARDS

First Prize of Chinese Mathematics Competitions for College Students

Sept. 2018

Successful Participant Prize of Mathematical Contest in Modeling

Apr. 2019

Excellent Prize of Mathematical Contest in Modeling of Chongqing University

Dec. 2018

Third Prize of Mathematics Competitions of Chongqing University

Jul. 2018

Third Class Chongqing University Scholarship

May 2018

SKILLS & INTERESTS

Programming Skills:

- Languages: C/C++, Java, Python, Matlab, Verilog HDL
- Software: PyTorch, ROS, CoppeliaSim/V-REP, OpenCV, g2o, Git, Simulink, PSIM, Multisim
- Micro-Controller: DSP, FPGA

WORK EXPERIENCE

ABB

Intern / Software Platform: RobotStudio 2019

- Designed a versatile robot application based on a collaborative robot (IRB 14050 Yumi) which expedited the speed of queuing by 23.6%, reduced direct human contact, and prevented the transmission of the virus

Chongqing, China

Jul. 2020

SIDE PROJECTS

Wind Farm Multi-Agent Consensus Control

SKL-PES, CQU

Research Assistant / Supervisor: Prof. Minyou Chen

Jan. 2020 ~ Dec. 2020

- Investigated control methods for a distributed wind farm system
- Formulated the target wind farm as a graph; designed and simulated a distributed consensus algorithm to regulate output power of 10 doubly-fed induction generators-based wind turbines with on-site battery energy storage systems

Electrical Compensation Technology for Visible Light Communication (VLC)

CQU

Leader / Supervisor: Prof. Quanming, Luo

Mar. 2019 ~ Dec. 2020

- Investigated into the compensation technology for the electrical index deterioration of VLC
- Structured the VLC system; designed and made the data sending and receiving platform; proposed and analyzed a waveform compensation method of a VLC driver; simulated the proposed method in PSIM
- Extended communication distance of VLC system whose LED worked as a scattering light source by 189%

Android Application Development

CQU

Supervisor: Prof. Ruilong Yang

Sept. 2020 ~ Dec. 2020

Software Platform: Android Studio / Language: Java

- Independently developed 4 APPs: Oral Calculation Tester (860 lines), Student Information Manager (990 lines), 24 Game with Poker(1160 lines), and Vocabulary Helper (1310 lines)
- Designed the user interface for APPs; developed management systems using database (SQLite)

Digital Oscilloscope Implementation and Real-Time Signal Processing

CQU

Team Leader / Supervisor: Prof. Yuxing Mao

Nov. 2020 ~ Dec. 2020

Software Platform: Code Composer Studio 9 (CCS) / Lines of Code: 1801 / Language: C

- Achieved an oscilloscope based on a TMS320F28335 DSP development kit and an LCD screen
- Sampled voltage of signal using the ADC in the DSP; analyzed frequency components of the signal using 128 points FFT; stabilized the waveform in rising edge, high-level or low-level mode; implemented a Finite Impulse Response (FIR) filter on the digital signal using circular convolution
- Speeded up refresh rate of the LCD by 274%; decreased delay time to 10% when transmitting data in the bottom layer software

Motor Vector Control System Design and Analysis

CQU

Software Platform: SIMULINK / Supervisor: Prof. Mingyu Wang

May 2020 ~ Jun. 2020

- Built an Indirect Rotor Flux Oriented control system for an induction motor (IM)
- Formulated a model of IM in a stationary reference frame ($\alpha\beta$ frame) by taking rotate speed, stator current and rotor flux as state variables; designed and simulated a motor control system in Simulink based on above model with no static difference between given and output; analyzed and concluded the suitable domain of parameters of PID according to the given IM

Brushless DC Motor Control System Design

CQU

Team Leader

Mar. 2020 ~ Jun. 2020

- Achieved a brushless DC motor control system on a PCB and a DSP development kit
- Designed the motor drive module and regulated motor speed with PID control

Digital Clock Design

CQU

Team leader / Supervisor: Prof. Lan Xiong

May. 2018

- Achieved a digital clock base on Xilinx Artix-7 FPGA (XC7A35T-1CSG324C)
- Structured, coded and debugged the source and constrain files for the FPGA development kit