Tsung-Sheng (Stephen) Huang

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Summary

- ✧ Software Engineer of Computer Vision & AI at Net2source (Contractor at Huawei)
- ✧ Super Resolution using **Convolutional Neural Network** (CNN) and **Generative Adversarial Network**
- ✧ Built automatic deployment pipeline for models from **Caffe**, **Tensorflow** and **Keras**
- ✧ Experienced in **Machine Learning**, **Computer Vision** and **Image Processing**
- ✧ Highly skilled in **C++**, **Python**, **JAVA** and **Android Application Development**

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.
- Developed the metrics for blurriness and blocking effect estimation of videos to further select the best model for the best visual experience.
- In charge of setting up the training environment for Caffe on Ubuntu for team members.
- Solved the issue of the inconsistency between PCs (**Keras**) and Phone's (GPU) result. Increased the PSNR between PCs and Phones from **35 dB** to around **60 dB**.
- Resolved Moire and shadowing artifact of recurrent frame Super Resolution models in **Python**.
- Increased the efficiency of conversion of models between different platforms like **Caffe**, **Keras** and **Tensorflow**.
- Built a tool for automatic deployment of models from different platforms using **C++** and **NDK-build**.
- 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)

Brigham Young University – Intern June. 2015 – Aug. 2015

Self-driving Remote Car

- 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.

Relevant Coursework & Skills

- ◆ Image Processing
- ◆ Machine Learning
- ◆ Computer Vision
- ◆ Tensorflow, Keras, Caffe, OpenCV, Scikit-learn
- ◆ Super Resolution
- ◆ Android Application Development
- ◆ Digital Signal Processing
- ◆ Python, C++, JAVA, Android, MATLAB
- ◆ Programming Algorithm & Data Structure
- ◆ Generative Adversarial Network.
- ◆ 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 – Individual Study (**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.

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- 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.

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.