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Education

M.S in Computer Science, Yonsei University (February 2021)

B.S in Computer Science, Yonsei University (February 2019)

Research Experience

Infra & Backend Developer

[Aug: Your next reality](#)

September 2023 ~ Present | Aug Team

- Deployed AWS resources with AWS CDK(IaC).
- Design and implement Serverless event-driven infrastructure.
- Video streaming & image content delivery.
- GeoLocation-based AR Social Networking Service.

MLOps Engineer

Global Solutions Technology, SK Telecom, Pangyo, Korea

February 2023 ~ Present | Security AI Development Team

- Deployed AWS resources with AWS CDK(IaC).
- Training dataset management.
- Implemented image and data content delivery service.
- Design and implement train, inference, conversion, deploy pipeline for AI CCTV cameras on AWS.
- Implemented batch inference API server for radio tower anomaly detection with drone images.
- Semantic image search.

Software Engineer

Department of OS, Tmax Inc, Bundang, Korea

October 2022 ~ January 2023 | Online Meeting Team

- Implemented C++ libtorch denoiser based on python PyTorch denoiser for Online Meeting solution based on Open WebRTC Toolkit(OWT) media server.

June 2022 ~ September 2022 | Virtual Desktop Solution Team

- Documentation of Tmax Virtual Desktop Solution(VDS)'s common library.
- Developed RTP/RTCP packet sender for WebRTC testing.

Game Server Developer

Department of Metaverse, Tmax Inc, Bundang, Korea

December 2021 ~ May 2022 | Metaverse Server Team

- Developed game server using Libuv which is Node.js core c++ library.
- Developed Unity client to test Libuv game server.

Machine Learning Researcher

Department of AI, Tmax Inc, Bundang, Korea

September 2021 ~ November 2021 | Computer Vision Team

- Developed realtime pose estimation with Unity 3D avatar on smartphones using BlazePose(Google Mediapipe).

May 2021 ~ June 2021 | Computer Vision Team

- NVIDIA Triton server inference system maintenance

February 2021 ~ August 2021 | Computer Vision Team

- Developed a face recognition algorithm HyperFace which certified KISA(K-NBTC) BIO Authentication test(ISO/IEC JTC1 SC37 standard).
- Developed realtime face recognition Android application using Google Android ML Kit.

Graduate Researcher

Department of Computer Science, Yonsei University, Seoul, Korea

March 2019 ~ February 2021 | Mobile Embedded System Lab | Advisor: Professor Hojung Cha

- Developed a gaze data collecting application for Android using Google Android ML Kit.
- Developed a convolution neural network for realtime gaze estimation model on smartphones using Tensorflow Lite.
- Developed an Android application for realtime gaze estimation with front facing camera on smartphones using Google Android ML Kit.

Undergraduate Researcher

Department of Computer Science, Yonsei University, Seoul, Korea

December 2017 ~ February 2019 | Mobile Embedded System Lab | Advisor: Professor Hojung Cha

- Developed a SVM model for estimating power consumption of smartphone(Pixel XL) display based on the RGB values of screen display.
- Developed energy aware UI design tool utilizing the SVM model, and image clustering.
- Developed iBeacon logger application for Android, and visualization tool on web browser using Highcharts and GoJS.

Paper

GAZEL: Runtime Gaze Tracking for Smartphones

2021 IEEE International Conference on Pervasive Computing and Communications (PerCom)

DOI: [10.1109/PERCOM50583.2021.9439113](https://doi.org/10.1109/PERCOM50583.2021.9439113)

J. Park, S. Park, H. Cha, "GAZEL: Runtime Gaze Tracking for Smartphones," *The 19th International Conference on Pervasive Computing and Communications (PerCom 2021)*, Virtual Conference, Mar. 22-26, 2021.

Projects

Aug: Location-based AR Social Network Service, with Gunhee Han, Harry Kim, Sangsun Kim

September 2023 ~ Present

[AppStore Link](#)

- Design and deploy the AWS resources with AWS CDK.
- Firebase authentication with email & password, Google login, Apple login.
- Mobile push notification with AWS SNS, Firebase Cloud Message(FCM).
- Video streaming & image content distribution with AWS Route53, CloudFront, S3.
- Automatic thumbnail creation with AWS S3, Lambda trigger.
- Automatic HLS conversion for videos with AWS S3, Lambda trigger, MediaConvert.
- Business logic with Event-driven architecture. Using only serverless resources, AWS REST API Gateway, EventBridge, Lambda, DynamoDB.
- Geolocation-based content search API based on Mapbox quadkey.

MLOps pipeline for AI CCTV Cameras(CVOps), SK Telecom

February 2023 ~ Present

- Design and deploy the AWS resources with AWS CDK.
- User Authentication with AWS Cognito.
- Dataset management with AWS Fathom(co-developing service with SKT) SDK.
- Image preview and data streaming middleware service with AWS CloudFront + ALB + Fargate + Fathom SDK
- Training pipeline with Sagemaker TrainingJob. Progress update, logging implemented with AWS SQS, Lambda.
- Inference pipeline with Sagemaker ProcessingJob. Progress update, logging implemented with AWS SQS, Lambda.
- Implementing Conversion pipeline, Torch to ONNX to binary file conversion. Each feature uses SageMaker ProcessingJob for conversion. Orchestrating workflow with Step Function.
- Pipeline(Train, Inference, Conversion) implementation with AWS Step Function.
- Model deployment API with AWS API Gateway, ALB, Fargate, FastAPI. AI CCTV update download logic integration with S3 presigned URL.
- Semantic image search with AWS OpenSearch. Feature extraction with OpenCLIP on Fargate.

