Zhongxuan Li

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Education

- **Imperial College London** — London, United Kingdom
  Integrated MEng in Electrical and Electronic Engineering; — ***Thesis:*** *Blind Source Separation based on Sparsity*

Experience

- **Huawei - Optical Business Product Line** — Shenzhen, China
  Research Engineer (Full-time) — *October 2019 - Present*
  - **Robotics**: Worked as a full-stack engineer, developed and built robots for different using purposes. In-depth understanding and practical experience with SLAM, motion planning, optimal control and reinforcement learning.
  - **Network Planning**: Solved optimisation problems in very large-scale ODN and WDM networks, built network planning tools with work-leading performance.
  - **CCSA Representive**: Delegated Huawei at China Communications Standards Association. Successfully conducted several ICT standardisation projects including the industrial optical bus protocol.
- **Ocado Technology - 10X Research Team** — Hatfield, United Kingdom
  Research Engineer (Internship) — *May 2018 - September 2018*
  - **Logistic Robots**: Worked towards patented tote transporting robots in smart warehouse. Experience in motor control and electronics design.
  - **Multi-robot navigation**: Developed robot swarming control algorithms for warehouse simulation. Experience with MARL methods (e.g. VDN, distributed Q-learning)
- **Robot Intelligence Lab - Imperial College London** — London, United Kingdom
  Undergraduate Research Assistant — *June 2017 - September 2017*
  - **Dexterous End Effector**: Designed and built a multi-joint underactuated dexterous hand for Baxter robot.

Related Projects

- **Service Robot**: Built a domestic service robot from scratch, performing tasks such as grasping and handover objects, switching lights and guest reception. The robot is equipped with stereo cameras for mapping and trajectory planning in 3D, as well as microphone arrays for word reasoning. Semantic-SLAM and graph attention neural networks are developed to achieve visual language navigation.
- **Data Center Robot**: Built a mobile manipulator with 6-axis arm for IT server room maintenance and inspection. The robot adapts to the narrow environment of the site and realizes self-leading navigation, multi-sensor fusion and intelligent identification. It detects the fibre connectors on the server rack using a self-trained neural network model. The robot arm with visual guidance manipulates itself to plug/unplug the fibres.
- **Network Optimisation**: Developed optical network optimisation tool that enables low cost of construction and faster time to market. Devised a hybrid algorithm that combined heuristics, mixed-integer programming and multilevel graph partitioning to achieve better time and optimality performance than market rivals.
- **Ultra-low Latency Industrial Busline**: Worked towards improving the existing PON L2-layer to meet field-level industrial bus-line performance. Collaborated with CAICT (China Academy of Information and Communications Technology), writing a national standardization white paper published in Q4 2022.
- **AR-HUD**: Worked on Huawei head-up display project, focused on computer vision that leverages the augmented reality feature. Trained DL models such as object detection, road segmentation, and depth estimation. Applied model pruning, factorization and quantization techniques for low-cost SoC deployment.
- **Linear Motor Design**: Designed and developed linear PMSM for logistic robots. Conducted full-stack development cycle including mechanical design, finite element analysis, and embedded FOC control. A novelty-designed PCB rotor is proposed, with ultra-thin printed windings providing a maximum of 10N force.

Patents

- **A method for automatic generation of floor plan based on wireless communication and IMU**: Submitted, 92011025CN01

Skills Summary

- **Programming**: C++, Python, Java, MATLAB, FPGA(Verilog)
- **Languages**: English, Chinese Mandarin
- **Robotics**: ROS, RL (DQN, DDPG), Control (LQR, MPC, Kalman), SLAM, Planning (A*, RRT*), Math (Lie Algebra)
- **Libraries**: PyTorch, PyData Stack, OMPL, FCL, CVXOPT, Cbc