

YIHAO (Charles) CAI

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Address: Worcester Polytechnic Institute, Worcester, MA 01609

USA Citizenship Status: Green Card Pending (Due to Covid-19)

EDUCATION

Worcester Polytechnic Institute (Worcester, MA, USA) Sep. 2021 – May. 2023 (Expected)

- **Major:** Robotics Engineering – **Master of Science** (GPA: 3.83/4.0)
- **Relevant Coursework:** Robot Dynamics/Control, HRI (Human Robot Interaction), Motion Planning, Operating System, etc.

Nanjing University of Posts and Telecommunications (Nanjing, Jiangsu, China) Sep. 2016 – Jun. 2020

- **Major:** Telecommunications Engineering – **Bachelor of Science** (GPA: 3.4/4.0)
- **Relevant Coursework:** Signals & Systems, Analog/Digital Circuits, Telecommunications Principles, Computer Networks, etc.

WORKING EXPERIENCE

Photo App Development (Summer Internship) Mar. 2021 – Aug. 2021

Full-stack Developer

- Design and create App UI layout using Flutter including interaction with SaaS platform Firebase, response/request by Restful API, and widget status management through Riverpod; In addition, I build an automation Flutter test framework (Frontend)
- I make a benchmark test framework to estimate RLS (Row-Level-Security) performance of PostgreSQL database (Backend)

Hillstone Networks Co., Ltd Apr. 2021 – Aug. 2021

Software Develop Engineer, Department of Cloud Security

- Utilize Kubernetes to organize Docker container-clusters, and design a security scheme following CIS Benchmarks to protect against container threats; Implement RPC frameworks (Http, Restful, gRPC) to build microservice modules using Golang
- For low-level layers like Linux Kernel, I apply mechanisms including SELinux, AppArmor, eBPF and IPC namespace on OS; for high-level ones, I create policies for securing interactions among Docker modules (dockerd, containerd and runc, etc.)

iWhaleCloud Computation Technology Co., Ltd Jul. 2020 – Mar. 2021

DevOps (Delivery) Engineer, Department of International & Operation Center

- Deployment of middleware (Nginx/Dubbo/Zookeeper/Redis) on servers and write Shell script for automatic management; Maintenance of Oracle database by creating stored procedure statements using PL/SQL
- Test and debug for business cases through logfile. Monitor and examine network performance for traffic flow by sending packets via socket program, and utilize Tcpdump to analyze them with Wireshark (filtered by iptables chain rules)

RESEARCH EXPERIENCE

WPI HiRO (Human-Inspired Robotics Laboratory) Lab Researcher Sept. 2021 – Present

- I create an IBVS (Image-based Visual Servoing) framework in Unity with two 6-Dof Kinova arms for shared autonomous teleoperation and use Oculus VR for remote scenario telepresence (github.com/CharlesCai123/Kinova-IBVS-Control)
- Development of wearable system using RealSense Cameras, HTC Trackers and VR Headset in Unity using C#. Design User Study and collect/analyze data for the research results (github.com/CharlesCai123/Wearable-MultiCamera-System)

National University Sci & Tech Innovation Program – SLR (Sign Language Recognition) Sept. 2018 – Jan. 2020

- Data Extraction of sign language features from a batch of video frames captured by KinectV2 (C++ & Python) plus image-processing algorithms from OpenCV (Edge Detection, Threshold Segmentation, Image Filtering) for optimization
- Implementation of Neural Networks (C3D, LSTM, R(2+1)D, etc.) to train model and model parameters tuning on server

An Intelligent Housekeeper System Design Based on Physical Raspberry Pi using C++ Dec. 2018 – May. 2019

- Build a master controlling system from scratch with deployment of wires on bread board as the hardware part of whole project system used for scenarios where people deal with daily routines at home (Smart House System)
- Code for analog sensors using C++ and design a user-friendly GUI with Qt Creator in Raspberry Pi (Broadcom BCM2835)

Summer Mathematical Modelling Application Activity

Jun. 2018 – Sept. 2018

- Master common mathematical models and algorithms like regression model, correlation analysis and grey prediction, etc.
- Responsible for creating mathematical models applied to daily life and improve the parameters (Matlab)

University Automation Science Laboratory Robotics Research Project – 2 years

Jan. 2017 – Dec. 2018

- Manipulate physical robots (TurtleBot, DOBOT Arm, etc.) in lab to perform basic tasks (Navigation, Locomotion, etc.)
- Build a framework for robot hand-eye coordination system using Halcon and Matlab, plus implementation of it for object detection and grasping without collision using motion planning algorithms from MoveIt library

EXTRA-CURRICULAR ACTIVITIES

- Member of Cyber Security and IEEE Club in WPI **2021 - Present**
- Founder Member of University Piobot Robotics Club in NJUPT **2017 - 2019**
Team Leader of Robotics Arm Team, organizing instruction lessons and participating in national robotics competitions and projects

HONORS / AWARDS

- Paper with field focused on HRI to be published on ICRA (On Process) **2022**
- Paper published on IWPR 2020 (DOI: <http://dx.doi.org/10.1117/12.2574424>) **2020**
- First Prize in 2018 National University Artificial Intelligence Internet Innovation Competition **2018**
- Third Prize in Jiangsu Provincial Mathematics Modelling Competition **2018**
- Third Prize in 2018 China National Service Robot Competition **2018**
- First Prize in Jiangsu Provincial University Advanced Mathematics Contest **2017**
- Faculty Honors: Faculty Academic Excellence Scholarship, Civilian Award **2016 – 2017**

SKILLS

- **Programming Languages:**
 - **Skilled:** C/C++, C#, Python, MATLAB, Shell/Tcl, Golang, PL/SQL
 - **Mastered:** HTML5/CSS, Dart, JavaScript, Assembly, VHDL/Verilog
- **Tools/Platforms:**
 - **Editors:** Vim, Microsoft Office, Sublime Text, VSCode, UltraEdit, OmniGraffle, Geany
 - **IDEs:** Microsoft Visual Studio, Unity3D, CLion, PyCharm, MASM, Wireshark, SolidWorks, Qt Creator, Eclipse
 - **Frameworks:** ROS, CMake, Docker/Kubernetes, Nginx, Git/SVN, Oracle, TensorFlow/Keras, Flutter