

# Ching-Cheong Lee

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## About Me

Graduated from HKUST with an M.Phil degree in Mathematics, worked in both academic and nonacademic fields, with solid knowledge in both frontend and backend programming.

I am passionate about designing software architecture, with rich experience in (i) delivering services with appropriate cloud infrastructure and (ii) building devops pipelines / infra-related websites to facilitate team's development process.

## Experience

### Software Engineer

Wonderbricks Limited, Hong Kong

Mid of May 2023 ~ Present<sup>1.96 Years</sup>

#### Skills Applied

- AWS. S3, Cloudfront, Lambda, EC2-loadbalancer, ECS-Fargate, Route53, API-Gateway, RDS, VPC and VPC Endpoints
- Frontend. Tailwind, Vite, React, Redux-toolkit, React-Native, React-Native-Reanimated, Next, Expo-CLI, Algolia, Socket.io-client, RevenueCat, Push Notification for iOS and Android
- Backend. Express (Node.js), Spring Boot (Kotlin), JOOQ, JPA, Domain Driven Design, Prisma, Prisma-Kysely, Expo Push Notification, PostgreSQL, MongoDB, Socket.io, RabbitMQ, Redis, Stripe and Stripe's Event Integration, JUnit5 and MockK
- DevOps. Replicate infrastructure by Terraform, Develop Github Actions to Automate: (1) Backend Deployment onto ECS; (2) Frontend Deployment onto S3 and Cloudfront; (3) Deployment of Lambda functions

### 1st Year (Mid-05/2023 to 09/2024)

**Summary.** In the 1st year I focused on building prototypes, completed tasks include:

- Developed a **mobile app** by **react-native**. Functionalities include:
  - Real-time messaging for collaboration
  - Interaction with endpoints from ai-developer to handle business domain logicAlso deployed to **iOS AppStore** via App-Store-Connect and to **google PlayStore** via Google-Play-Console
- Developed a **webpage** by react as a supplementary tool for our mobile app
  - Deployed it via S3, Cloudfront and Route53
  - Managed domain-validation for DNS-configuration (forward 3rd party domain to our cloudfront distribution)
- Built **backends** using **express** (for supporting service such as file-generation) and **spring boot** (for business logic). What I have done:
  - Designed table with DDD principle in mind (context-first) to solve business problem
  - Designed backend with appropriate layers (application service, domain service, etc) and with domain object in mind (Entity class with rich behaviour)
  - Versioned and migrated database schema via Prisma (an npm package)
  - Invented procedure to reverse-engineer existing tables into @Entity classes and enum variables for spring boot project
  - Invented annotation to auto-generate kotlin-extension function ".toDTO()" to transform an entity class into DTO (no need to write mapper and its class any more)
  - Created SQL-based services for dashboard (statistics purpose only, I strongly oppose writing SQL for business logic, we delegate it to ORMs)
  - CRUD routines

### 2nd year (10/2024 to Present)

**Summary.** In the 2nd year I focused on **DevOps**. I was responsible to the following:

- CICD**
  - Created github workflows for frontend deployment

## Blog

<https://machingclee.github.io/blog>

## Portfolio

<https://machingclee.github.io/portfolio>

## Education

### MicroMaster in A.I. and Programming

Tecky Academy

Mar 2019 ~ Mar 2019

### M.Phil. in Mathematics

The Hong Kong University of Science and Technology

Sep 2012 ~ Aug 2014

### B.Sc. in Mathematics

Pure Math Option, 1st Class Honor

The Hong Kong University of Science and Technology

Sep 2009 ~ June 2012

## Skills

### Source Control

Git

### Infrastructure as Code

Terraform, Serverless Framework

### Deployment

Docker, Github Actions

### Cloud (AWS)

Security Group, Target Group, Load Balancer, ECS Fargate, Route53, S3, CloudFront, Lambda Functions, API-Gateway, RDS, SQS, VPC

### Typescript

Tailwind, React, React-Native, Redux, Redux-Toolkit, React-Query, Next.js, Electron.js, Electron with Next.js, Node.js, Express.js, Socket.io, Twilio.js, Knex.js, Mon-goose.js, Prisma.js, Prisma-Kysely.js

### Kotlin

Spring Boot, JPA, JOOQ, Domain Driven Design, JUnit 5 and MockK

### Golang

Gin, Goose, Sqlc, Azure-sdk for Voice, Go-Jet

### Python

Tensorflow v2, PyTorch, Pandas, Flask, ONNX, Openpyxl, Boto3, Mongoengine, Selenium, Conda

### C++

CMake Ecosystem, Libtorch, OpenCV, ImGui for Desktop App

### C#

Windows Presentation Foundation

### Database Query & Management

PostgreSQL, MongoDB

- ❑ Created modularized github workflows for auto deployment of **zipped/dockerized lambda functions** and **ECS** services.

Lambda functions include:

- Python flask projects
- Spring boot projects

**Remark.** We deploy it via **snap-started** lambda functions

- Nodejs express projects

**Remark.** When zipped file **exceeds 250Mb** we execute this **in docker image**

#### • Cloud.

- ❑ Transitted our cloud infrastructure from manual aws console manipulation to generation via **terraform**
- ❑ **Modularized** our infrastructure as a single terraform module for replicating the whole infra identically to another stage
- ❑ Developed deployment procedure to switch our working PROD environment into our **well-tested** pre-PROD as quick as possible
- ❑ Refactored all backend projects to use shared backend variables stored in secret managers.
- ❑ Created terraform project to **manage** and **version** all "console" lambdas and their layers, instead of defining them **sporadically** in aws console
- ❑ Managed interaction of resources in our **private subnets**. Such as security groups and inline policies for mutual access right.

