Yuexi Du

Computer Science :: Computer Vision :: Deep Learning

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EDUCATION

Yale University, New Haven, U.S. *Start from Sept. 2022*

- Doctor of Philosophy (Ph.D.) in Biomedical Engineering, Medical Image Analysis direction

University of Michigan, Ann Arbor, U.S. *Sept. 2020 – May. 2022*

- Bachelor of Computer Science, Department of Engineering, Mathematics Minor
- GPA: 4.00/4.00
- Course Work: *Intro. to Computer Organization* (**A+**), *Computer Vision* (**A+**), *Adv Topic in CV* (**A+**)

Shanghai Jiao Tong University, Shanghai, China *Sept. 2018 – Present*

- Bachelor of Science, Electrical Computer Engineering (Dual Degree)
- GPA: 3.70/4.00 (Top 10%)
- Course Work: *Programming and Data Structures* (**A+**), *Honors Mathematics IV* (**A+**)

SKILLS

Language: **C/C++, Python, JavaScript, MATLAB, Tex, Bash, R, Verilog, Arduino.**
Framework: **PyTorch, TensorFlow, MXNet, OpenCV, Faiss, OpenSlide, Flask, React, Gurobi, SQLite, Hadoop.**
Language: **Chinese** (*Native*), **English** (*Proficient*), **Spanish** (*Intermediate*).

PUBLICATION

Xiyue Wang*, Yuexi Du*, Sen Yang, Jun Zhang, Minghui Wang, Jing Zhang, Wei Yang, Junzhou Huang, Xiao Han. **RetCCL: Clustering-guided Contrastive Learning for Whole-slide Image Retrieval.** *Medical Image Analysis: Special Issue on Explainable and Generalizable Deep Learning Methods for Medical Image Computing (under review).*

Yuexi Du, Ziyang Chen, Justin Salamon, Bryan Russell, Andrew Owens. **Conditional Foley Generation.** *2022 Conference on Neural Information Processing System (under review).*

INTERN EXPERIENCE

Tencent, AI Lab, AI HealthCare *Advised by Dr. Xiao Han, M.S. Sen Yang*

Pathological Image Treatment Group Internship *May. 2021 – Sept. 2021*

- ***Objective:*** Research on **unsupervised contrastive learning** and **CBIR system** for pathological WSI.
- ***Responsibility:*** Introduce **periodical** moving average **clustering guided** module to reduce the number of **false negatives** in the contrastive learning process. Pre-trained model outperforms **ImageNet/other SSL** pre-trained on multiple downstream tasks. Achieves an accuracy of **93%** on the **TCGA lung cancer patch classification** experiment (ImageNet: 87%, SimCLR: 88%).
- ***Outcome:*** On **TCGA WSI retrieval** task for primary site of disease and patient level diagnoses test, beats Yottixel & FISH with a surpass of more than **10%** in terms of average mMV (mean Majority Vote). **A co-first author article** is under review for the top-tier journal **MedIA**.

RESEARCH EXPERIENCE

Vision @ UMich Research Group *Advised by Prof. Andrew Owens*

Research Assistant *May. 2021 – Present*

- ***Objective:*** Research & development of a novel **condition-based** method of **audio foley generation** with given silent video clip. Conditional visual-sound pair helps to generate **different style of output**.
- ***Responsibility:*** Design and implement the **VQ-GAN** model and auto-regressive model to generate plausible audio according to the target video and user provided conditional audio-visual clips.
- ***Outcome:*** One first author paper "*Conditional Foley Generation*" submitted to the NeurIPS 2022.

SJTU 35th PRP (Participation in Research Program) *Advised by Prof. Weiyao Lin*

Prime Participator *Dec. 2018 – Aug. 2019*

- ***Objective:*** Transplant **facial key point extraction** algorithm to mobile & improving b-box tracking algorithm.
- ***Responsibility:*** Revised the algorithm based on the MobileNetV2 rather than classify network. **Quantize** the network with TF-Lite to reduce model size. Modify the **bounding-box prediction algorithm** to avoid traction lost and reduce detection frequency.
- ***Outcome:*** Achieves an accuracy of **92%** and running speed of 10fps on Android platform.

