

# Xiangru Zhou

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## CAREER PROFILE

With **10+ years** of experience as a software algorithm development engineer, I specialize in C/C++/Python programming and image algorithm research, and have attained or applied for **more than 10 patents**. Recognizing that life sciences are poised to become a highly promising field in the future, I am transitioning from intelligent manufacturing to become a cross-disciplinary software algorithm developer. During my graduate studies at The Hong Kong Polytechnic University, I was introduced to introductory molecular dynamics simulations (focused on semiconductor solids), which further solidified my belief that computational methods and theories will play an increasingly important role in life sciences—particularly in the field of Brain-Computer Interface (BCI).



## EDUCATION

### The Hong Kong Polytechnic University

*Master of Microelectronics Technology & Materials*

**Hong Kong**

Sep. 2024 – Oct. 2025

• **GPA: 3.13/4.3**

• **Course Project:** Phase Transition Mechanism and Potential Function Adaptation of CsPbBr<sub>3</sub> under a Cross-Platform Molecular Dynamics Simulation Framework

### Xi'an University of Technology

*Bachelor of Microelectronics*

**Xi'an, China**

Sep. 2009 – Jul. 2013

• **GPA: 3.64/5.0**

• **Average Score:** 81.18/100

• **Honours:** 2<sup>nd</sup> Prize 8th Xi'an High-tech "Challenge Cup" Shaanxi Province University Student Extracurricular Academic Science and Technology Works Competition; 1st and 3<sup>rd</sup> Prize University 19th Extracurricular Academic Science and Technology Works Competition; 1<sup>st</sup> Prize University 18th "LiAo Cup"; University Innovation Achievement 2<sup>nd</sup> Prize, University 3<sup>rd</sup> Prize Scholarship

## TECHNICAL SKILLS

- **Speaking Languages:** Cantonese, Mandarin, English (Fluent; IELTS: 6.5), Japanese (N5)
- **Programming Languages:** C, C++, Python, Java, Java Script, HTML, CSS, PHP
- **Platforms:** (Local) Windows, Ubuntu; (Remote) Linux, HPC, Aliyun ECS etc.
- **Development Tools & Libraries:** OpenCV, PyTorch, QT, Visual Studio, gdb/pdb, Git, Docker/Apptainer, Anaconda, Halcon, DeePMD, GPUMD, OpenMM, LAMMPS, OVITO
- **Other Skills:** Keil (STM32), Altium Designer (PCB), Rhino (3D printing), Dreamweaver (Website)
- **Books:** Computer Vision: Algorithms and Applications, Design Patterns: Elements of Reusable Object-Oriented Software
- **Patents:** CN202311136494.1; CN202310973415.6; CN202310287581.0; CN202310051665.4; CN202211602503.7; CN202211474648.3; CN202211357774.0; CN202210994137.8; CN202230264395.1; CN201911330078.9; CN201110120104; CN201110308514.X

## PROFESSIONAL EXPERIENCE

### SMARTMORE CORPORATION LIMITED

*Software Engineer*

**Shenzhen, China**

May 2020 – Sep. 2024

#### BGI Genomics Reagent Bottle Inspection

*Collaborator*

Oct. 2022 – Feb. 2023

- Designed algorithmic solutions and implemented the AI model into software for real-time monitoring of reagent bottle caps, ensuring seal integrity and smoothness during the manufacturing process.
- Conducted Optical Character Recognition (OCR) for character detection on reagent bottle bodies, effectively identifying characters on various colored backgrounds of medication and detecting printing defects.

#### AI-Driven Robotic Arm Project

*Leader*

May 2024 – Sep. 2024

- Branch 1: Traditional Hand-Eye Calibration + Image Recognition
  - Implemented 3D scenarios: arbitrary object recognition and grasping, sketching based on verbal commands, and interactive stacking toys with users.
  - Integrated an Intel Realsense camera, a structured light 3D camera, a 7-axis robotic arm with a gripper, two servers for large-model deployment, and a PC for control and ASR-based voice input.
  - Deployed conversational and vision models to enable seamless interaction between visual, auditory, and motor systems.
  - Achieved high precision in object localization and vision-guided robotic operations.
- Branch 2: Transformer-Based Action Prediction
  - Utilized a Transformer model to predict robotic arm actions by joint data, CNN features, and task descriptions.
  - Enabled real-time responses without hand-eye calibration, adapting to dynamic environments.
- Tackled computational challenges and dataset requirements for effective training and deployment.

