# Zhongxuan Li

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## Education

- **Imperial College London** — London, United Kingdom
  *Integrated MEng in Electrical and Electronic Engineering; GPA: 3.7* — *July 2015 - June 2019*
  ***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.
  - **Operations Research**: 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.
  - **Deep learning**: Hands-on experience with training neural networks. Comprehend knowledge about model tuning and compressing for embedded platform deployment.
- **Ocado Technology - 10X Research Team** — Hatfield, United Kingdom
  *Research Engineer (Internship)* — *May 2018 - September 2018*
  - **Logistic Robots**: Worked towards patented tote transporting robots equipped with linear PMSM.
  - **Multi-robot navigation**: Developed robot swarming control algorithms for warehouse simulation (Dec-POMDP problem). Good understanding of MARL methods(VDN, distributed Q-learning)
- **Robot Intelligence Lab - Imperial College London** — London, United Kingdom
  *Undergraduate Research Assistant* — *June 2017 - September 2017*
  - **Dexterous End Effector**: Independently developed a multi-joint dexterous hand for Baxter robot. Programmed a robot controller GUI with QT and C++.

## Related Projects

- **Service Robot**: Built a domestic service robot from scratch, performing tasks such as grasp and handover objects, switch 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 a graph attention neural nets 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 realize self-leading navigation, multi-sensor fusion and intelligent identification. It detects the fiber connecters on the server rack using a self-trained neural network model. A 6-axis robot arm with visual guidance manipulates itself to plug/unplug the fiberss..
- **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 compared to rivals' products
- **Ultra-low Latency Industrial Busline**: Worked towards improving the existing PON L2-layer in order to meet field-level industrial bus-line performance. Collaborated with CAICT(China Academy of Information and Communications Technology), writing a national standardization white paper to be published in late 2022.
- **AR-HUD**: Worked in the 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 prunnning, factorization and quantization techniques for low-cost SoC deployment.
- **Linear Motor**: Designed and developed linear PMSM (permanent magnetic synchronous motor) for logistic robots. Conducted full-stack development cycle including mechanical design, finite element analysis, and embedded FOC control. A novelty designed PCB rotor is implemented, 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, (April '22)

## Skills Summary

- **Programming Languages**: C++, Python, Java, MATLAB, FPGA(Verilog), HTML/CSS,
- **Languages**: English, Chinese Mandarin
- **Robotics**: ROS, RL (DQN, DDPG, etc), Optimal Control (LQR, MPC), SLAM, Planning (A*, RRT*, etc)
- **Libraries**: PyTorch, Tensorflow, PyData Stack (numpy, pandas, sklearn, etc), cvxopt, Cbc(COIN-OR)
- **Soft skills**: Public speaking, Leadership