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Chiao Yen-Hao

Software Engineer

Companies & Education

2021 - Now	**SenseTime**, AI Solution Manager
2019 - 2021	**Perfect Corp**, Associate Principal Engineer
2012 - 2018	**Garmin**, Advanced Software Engineer
2010 - 2012	M.S. Computer Science, Computer Vision Lab National Tsing-Hua University, Taiwan
2006 - 2010	B.S. Computer Science National Tsing-Hua University, Taiwan

Skills

Computer Vision

Landmark detection, image segmentation, object detection, video stabilization, structure from motion

Deep Learning Frameworks

Keras, TensorflowJS

Programming Languages

C++, python, C#, javascript, OpenCV

Jobs Overview

GARMIN → **PERFECT** → **商汤 sensetime**

Advanced Software Engineer, 6 years	Associate Principal Engineer, 2.5 years	AI Solution Manager, 0.5 years
Computer Vision ➢ Traffic sign detection ➢ 3D reconstruction from aerial images ➢ Video stabilization ➢ Image compression	**Segmentation** (skin care) ➢ acne/texture/dehydration detection **Hand Pose Estimation** (virtual try-on) ➢ hand joints/wrist/ring **Algorithm Implementation** ➢ porting algorithms to mobile(C++) and web(js) SDK	**Product Management** ➢ virtual try-on products **Presales** ➢ virtual try-on products ➢ AR marketing, AR navigation ➢ Avatar
Navigation Map ➢ Survey car software ➢ Map production tools		

Project Experiences

AR product management

- Product management (virtual try-on, AR marketing, AR navigation, Avatar)
  - ➢ Overlook market and potential competitors. Provide knowledge for tech niche of products and new business model
  - ➢ Keep track of product roadmap, business status and risks
- Presales information center
  - ➢ Handle questions between sales teams and product teams
  - ➢ Manage demo tools, support Asia-Pacific demos and POCs

(AI) Hand virtual try-on

(7 engineers, 6 months)

- Training data generation (synthetic)
  - ➢ Generate training data from 3D hand model for ring/bracelet/nail virtual try-on
  - ➢ Render training images with Blender
  - ➢ Compute ground truth labels from hand mesh and joint coordinates
- Hand tracking
  - ➢ AI model for live 3D hand joints detection
- Finger pose estimation
  - ➢ AI model for live finger joints 3D pose estimation (translation, rotation, scale)

(AI) Skin care feature detection (1 engineer, 1 year)

- Acne detection (B2B), texture detection (B2B), dehydration detection (B2C)
- Full-stack from scratch to product
  - Data collection, labelling, augmentation, balancing
  - Model design
  - Post-processing, porting to PC, mobile and web platforms

(AI) Feature integration and porting (1 engineer, 6 months)

- Integration of 10 skin care features from different people and repositories
  - Coding style unification, code size reduction (>50%)
- Porting AI detectors to web platform with tensorflow.js
  - Web assembly for fast pre-processing and post-processing
  - TFJS for fast inference
- Set up and maintain servers for real time skin care detection

Traffic sign recognition (1 engineer, 2 assistants, 4 months)

- Image feature extraction for traffic signs with traditional CV algorithms
  - HSV color space, edge detection, connected components, DtBs, HOG
- SVM for classification (over 20 classes), with both precision and recall > 90%
- Replace manual operation of traffic sign labeling with automatic identification

3D reconstruction and ortho-rectification from aerial images (3 engineers, 10 months)

- Reconstruct 3D scene from multiple 2D images by
  - SfM (Structure from Motion) to estimate camera poses, and construct ground feature point cloud
  - Bundle adjustment, with Ceres library for non-linear least square optimization
- Collaborating with GIS engineers, perform image stitching by orthographic projection, with re-projection error < 50cm

Garmin street view survey car (1 engineer, 3 drivers, 6 months)

- A large-scale update of survey car production software
  - Re-factory of production software into shooting, storage, map, user interface modules
  - Resolve overflowed memory problem due to replacement of high-resolution cameras
  - Dynamic adjustment of camera parameters to improve image quality
- Manage issue report system and related databases
- Online resolving issues reported by survey car drivers

React web app

- Self-driven project
- A YouTube music player with user-based playlist and real-time shared playlist
- Built with React, Redux, Material UI for appearance, and Firebase for data storage

Publications

1. Rolling shutter correction for video with large depth of field. ICIP'13
2. Blind image deblurring with modified richardson-lucy deconvolution for ringing artifact suppression. PSIVT'11