

Bo Sun

Email: bos@usc.edu, Google Scholar: [link](#), Github: [link](#) (total 🌟 287), Location: CA

HIGHLIGHTS

- USC Graduate School Theodore and Wen-Hui Chen Endowed Fellowship (Top 2%).
- 2 papers **accepted** by CVPR 2021, 1 **oral** and 1 poster.
- Open source my SOTA few-shot object detection method FSCE at [github](#), **accepted** by CVPR 2021.
- Re-implement Zero-DCE (a CVPR 2020 paper) with improvement and open-sourced on [github](#).
- Deployed a FaceID for Glidewell, open doors with IoT + IP camera via face, and alert with MS Team.
- Delivered a freelance project, IOS app for real-time rock classification with Pytorch Mobile and SwiftUI.

INTERESTS & SKILLS

Research Interests: Computer Vision. I have a strong passion for researching and building modern computer vision system/applications which understand and automate tasks that human visual system can do. My current research experience centers around **deep learning** and **object detection**.

Languages/Tools: Python, PyTorch, bash/zsh, detectron2, git/Github, AWS, OpenCV

EDUCATION

University of Southern California, CA, USA

M.S. Computer Science (Computer Vision Track, GPA: 3.92/4.0) Aug 2018 – May 2021

Ph.D. Computational Biology and Bioinformatics (GPA: 3.94/4.0) Aug 2016 – Dec 2021

Tongji University, Shanghai, CHINA

B.S. Bioinformatics (GPA: 90.05/100, Rank : 2/61) Aug 2012 – Jun 2016

INTERNSHIP EXPERIENCE

Facebook Inc.

Menlo Park, CA, May 2021 – Aug 2021

Business Integrity Team, Mentor: Dr. Rong Jin

Ph.D ML Engineer Intern

- Build data pipelines to collect and clean Ad-level data for weapon sale Ad policy enforcement.
- Road-test the new internal tech investment "Integrity Brain" in weapon sale policy.

Megvii

Beijing, China, Sep 2020 – Feb 2021

General Detection Team, Mentor: Banghui Li

Research Intern

- Devised a few-shot object detection algorithm with contrastive object proposal encoding, achieved *state-of-the-art* few-shot object detection (FSOD) performance with up to +8.7% AP on PASCAL VOC and +2.1% AP on the COCO benchmark. Paper under rebuttal for CVPR 2021, rating=2,2,3.
- Very familiar with developing with the facebook open-source detection framework Detectron 2.
- Continued research in FSOD and long-tail object detection (LVIS), current idea to regularize the object feature representations via covariance matrix is in-preparation for ICCV 2021.

Intellindust Inc.

Shenzhen, China, May 2019 – Aug 2020

Algorithm Team, Mentor: Dr. [Caizhi Zhu](#)

Algorithm Engineer Intern

- My modification and optimization of the Zero-DCE algorithm (no-reference image enhancement, CVPR2020) has 70+ stars on [Github](#). And it was selected to be marketed by Huawei on Modelarts.
- Led the set-up of a dark room for optical experiments, examining the algorithm boundary for neural-network based image enhancement under extremely low-light condition (<0.01 lux).
- Research in RGB/NIR image fusion, de-noise in RAW space, image/video enhancement.

PCL Laboratory

Shenzhen, China, Dec 2019 – May 2020

AI Reality Lab, Mentor: Prof. [Yinqiang Zheng](#)

Research Intern

- Designed a two-branch network structure for spectra reconstruction from RGB, which achieved high spectra upsampling accuracy, and can estimate illumination spectra for various lighting conditions.
- Designed an infra-red cut filter design module in the network, committed the deeply-learned filter to manufacture by Omegon company, validated the effectiveness with hardware implementation. The paper receives strong review (rating=1,2,3) at CVPR 2021, and is under rebuttal.