**"Wafer ID Reader" Integrated OCR Code Reader Product for Semiconductor Industry**

#### *Leader*

*Oct. 2021 – Sep. 2024*

- The first deep learning-based OCR wafer character recognition tool in the semiconductor industry. Convenient use and no need to adjust the recognition parameters compare to its competing products.
- Collaborated with the algorithm team to devise strategies, conduct experiments, and select optimal algorithmic solutions.
- Modified software and SDK interfaces and functionalities based on the product manager's research and user requirements.
- Implemented end-to-end closed-loop process from requirement analysis to deployment, including evaluation, experimentation, algorithm/software/SDK development, testing, and deployment.
- Same recognition rate level as that of industry leader Cognex products in normal cases, partially exceeds its recognition rate (100% versus 99.5%) in the case of fixed format recognition.

#### **Defect Detection System for SONY Labels**

*Second-hand Maintainer & Developer*

*Feb. 2023 – May 2023*

- Conducted Proof of Concept (POC) using client samples to validate system performance.
- By combining the template image and the image to be checked together to form a two-channel image, defects are marked and trained on this basis, the accuracy has been improved by 2%.

#### **Character Recognition System for Apple Watch Bands Using Laser Engraving Technology**

*Designer & Developer*

*May. 2020 – May 2021*

- Trained character localization and classification models on a four-card 2080Ti server running Ubuntu, utilizing the MobileNet architecture.
- Employed the ONNX Runtime (ORT) for model deployment, integrating a C++ SDK for inference on the server and developing a user-friendly software interface.
- Collaborated with colleagues to align and optimize the SDK, including pre-processing and post-processing workflows.
- Precision and recall were above 99.7% respectively.

#### **Defect Detection System for Apple Watch Bezels Using 3D Imaging Technology**

*Designer & Developer*

*Oct. 2020 – Apr. 2020*

- Implemented the conversion of 3D point cloud data into 2D heatmaps for analysis purposes.
- Designed and programmed the user interface for the software application.

#### **SHENZHEN PHDI CORPORATION LIMITED**

*Co-founder, CTO*

**Shenzhen, China**

*Jul. 2017 – May 2020*

#### **Android Software for A Car-Mounted Mobile Phone Controller**

*Designer & Developer*

*Jul. 2017 – May 2020*

- Managed the schematic design, PCB layout optimization, final delivery for production, and functional validation; Programmed based on the TI CC2540 Bluetooth chip; Conducted 3D design and printing for the product's appearance.
- Enabled rapid switching between navigation, music, and WeChat applications in a car environment.
- Implemented automatic sending and receiving of WeChat messages.
- Integrated features for one-touch activation of voice navigation and song search.
- Designed and developed a comprehensive product including a mobile application and a Bluetooth controller.

#### **Face Recognition and Tracking Software on The Android Platform**

*Designer*

*Jul. 2017 – May 2017*

- Utilized OpenCV, Caffe, Idlib, and VGG net deep learning neural network for face localization and gender recognition.
- Integrated BP neural network for gender recognition within the face detection algorithm.
- Applied the developed algorithm in systems for estimating the attention of different gender groups towards billboards and for access control systems, resulting in the acquisition of a patent.
- Adapted the algorithm for integration with security cameras to track familiar/strange faces indoors, aiding in the detection of potential security threats.
- Successfully delivered the developed solution to a renowned domestic security camera company.

#### **OPT MACHINE VISION TECH CO., LTD.**

*Image processing algorithm engineer*

**Guangdong, China**

*Apr. 2014 – Jul. 2017*

#### **One-Dimensional Barcode Localization and Recognition Algorithm**

*Designer*

*Apr. 2014 – Jul. 2017*

- Achieved automatic localization of barcodes in approximately 10ms on a PC equipped with an i3 processor, capable of identifying barcodes in complex images of up to 2 million pixels.

#### **Two-Dimensional Barcode Localization and Recognition Algorithm**

*Designer*

*Jan. 2015 – Jul. 2017*

- Implemented functionality to locate and recognize QRCode, DataMatrix, and other two-dimensional barcodes.
- Utilized Google's open-source libraries ZXing/Zbar and made necessary modifications for enhanced performance

#### **Rapid Edge And Circle Detection Algorithm**

*Designer*

*Jan. 2015 – Jul. 2017*

- Utilized non-Hough fitting method to swiftly fit specified parameters of lines and circles in designated directions, implementing the algorithm to effectively recognize lines and circles in blurry edge images of up to 2 million pixels.
- Achieved real-time identification within 10ms on a PC with an i3 processor and 8GB of memory.