

RUOQI WANG

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EDUCATION

Sun Yat-sen University (SYSU), B.Eng., School of Computer Science and Engineering. Sep. 2018 — Jun. 2022

- Major: Computer Science and Technology
- Weighted Average Grade: **89/100** (GPA: **3.8/4.0**)
 - Freshman Year: 85/100, Sophomore Year: 91/100, Junior Year: 91/100
- Awards and Honors:
 - Academic Excellence Scholarship, Sun Yat-sen University, 2020
 - Student Elite Representative, School of Computer Science and Engineering, Sun Yat-sen University, 2021

PUBLICATIONS

1. **Ruoqi Wang**, Ziwang Huang, Haitao Wang, Hejun Wu, “AMMASurv: Asymmetrical Multi-Modal Attention for Accurate Survival Analysis with Whole Slide Images and Gene Expression Data,” *IEEE International Conference on Bioinformatics and Biomedicine (IEEE BIBM)*, under review, preprint arXiv:2108.12565, 2021.
2. Ziwang Huang, Hua Chai, **Ruoqi Wang**, Haitao Wang, Yuedong Yang, Hejun Wu, “Integration of patch features through self-supervised learning and transformer for survival analysis on whole slide images”, *Medical Image Computing and Computer-Assisted Intervention Society (MICCAI)*, **accepted**, 2021.
3. Haitao Wang, Hejun Wu, **Ruoqi Wang**, Ziwang Huang, “Deep Discriminative Feature Learning for Concrete Surface Damage Classification,” *IEEE Transactions on Industrial Informatics (IEEE TII)*, under review, 2021.
4. Haitao Wang, Yongqiang You, Hejun Wu, **Ruoqi Wang**, “Discrete Contrastive Learning for Sample-Efficient Reinforcement Learning,” *AAAI Conference on Artificial Intelligence (AAAI)*, under review, 2022.

RESEARCH PROJECTS

Artificial Intelligence in Healthcare

Asymmetrical multi-modal survival analysis using medical images and structured data. May. 2021 — Aug. 2021

Machine Perception Laboratory, SYSU

My contributions:

- I independently designed an asymmetrical multi-modal attention mechanism (AMMA) to generate more flexible joint representation of medical images and structured data.
- Different from previous works, AMMA can effectively utilize the intrinsic information within every modality and flexibly adapt to the modalities of different importance.
- I designed and conducted various experiments to verify the effectiveness of the new model. On public datasets from TCGA, the results of the proposed method are 5%-6% higher (C-index) than other SOTA methods.
- The article “AMMASurv: Asymmetrical Multi-Modal Attention for Accurate Survival Analysis with Whole Slide Images and Gene Expression Data” is submitted to IEEE BIBM.

Integration of Patch Features of Whole Slide Images through Self-Supervised Learning and Transformer for Survival Analysis. Dec. 2020 — Mar. 2021

Machine Perception Laboratory, SYSU

My contributions:

- I conducted experiments on the influence of self-supervised learning for extracting the features of whole slide images (WSIs) and researched the effect of positional embedding of WSI patches.
- The approach with self-supervised learning and position embedding outperformed the previous best approach by an average of 3% (C-index) in survival prediction on three datasets.
- The article “Integration of Patch Features through Self-Supervised Learning and Transformer for Survival Analysis on Whole Slide Images” is accepted by MICCAI 2021.

The effect of surgery and drug treatment on the visual field progression of different glaucoma patients and glaucoma patients with comorbidities. Dec. 2020 — Mar. 2021

Zhongshan Ophthalmic Center, SYSU

My contributions:

- I designed an efficient sample matching method based on the Levenshtein distance algorithm to solve the problems of inaccurate and incomplete information in the original medical dataset.
- The proposed method increased the number of effective samples by 30%, facilitating subsequent experiments.
- The results are expected to be published in 2022.

Machine disease diagnosis on small and unbalanced datasets with multi-modal data. Nov. 2020 — Dec. 2020

Machine Perception Laboratory, SYSU

My contributions:

- I used multi-modal data (clinical data and omics data of patients with nasopharyngeal carcinoma) to get better joint representations for classification.
- I proved the complementarity between data from two modalities.
- I studied the application of machine learning methods on small and uneven datasets.

Artificial Intelligence in Industry

Deep discriminative feature learning on concrete surface images. Jul. 2021 — Sep. 2021

Machine Perception Laboratory, SYSU

My contributions:

- I participated in researching a novel end-to-end framework named Deep Discriminative Feature Learning (DDFL) based on Collective Matrix Factorization (CMF) and Vision Transformer (ViT) to extract and select discriminative features of crack images.
- The learning framework integrates the deep feature learning and feature selection so that more discriminative representation can be learned for crack classification.
- Our method outperforms other mainstream classification models on four datasets in varieties of evaluation criteria.
- The article "*Deep Discriminative Feature Learning for Concrete Surface Damage Classification*" is submitted to IEEE TII.

Smart balanced delivery task scheduling. Jul. 2021 — Aug. 2021

Machine Perception Laboratory, SYSU

My contributions:

- I optimized one of the proposed algorithms by reducing loops and superimpose distance and time matrices, making the computational complexity become 1/2 of the original method.
- I re-implemented a baseline method GCN-NPEC.
- The results are expected to be published in Dec. 2021.

TECHNICAL SKILLS

- **Research Areas:**
Artificial intelligence in healthcare, machine learning, deep learning and computer vision.
- **Programming Languages:**
Familiar with C/C++, Python, and MATLAB.
- **Software Frameworks & Tools:**
Familiar with PyTorch, OpenCV, NumPy, Scikit-learn, Pandas, CUDA, LaTeX, and MySQL.