

Tsung-Sheng (Stephen) Huang

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Summary

- ✧ Software Engineer of Computer Vision & AI at Net2source (Contractor at Huawei)
- ✧ Trained Super Resolution models in **Caffe**, **Tensorflow** and **Keras**.
- ✧ Built automatic deployment pipeline for models from Caffe, **Tensorflow** and **Keras** in **C++** and **Python**.
- ✧ Experienced in **Machine Learning**, **Computer Vision** and **Image Processing**
- ✧ Highly skilled in **C++**, **Python**, **JAVA**, **Android Application Development** and **Object-oriented Programming**

Experience

Net2Source (Contractor at Huawei) – Software Engineer of Computer Vision & AI

Aug.2018 - present

Super Resolution using Convolutional Neural Network and Generative Adversarial Network

- Compared to traditional interpolation algorithms like bicubic or bi-linear, Super Resolution using CNN can reconstruct more details and present a better and sharper quality of videos to customers. In this project, I helped the team deploy, evaluate and solve the artifact of different models.
- Evaluated different CNN models trained with different hyper-parameters using objective metrics.
- Solved the issue of the inconsistency between PCs (**Keras**) and Phone's (GPU, Android) result. Increased the PSNR between PCs and Phones from **35 dB** to around **60 dB**.
- Increased the efficiency of conversion of models between different platforms by creating an automatic conversion script using **Python**.
- Built a tool for automatic deployment of models from **Keras** or **Caffe** to Android phones using **C++** and **NDK-build**.
- Constructed an Android app for running inference on GPU using **Tensorflow Lite** GPU API.
- In charge of setting up the training environment for **Caffe** on Ubuntu for team members.
- Investigated data augmentation of training data and post-processing (e.g. contrast enhancement) of label data.
- Research on ensemble CNN Super Resolution using Attention Mechanism. This further enhanced the performance of models when dealing with different scenarios. (in-door, out-door, human face)

Relevant Coursework & Skills

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| ◆ Image Processing | ◆ Digital Signal Processing |
| ◆ Machine Learning | ◆ Python, C++, JAVA, Android, MATLAB |
| ◆ Computer Vision | ◆ Object-oriented Programming |
| ◆ Tensorflow, Keras, Caffe, OpenCV, Scikit-learn | ◆ Programming Algorithm & Data Structure |
| ◆ Super Resolution | ◆ Generative Adversarial Network. |
| ◆ Android Application Development | ◆ Attention based Neural Network |

Relevant Technique

Computer Vision	Super Resolution, HoG, LoG, SIFT, Restoration, SIFT, Disparity Estimation, Image Compression, 3d point cloud processing, Histogram Equalization, Edge Detection, Segmentation, SIFT
Machine Learning	Neural Network, Convolutional Neural Network, Natural Language Processing (NLP), Generative Adversarial Network, Attention based Neural Network, SVM, Bayes Classifier, PCA, Clustering, Regression, Logistic Regression, Expectation Maximization

Relevant Projects

Texas Tech University

Quail Call Segmentation and Localization – Independent Research (**MATLAB**)

Aug. 2017 – Aug. 2018

- Helped government manage quail hunting by measuring the quail population density.
- Calculated correlation between template and spectrum by using Normalized Cross Correlation.
- Applied envelope detection on 1-D signal to correlation values to detect peaks and remove the background noise.
- Implemented logistic regression on envelope signal to detect the quail calls (F1-score: 89%).
- Reduced the manual work by 90% via automatic image and signal processing solutions.

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Hand-Written Digits Recognition – Machine Learning Project April 2018 – May 2018

- Implemented MSER algorithm to detect the hand-written digits in real time.
- Trained own Convolutional Neural Network with MNIST dataset to recognize digits (Accuracy: 98%).

Image Stitching – Computer Vision and Image Reconstruction Project February 2018 – March 2018

- Used SIFT, SURF and MSER algorithm to detect features in images automatically.
- Estimated geometric transform matrix by matching features of images to construct panorama view.

Orthopedic Diseases Classification – Machine learning Project March 2018 – April 2018

- Classified the disease of patients using the biomechanical attributes of pelvis lumbar spine with logistic regression.

Musical Tutoring App – Technology Startup Laboratory Project January 2017 – May 2017

- Developed an app on Android platform to help the students look for tutors on smart phones.
- Collaborated with business students to draft business plans and market strategies for the pricing of the app.

National Kaohsiung First University of Science and Technology

Self-directed Remote Car – Lab Project (JAVA) June 2013 – September 2014

- Utilized smart phones as the pilot of remote car to do surveillance patrol.
- Designed a system that transit images from phone in real time to assist safe controls more effectively.
- Automated self-directed vehicles to arrive at destination via setting start and end points.

Education & Certification

Texas Tech University – Lubbock, TX May 2018

M.S. Electrical Engineering, GPA – 3.9

NCEES - Fundamental Exams of Electrical and Computer Engineering March 2018

National Kaohsiung First University of Science and Technology – Kaohsiung, Taiwan June 2015

B.S. Computer and Communication Engineering

Publication

License Plate Localization and Recognition under Different Illumination Conditions

Thesis on ICCE-TW 2016 - Second Author (**C++ with OpenCV**)

- Improved detection rate of license plate using HDR (High Dynamic Range).
- Implemented Bernsen Binarization to enhance visibility of local details to improve accuracy of plate recognition.
- Applied Support Vector Machine (SVM) for character recognition after segmentation of license plate.

Internship

Brigham Young University

Self-driving Remote Car – Lab Internship (**JAVA with OpenCV**) June 2015 – August 2015

- Enhanced the efficiency of the remote car by increasing the obstacle recognition rate.
- Developed an app using OpenCV in **Android** (Open Source Computer Vision).
- Programmed an app to guide vehicles to run on tracks and detect/avoid obstacles using image processing.