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 infrasturcture and **(ii)** building devops pipelines to facinitate team's collaboration.

Experience

Software Engineer
Wonderbricks Limited, Hong Kong

Mid of May 2023 ~ Present [1.65 Years]

Skills Applied

AWS.	S3, Cloudfront, Lambda, EC2-loadbalancer, ECS-Fargate, Route53, API-Gateway, RDS, VPC and VPC Endpoints
Frontend.	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.	Github Actions, Automated: **(1)** Backend Deployment onto ECS; **(2)** Frontend Deployment onto S3 and Cloudfront; **(3)** Deployment of Lambda functions

Project 1. Web Application (Mid-05/2023 to Mid-09/2023)

Frontend.
- Revamp and maintain an existing React project in Typescript

Backend.
- Maintain existing Spring Boot project, build APIs by iBatis and mongo-java-driver

Project 2. Mobile Application (Mid-09/2023 to Present)

Frontend.
- Developed a realtime text-messaging and LLM based project from scratch by React-Native and EXPO
- Created custom interactive components by React-Native-Reanimated
- Integrated RevenueCat in frontend

Backend and Infrastructure.

Database (PostgreSQL + MongoDB).
- Conducted schema migration via Prisma for dev and non-dev environments
- Managed user accounts by granting appropriate privileges in PostgreSQL database
- Used both PostgreSQL for business-centric data and MongoDB for complex json object resulted from LLM model
- Designed and adjusted tables in PostgreSQL to fulfll ever-changing requirements

Backend Project 1 (Nodejs Express, serving mobile and web applications).
- Decided to use query builder (Prisma-Kysely) instead of any existing ORMs, making the application readily maintainable by anyone who knows basic SQL
- Designed middleware to let user send text, audio, images via REST apis and broadcast the message via socket.io
- Developed Push notification system for ios and android
- Introduced the concept of domain objects, make clear distinction between a repository and a DAO
- Implemented an ApplicationEventPublisher (for DDD) with decorators: @listener, @order, @nextEvent. Listeners are registered with the help of reflect-metadata.

Blog

https://machingclee.github.io/blog

Portfolio

https://machingclee.github.io/portfolio

Education

MicroMaster in A.I. and Programming
Tecky Academy
Mar 2019 ~ June 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

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
- 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, Mongoose.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

Rust
- Implementation of Elliptic Curve Digital Signature Algorithm, Code Explanation and Implementation

Backend Project 2, 3 (Kotlin Spring Boot, mobile and payment respectively).

- Integrated with Stripe and RevenueCat for purchasing in-app resources in our applications, integration includes:
  - ☐ Subscribe, upgrade, downgrade and cancel the monthly plans
  - ☐ Distribute purchased in-app resources to team members
  - ☐ Studied all kinds of stripe events and designed metadatas in Stripe operations, enabled the backend to make persistence changes in database according to correct events and metadatas
- Designed test cases via JUnit5 to mimic the subscription processes
- Built repository layer using **JPA** which returns AbstractAggregateRoot; Reverse engineered existing database into @Entity classes by JOOQ (surgery needed)
- Made use of Coroutines and context Dispatchers.IO intensively for IO tasks via DeferredResult which is available from spring 3.2 onwards
- Designed AOPs to track program excution flows and to store domain events because database history is very important to the payment service

System Design.

- **Queuing.** Used RabbitMQ to **(i)** Rate limit api which has a limit of 100 concurrent calls (azure openai service); **(ii)** Delay actions by staling messages into DeadLetter Queue
- **Inapp Notification.** Created a table to store notification in granular level, and designed API to enable the frontend to display notification such as **(i)** New messages in a channel; **(ii)** New channels to join; **(iii)** Number of Unread Messages in a chat
- **Payment.** Designed table to allow users to subscribe, upgrade, downgrade and cancel plans for the extra usage limit in our app

AWS Cloud Solution

- Deployed node.js and spring boot application onto ECS
- Created Scheduled Task running in container via ECS to backup PostgreSQL and MongoDB database regularly at the same time
- Configured RDS proxy to reuse the db connections from lambda functions
- Shared knowledge to teammates how to config load-balancer to detect special header in order to route requests to a special backend (e.g., for apple tester in iOS app)
- Developed Lambda functions in various use cases such as **(i)** LLM Application in Python; **(ii)** file generation and google authentications in Node.js; and **(iii)** ordinary **snap-started** spring boot application in Kotlin
- For Lambda functions whose unzipped file size **inevitably exceeds 250MB**, developed another variant to run the content in docker image, both in python and nodejs
- Move Lambda functions into a private VPC, set up NAT gateway, VPC endpoints and internal-load-balancer to let lambda functions communicate in an isolated network
- Designed workflow to upload files in frontend via presigned-urls

DevOps / CICD via Github Actions

- Created **automated deployment** workflows for frontend and backend via github actions. **Automations** include:
  - ☐ Deployment of containerized node.js and spring boot application using AWS ECS Fargate via: **Step 1.** Push to image registry; **Step 2.** Update task defintion; **Step 3.** Instruct ECS Serivce to use the updated task
  - ☐ Deployment of all web apps onto S3 and cache-invalidation in AWS Cloudfront
  - ☐ Deployment of Lambda functions
- Created Docker Action written in python to let teammates download cloudwatch logs from various log-group and from custom start-time (via workflow_dispatch options), with the log file being downloadable as an artifact

iOS Deployment to AppStore with EXPO.

- Handled App Submissions and Rejections via TestFlight
- Created OTA Update to patch the application
- Managed everything above with 3 stages (DEV, UAT, PROD)

Art Portfolio

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

AI Engineer

Eye Catching Limited, Hong Kong

Skills Applied	
Python.	PyTorch
Typescript.	Tensorflow, Onnx
C++.	Libtorch, Imgui, CMake Ecosystem

- Maintained angular project
- Studied eye-tracing related algorithm
- Studied and deployed machine leanring algorihtm 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

RaSpect 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 classifcation 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

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 [11.9 Months]
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 [11 Months]
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 [6.9 Months]
Department of Mathematics, Hong Kong Baptist University, Hong Kong

- Study HJB equations arised in specific financial games

Research Assistant   Sep 2014 - Feb 2015 [6 Months]
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 [1.82 Years]
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] Mathmatical Analysis, [4] Real Analysis.