Glidewell Laboratory

Irvine, CA, Dec 2019 – May 2020

Data Science Team, Mentor: [Ben Vu](#), Roy Luo

Ph.D ML Engineer Intern

- Deployed a FaceID via IP camera and IoT devices, utilized Resnet, SSD, and ArcFace.
- Deployed a serverless information extraction pipeline in production for Glidewell Rx. forms, powered by object detection(faster-RCNN), and OCR(tesseract), served on AWS Lambda.
- Deployed a denture recognition model on webcams for the 2019 Glidewell Symposium.

Eli & Eythe Broad Center of Regeneration Medicine & Stem Cell Research LA, CA, Nov 2018 – Mar 2019

Mentor: Prof. Liang Chen, Prof. [Andrew P McMahon](#)

Data Analytics Intern

- Adopted a variance decomposition algorithm to remove confounding effect from association study.
- Deployed an interactive dash board with R Shiny to visualize gene expression changes through time.
- Algorithm predicted pseudo-time achieved $R^2 = 0.69$ in validation with real clinical surgery duration.

PUBLICATIONS

[Sun, B.](#) et al. Tuning IR-cut Filter for Illumination-aware Spectral Reconstruction from RGB (**CVPR 2021 Oral**)

[Sun, B.](#) et al. FSCE: Few-Shot object detection via Contrastive proposal Encoding (**CVPR 2021 Poster**)

Cippà, P. E., [Sun, B.](#), et al. (2019) A late B lymphocyte action in dysfunctional tissue repair following kidney injury and transplantation. **Nature Communications**.

[Sun, B.](#) Chen, L. (2019) Quantile regression for challenging cases of eQTL mapping. **Briefings in Bioinformatics**.

[Sun, B.](#)[†], Cippà, P. E.[†], et al. (2018) Transcriptional trajectories of human kidney injury progression. **JCI insight**.

[Sun, B.](#) et al. Improving few-shot object detection via coarse-to-fine refinement. (in-prep. for **ICCV 2021**)

[Sun, B.](#) Chen, L. In-silicon human gene knock-out experiments via neural networks. (in-prep. for **Cancer Cell**)

[Sun, B.](#) Chen, L. Modeling and quantifying Nonsense-Mediated Decay effect through eQTL fine-mapping. (in-prep. for **Nature Genetics**, bio-experiments delayed due to the COVID situation)

HONORS & CERTIFICATIONS

- 2020 Q4 distinguished internship award from Megvii object detection team.
- 2020-2021 USC Graduate School Theodore and Wen-Hui Chen Endowed Fellowship (Top 2%)
- 2016-2017 USC Dornsife Ph.D. Fellowship in the Science
- Three times Tongji University 2nd prize Study Scholarship (Year 2013, 2014 and 2015)
- AWS Associate Developer Certificate (2019-2022); Machine Learning Specialty Certificate (2019-2022)

COURSE PROJECTS

Recommender System for Yelp Ratings (a recommendation system project) Jun 2019

- Implemented kNN user-based, and online item-based collaborative filtering (CF) with PySpark.
- Achieved lowest RMSE = 0.99 with a model-based CF recommender built with Spark ML library.

Video colorization and cartoonization (a CV and deep learning project) Sep – Nov 2019

- Python image processing, video and soundtrack processing with ffmpeg and MoviePy.
- Image colorization with DeOdfy and cartoonization with CartoonGAN .
- Proposed a Temporal Stabilization Loss to increase the visual stability of the transformed video.

DOTA2 Gaming Review Sentimental Analysis (a NLP project) Nov - Dec 2018

- Built a scrapper for Stream™ gaming reviews, performed sentimental analysis for DOTA2™ reviews.
- Implemented Byte-Pair Encoding to learn a better tokenization for gaming reviews from data.
- Implemented a multi-label classifier for predicting question tags given Stack Overflow question body.
- Practiced a naming entity recognition (NER) pipeline for Twitter tweets with Bidirectional LSTM.