Yuexi Du

Biomedical Engineering :: Computer Vision :: Medical Image Analysis

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EDUCATION

Yale University, New Haven, U.S. *Sept. 2022 – Present*
- ❖ Doctor of Philosophy (Ph.D.) in Biomedical Engineering, Medical Image Analysis direction
- ❖ Currently advised *Prof. John Onofrey.*

University of Michigan, Ann Arbor, U.S. *Sept. 2020 – May. 2022*
- ❖ Bachelor of Computer Science, Department of Engineering, Mathematics Minor, **GPA: 3.97/4.00**
- ❖ Course Work: *Intro. to Computer Organization* (**A+**), *Computer Vision* (**A+**), *Adv. Topic in CV* (**A+**)

Shanghai Jiao Tong University, Shanghai, China *Sept. 2018 – Aug. 2022*
- ❖ 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

[1] **Yuexi Du**, Ziyang Chen, Justin Salamon, Bryan Russell, Andrew Owens. **Conditional Generation of Audio from Video via Foley Analogies.** *2023 Conference on Computer Vision and Pattern Recognition. Project page: https://xypb.github.io/CondFoleyGen/*

[2] 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, Volume 83, 2023, 102645, ISSN 1361-8415, https://doi.org/10.1016/j.media.2022.102645.*

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*
- ❖ *<u>Objective</u>:* Research on **unsupervised contrastive learning** and **CBIR system** for pathological WSI.
- ❖ *<u>Responsibility</u>:* 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%).
- ❖ *<u>Outcome</u>:* 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). Our work is accepted by the top-tier journal **MedIA**.

RESEARCH EXPERIENCE

Image Processing & Analysis Group at Yale *Advised by Prof. James Duncan & Prof. John Onofrey*
Research Assistant *Sept. 2022 – Present*
- ❖ *<u>Objective</u>:* Research of temporal information in 4D echocardiography for left ventricular motion tracking and segmentation joint network. Also, research on a local rotational invariant CNN architecture.
- ❖ *<u>Responsibility</u>:* Leading the project and implement the designed dual-decoder U-Net network with a temporal module to process the temporal information. Conduct the experiment on synthetic dog echocardiography data.

Vision @ UMich Research Group *Advised by Prof. Andrew Owens*
Research Assistant *May. 2021 – Present*
- ❖ *<u>Objective</u>:* 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**.
- ❖ *<u>Responsibility</u>:* 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.
- ❖ *<u>Outcome</u>:* One first author paper accepted by the CVPR 2023.

M.I.N. Laboratory at SJTU *Advised by Prof. Weiyao Lin*
Research Assistant *May. 2019 – Mar. 2020*
- ❖ *<u>Objective</u>:* 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

Protect Face Recognition System against Various Attacks   *Advised by Prof. Ran Yi*
Primary Group Member   *May. 2022 – Aug. 2022*
- ❖ **Objective:** Develop a human face deep-fake detection algorithm that robust to various deep-fake methods.
- ❖ **Responsibility:** Implement the patch-wise discrete cosine frequency transformation blocks to re-encode the video information into different frequency domain. Design and experiment with different 2 stream X3D based video fraud detection architecture and combine with frequency transformation block. Experiment the proposed model on the FF++ dataset.
- ❖ **Outcome:** The final algorithm achieves an SOTA performance with as high as **97.9%** Acc. on the FF++ c40 dataset and **99.8%** Acc. on the Celeb-DF v2 dataset.

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.

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

Yale University Fellowship, Yale	*2022*
Outstanding Graduates of Shanghai, SJTU	*2022*
James B. Angell Scholar, UMich	*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).