Anomaly detection(with drone images) service for pipeline for radio towers, SK Telecom

June 2023 ~ August 2023

- Whole AWS infrastructure with AWS CDK(IaC).
- VPC & NAT Gateway for security requirements.
- Batch inference anomaly detection model with AWS Sagemaker ProcessingJob to only use instance on-demand(Serverless Service).
- Handling non-code level errors such as AWS Sagemaker resource errors with AWS Step Functions. Triggering AWS Lambda if errors occur, then report it to the server.

Porting python denoiser module to Tmax Online Meeting solution, Tmax OS

October 2022 ~ December 2022

- Converting PyTorch denoiser model to C++ torchscript model which is customized from [FaceBook denoiser project](#).
- Converting python denoiser inference script to C++ libtorch code.
- Applying the model to Node.js Tmax Online Meeting based on [Open WebRTC Toolkit Media Server](#) (On progress).

Documentation and testing for Virtual Desktop Soution (VDS), Tmax OS

June 2022 ~ September 2022

- Writing guidelines for using VDS common library, especially for establishing TCP/WebSocket Channel connection, and Signaling interface in VDS.
- For testing VDS server, developed RTP/SRTP media packet sender.

Game server development using Libuv, Tmax Metaverse

December 2021 ~ May 2022

- Developing C++ Metaverse Game Server with Libuv(Node.js core library) for C# Unity Client. [Demo](#).
- **TCP** Server for realtime multiplayer games.
- Designing packet protocol for Metaverse server and Unity cleint.
- Handling 100+ players in a **stateful** Metaverse server.

Realtime 3D pose estimation on smartphones with Unity, Tmax AI

September 2021 ~ November 2021

- Developed realtime pose estimation with Unity 3D avatar on smartphones using BlazePose(Google Mediapipe) with Unity Barracuda.
- Modified [BlazePoseBarracuda](#) & [ThreeDPoseUnityBarracuda](#) for development.
- Optimized application to meet 16 FPS on Galaxy S21.
- [Demo](#).

NVIDIA Triton Server Maintenance, Tmax AI

May 2021 ~ June 2021

- Deployed our team's deep learning models with NVIDIA Triton Server on Tmax HyperCloud(customised k8s)
- (Deprecated) Used Flask gateway for pre & post processing
- Modified input stream format. JSON to byte buffer
- Changed pre & post processing to use Ensemble + Python BLS pipeline

Face recognition algorithm development, Tmax AI

February 2021 ~ August 2021

- Implemented face recognition algorithms on TensorFlow 2
- Converted TensorFlow 2 model to TensorFlow Lite
- Applied uint8 quantization on TensorFlow Lite model.
- Developed realtime face recognition PC/Android application using OpenCV/Android ML Kit and IJB-C dataset. [Android Demo](#).

- Further developed *HyperFace* face recognition algorithm to get KISA(K-NBTC) BIO Authentication test(ISO/IEC JTC1 SC37 standard) certified.
- Developed *Face Bird* game application with *HyperFace*. [Demo](#).

Realtime gaze estimation on smartphones, Yonsei University

March 2019 ~ February 2021 | Advisor: Professor Hojung Cha

- Developed realtime eye region Bitmap cropper, and landmark collector with Google Android ML Kit.
- Developed button click based auto gaze data collecting application for Android using Google Android ML Kit.
- Developed Android launcher application for gaze data collection.
- Developed a light-weight convolution neural network for realtime gaze estimation model on smartphones using TensorFlow Lite.
- Used tablet gaze data for training, applied linear regression to use this model on smartphones.
- Utilized RenderScript for converting RGB image to 1 channel Black & White image.
- Developed an Android application for realtime gaze estimation with front facing camera on smartphones using Google Android ML Kit.
- *GAZEL: Runtime Gaze Tracking for Smartphones* paper publication.
- Developed *Gaze Bird* game application with *GAZEL*. [Demo](#).

Power management on embedded systems, Yonsei University

December 2017 ~ February 2019 | Advisor: Professor Hojung Cha

- Developed a SVM model for estimating power consumption of smartphone(Pixel XL) display based on the RGB values of screen display using [Monsoon ADB](#).
- To decrease power consumption on smartphones, developed *Energy Aware UI Design Tool* which runs on Flask. [ver1](#). [ver2](#).
- Developed iBeacon logger application for Android, and visualization tool on web browser using Highcharts and GoJS.

Social

Teacher at Daesung high school, Daesung high school Seoul, Korea.

September 2017 ~ December 2017, Teacher

- Taught C++ programming for high school students on weekends.
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Selected Coursework

Yonsei University(Undergraduate)

- Freshman
 - Computer Programming
 - Object Oriented Programming
- Sophomore
 - Data Structure
 - Internet Programming
 - Computer System

- Logic Circuit Design
- Digital Logic Circuit Practice
- Programming Language Structure Theory
- Junior
 - Operating System
 - Computer Architecture
 - Computer Graphics
 - A.I
 - Computer Network
 - Database
 - System Programming
 - Algorithm Analysis
- Senior
 - Compiler Design
 - Human-computer Interface
 - Information Protection
 - Software Comprehensive Design (1)
 - Software Comprehensive Design (2)

Yonsei University(Graduate)

- Database System
- Multicore Programming Basics
- Wireless Network Technology Special Lecture
- Computer System Special Lecture
- Dependable Computer System
- Dependable Computing Special Lecture

Skills

Dev. Languages: C++, Java(Android Studio), Python, JavaScript