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

Mid of May 2023 ~ Present [1.66 Years]

Wonderbricks Limited, Hong Kong

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 with 100 concurrent calls limit (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
- Set up RDS proxy and architected VPC and VPC endpoints for lambda functions (in private VPC) to access RDS with controllable size of connection pool
- 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
- 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
- Designed workflow to upload files in frontend via presigned-urls
- 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)

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)

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/checkercc

AI Engineer

15 Aug 2022 ~ April 2023 8.4 Months

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

Sep 2021 ~ July 2022 10.9 Months

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-inpainting method in pytorch. Finally I follow this paper to obtain a text eraser with satisfactory performance

Software Engineer

Aug 2020 ~ Mid-Aug 2021 1.03 Years

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.