Resources include:

- RDS, RDS-proxy
- Lambdas (inside VPC, for RDS-proxy)
- VPC-endpoints (e.g., cloudwatch (interface type) and S3 (gateway type))
- Loadbalancers (we serve lambdas via ports, i.e., Invocation policies needed)
- Websocket-api of apigateway (such as :ManageConnections in order to emit socket message)
- NAT Gateway (for services such as google map API to autocomplete addresses)

- ❑ Architected important services to **lie completely inside private subnets**, only internal services can access it (via internal load-balancer).

#### ❑ Terraform Output and Display in Webpage

- Created script to upload terraform's output to S3
- Created backend for
  - Simple google-login authentication
  - Fetch that terraform output and display data such as:
    - ❑ Database URL
    - ❑ All the endpoints and the corresponding lambda function served
    - ❑ ECS metadata to let AI-engineers deploy their docker-image

#### Rust

Implementation of Elliptic Curve Digital Signature Algorithm, [Code Explanation and Implementation](#)

#### Data Streaming/Monitoring

Kafka with Debezium

#### Message Broker

RabbitMQ, AWS SQS

#### Art

Photoshop CC, 3DS Max, Saola Animate (HTML5 Game), 2D Game Character Design

### Art Portfolio

<https://www.artstation.com/check-ercc>

## AI Engineer

Eye Catching Limited, Hong Kong

15 Aug 2022 ~ April 2023<sup>8.4 Months</sup>

#### Skills Applied

Python. PyTorch

Typescript. Tensorflow, Onnx

C++. Libtorch, Imgui, CMake Ecosystem

- Maintained angular project
- Studied eye-tracing related algorithm
- Studied and deployed machine learning algorithm in web-app and desktop-app
- Completely translated a BlazeFace model in python into the same model in libtorch of C++ for GUI application

- Implemented methods to ensure weights in pytorch model can be used in libtorch model
- Studied CMake and developed software to combine libtorch model and imgui application

## Senior Software Developer

Sep 2021 ~ July 2022 <sup>10.9 Months</sup>

RaSpec Intelligence Inspection Limited, Hong Kong

### Skills Applied

- Python. Selenium, Boto3, Mongoengine, gRPC, PyTorch, Tensorflow
- Annotation. CVAT, COCO-Annotator
- AI-General. Data Annotation, DataLoader with Various Data Augmentations, Model Training for Rust Detection, Model Training for Crack Detection
- AI-Models. GAN for Producing Synthetic Data, Faster RCNN from Scratch and its Modification, Single Stage Headless Face Detector into Rust Detector

### Scope: Web Related

- Maintained React Next project
- Implemented data scrapping for house transactions records
- Automated the process of tracking latest rtk-data from official geodetic website and data-processing pipeline using selenium and pywinauto

### Project 1: Object Detection

- **Text Detection.** Managed to run an open-sourced text detection (EAST) to facilitate signboard defect classification
- **Crack Detection.** Helped implement detection model for crack and spalling
- **Rust Detection.** Implemented two solutions: (i) Text removal, then classification pipeline; and (ii) direct object detection model using faster rcnn

### Project 2: Synthetic Data Generation

- **DefectGAN.** Implemented image-generation model following [this paper](#) that generates synthetic data on cracks and spallings for training defect detection models on facades
- **Text Removal.** Experimented with existing algorithms like various GAN or image-in-painting method in pytorch. Finally I follow [this paper](#) to obtain a text eraser with satisfactory performance

## Software Engineer

Aug 2020 ~ Mid-Aug 2021 <sup>1.03 Years</sup>

EAB Systems (Hong Kong) Limited, Hong Kong

### Skills Applied

- Typescript. React, Redux, React-Native, Express, Mongoose, Sendgrid, Twilio, socket.io
- Python. Pandas, Tensorflow v2

### Project 1. Web Application

- Built video conferencing frontend and backend application in React, Twilio and express
- Built CMS system that lets users create their own single page application

### Project 2. Machine Learning Related

- Built CSV Importer (together with an express layer and a Flask layer) that can parse a csv/excel file and perform:
  - **Data Classification.** Classified column based on existing data using LSTM model with two dense layers and finally a softmax ([sample code](#))
  - **Auto Date-reformatting.** Based on machine learning model (transformer in NLP), translated all common form of date into YYYY-MM-DD format ([sample code](#))

## Frontend Developer

Sep 2019 ~ Aug 2020<sup>11.9 Months</sup>

eLearningPro, Hong Kong

### Skills Applied

Javascript. React

Python. tkinter, pyinstaller

Art. Adobe Premiere, Adobe Photoshop, Saola Animate (CSS Animation)

- Create HTML5 Games, maintain web pages and construct React frontend application
- Created a python GUI project for text extraction from an image (a work necessary to translate old fresh game into html5 game, [detail](#))

## 2D Game Artist

Jan 2018 - Dec 2018<sup>11 Months</sup>

深圳瘋点子科技有限公司, Sheng Zheng

- Responsible for constructing 3d accessories, creating environment art and character design. Game that I worked on [link](#)

## Senior Research Assistant

Mar 2015 - Oct 2015<sup>6.9 Months</sup>

Department of Mathematics, Hong Kong Baptist University, Hong Kong

- Study HJB equations arised in specific financial games

## Research Assistant

Sep 2014 - Feb 2015<sup>6 Months</sup>

Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong

- Study the properties of viscosity solution of HJB equations

## Teaching Assistant

Sep 2012 - June 2014<sup>1.82 Years</sup>

Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong

- Fulfill teaching duty as required in obtaining studentship in the course of M.Phil study. Subjects include: [1] Calculus II, [2] Linear Algebra, [3] Mathematical Analysis, [4] Real Analysis.