Shuyang Wu

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Current Interest: Computational Sustainability, Video Segmentation

Education

Shanghai Jiao Tong University
Shanghai, China

B.S. in Environmental Engineering — *Sept. 2015 - Exp. June 2020*

- **GPA** - 3.4/4.3 (3.3/4.0, 83/100)
- **Standard Test** - TOEFL: 106 (R28 + L30 + S24 + W24), GRE: 320 (V150 + Q170 + AW3.5)
- **Relevant Coursework** -
  Basic: Programming, Theory of Computation, Architecture, OS, Linear Algebra, Probability and Statistics, Calculus
  Advanced: Data Science, Data Mining, Cryptography, High-performance Computing, Data Visualization, Software Engineering, VR/AR U3D Program Design, Unreal Game Design

Denmark Technical University
Kgs. Lyngby, Denmark

Exchange Student — *Jan. 2018 - Aug. 2018*

- **Relevant Coursework** - Database Systems, Machine Learning, Algorithms and Data Structure

Research Experiences

Multi-endpoint quantitative evaluation on zebrafish cardiovascular video
Shanghai, China

Advisor: Prof. Yanbin Zhao, Assistant Professor at Environmental Health Group, SJTU Environment — *Feb. 2019 - Exp. Nov. 2019*

- Implementing automated analysis tools to detect parameters of zebrafish ventricle and artery, improving from manual annotations, to release burdens of researchers and accelerate the detection of environmental cardiovascular toxicants.
- Building video segmentation model to detect relevant parameters of zebrafish ventricle based on MaskTrack and ResNet-Unet, reaching **IoU at 86%** and parameter error below 10% conform to **90% videos**, thus the method could completely replace human annotation with only basic verification.
- Proposed two methods based on OpenCV to automate the process of measuring artery parameters. Final results shows comparing to manual measurement, proposed automatic method raised detection rate from **75%** to **88%** and **20 times** reducing time consumption.

Machine Learning for Systematic Review in Food Toxicokinetics
Kgs. Lyngby, Denmark

Advisor: Prof. Finn Årup Nielsen, Associate Professor at Section for Cognitive Systems, DTU Compute — *July 2018 - Sept. 2018*

- Applied Natural Language Processing(NLP) method to classify abstract of scientific articles in Food Science into 9 areas, achieving the highest precision at 95% recall, to reduce researchers' workload.
- Raised the precision from **9%** of the original model to **22.4%**, based on NLTK, emsemble model of Logistic Regression, xgboost and Multilayer Perceptron. The features selected are regarded highly relevant from experts' review which indicates the model in high interpretability.
- Proposed a feasible transfer learning method, applying current model for classifing the same dataset into other areas for further research.

Selected Projects

Generating Chinese Memes (Biaoqingbao) Using Deep Neural Networks [Github]
Shanghai, China

Advisor: Prof. Liyao Xiang, Assistant Professor at John Hopcroft Center for Computer Science, SJTU — *Apr. 2019 - June 2019*

- Built meme dataset from (1)crawling meme-caption pair from Internet and (2)translating meme dataset with English captions into Chinese.
- Build encoder-decoder model with ResNet and Show and Tell model and train on the dataset. Used Stochastic Beam Search to generate various meme captions.
- Achieved perplexity at **5.16** and get some really funny memes.

Visualization of traffic flow evolution and congestion for concert traffic guidance
Shanghai, China

Advisor: Prof. Huijuan Dong, Associate Professor at BASICS lab, SJTU — *Apr. 2019 - June 2019*

- Applied real-time trip line, scatter point and 3D heat map on 50,000 taxi orders, based on deck.gl and d3.js, to visualize each track, to show traffic congestion interactively.
- Displayed and correctly summarized traffic flow evolution of all three key areas and five congestion area through visualization.
- Offered possible traffic guidance suggestions based on relevant information and visualization.

Analysis of Stormwater Quality Data from Online Sensors in Venice
Kgs. Lyngby, Denmark

Advisor: Prof. Luca Vezzaro, Associate Professor at Section of Water, DTU Environment — *Feb. 2018 - June 2018*

- Analyzed and interpreted spatiotemporal data of highway runoff, collaborating with *SWIgroup Italy*.
- Improved the original Outlier Detection method by Sensor Characterization, Local Outliers Function and PCA.
- Applied Generalized Linear Model on the processed data to make prediction, which reached RMSE to **35%**, and discovered relations between possible variables, to reduce the effect of sensor failure by giving suggestions for decision making.

Simulation on Air Pollutants Transmission of Power Plants based on CALPUFF *Shanghai, China*

Advisor: Prof. Zhen Cheng, Associate Professor at Air Pollution Group, SJTU Environment *Oct. 2017 - Dec. 2017*

- Crawled emission data of two power plants 6km away from campus.
- Simulated pollutants transmission and their impact with weather and air quality data based on WRF, CALPUFF and Matlab.
- Proved 'horrified' chimneys of power plants only contribute a little on awful air quality in campus. In worst situation when wind direction is from power plants, SO_2 would account for 9% of background value, while TSP and NO_X account for much less.

Honors & Awards

- **B-class University Scholarship** Twice, Top 10% in SJTU *2017 & 2018*
- **Outstanding Undergraduate Research Project** Top 10% in Shanghai *2017*
- **Merit Student** Top 5% in SJTU *2016*

Extracurricular Activities

SJTU Ourdoor Association *Shanghai, China*

Co-President in 2017-2018 *Oct. 2015 - PRESENT*

- Perform as core members in the hiking team, including team leader, first aid doctor, photographer. Leading team of 40 people.
- Re-constructed and normalized the publicity systems of the association inside and outside the campus. Made a series of templates in different media version for future use.

World Wildlife Fund(WWF) China *Shanghai, China*

Education Department, Long-term Volunteer *Oct. 2017 - Apr. 2018*

- Collected and edited 100+ pieces of news in environmental education, science, policies, etc each week, to deliver real-time environmental information to teenagers.
- Translated environmental news from the mainstream environmental website including UNEP, MONGABAY, TRAFFIC, into Chinese.

Skills

Programming	**Python**, **C/C++**, C#, R, JavaScript, HTML, CSS, Shell, SQL
Software&Toolkits	Pytorch, Tensorflow, Keras, CUDA, Git, LaTex, D3.js, Unity3D, Unreal, Arduino, MySQL, AutoCAD
Interests	Hiking, Running, Climbing, Bouldering, Orienteering