M.I.N. Laboratory at SJTU *Advised by Prof. Weiyao Lin*

Research Assistant *May. 2019 – Mar. 2020*

- ***Objective:*** Re-Implementing & Developing cutting edge computer vision deep learning algorithms.

- ***Responsibility:*** LSTM based **skeleton sequence classification** w.r.t. types of activity program on NTU-RGBD dataset. Re-implement Mask-RCNN based on Fast-RCNN on MXNet framework, which achieves the same level of performance with less training time and batch size.

SELECTED PROJECTS

MIDOG Challenge of MICCAI 2021 *Advised by Dr. Xiao Han, M.S. Sen Yang*
Group Member as Intern *July. 2021 – Aug. 2021*

- ***Objective:*** Develop mitosis detection algorithm that able to generalize to different style of scanner.
- ***Responsibility:*** Implement and test frequency-based **Fourier Domain adaptation** method that generate pathological images with assigned style. Generate the segmentation mask for training with HoverNet.
- ***Outcome:*** **Ranked #1** in MICCAI 2021: MIDOG Challenge with a surpass, proposed method can generalize to 6 different domains with 2 unseen during training.

ColorVAE: Generative Colorization with Variational Auto-encoder *Advised by Prof. David Fouhey*
Prime Group Member *Feb. 2021 – Apr. 2021*

- ***Objective:*** Design an algorithm to generate **diverse and plausible** colorization plan for grayscale images.
- ***Responsibility:*** Implement **conditional** Variational Auto-Encode based model with image reconstruction loss. Conduct the experiment on the COCO dataset. Writing the complete report in CVPR format.
- ***Outcome:*** Proposed method can generate **diverse and authentic** colorization plan with different latent variables. Outperform SOTA colorization methods in an **anonymous survey** of 500 randomly sampled images and PSNR scores. Ranked #1 in the course EECS 442: Computer Vision.

IEEE Skeleton Data Encoding Algorithm Proposition *Advised by Prof. Weiyao Lin*
Volunteer Research Assistant *Aug. 2019 – Mar. 2020*

- ***Objective:*** Improve the existing compression algorithm & develop a demo program for the proposition.
- ***Responsibility:*** Implement frame-wise **automatic encoding selection algorithm** according to the predicted score of four different encoding of the previous frame in C++, which ensures no additional information is required during decoding. Develop an **end-to-end** video skeleton extraction, re-ID, and compression program with AlphaPose and PoseFlow.
- ***Outcome:*** The final program could encode the video in **real-time**. Reach a compression rate of **50%** at most.

TEACHING EXPERIENCE

Instruction Assistant of Computer Vision at UMich *Taught by Prof. David Fouhey*
Hold weekly Office Hour & Design homework & Manage Piazza *Jan. 2022 – April. 2022*

Teaching Assistant of Intro to Comics & Graphic Novels at SJTU *Taught by Prof. Joelle Tybon*
Hold weekly Office Hour & Grading, English only *May. 2021 – Aug. 2021*

Teaching Assistant of Intro to Computer & Programming at SJTU *Taught by Prof. Jigang Wu*
Leading Review Class & Office Hour & Grading & Design Lab Questions, English only *Aug. 2020 – Dec. 2020*

SELECTED HONORS & AWARDS

Outstanding Graduates of Shanghai *2022*
James B. Angell Scholar *2022*
Dean's Honor List & University Honor, UMich *2020, 2021, 2022*
Undergraduate Volunteer Scholarship, JI, SJTU *2020*
Intro to Engineering Course: Best Innovation Award, JI, SJTU *2019*
Undergraduate Scholarship of Excellence, SJTU *2019, 2020*
John Wu & Jane Sun Scholarship of Excellence, SJTU *2018*

OTHER ACTIVITIES & SERVICES

Joint Institute Student Union *Shanghai, China*
Leader of Organization Department *May. 2019 – June. 2020*

- ***Keywords:*** *Student's right affairs; Activity organization.*

Yunnan Kuang Chang Primary School *Yunnan, China*
Leader of Volunteer Teaching Group *Dec. 2019 – Feb. 2020*

- ***Keywords:*** *Teaching plan design; Activity promotion.*

Winter Exchange Program of University of Navarra *San Sebastián, Spain*
Exchange Student *Dec. 2018 – Feb. 2019*

- ***Keywords:*** *Machine Learning (A); Spanish (A).*