

# RUOQI WANG

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## EDUCATION

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**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
  - Excellent Student Elite Representative, School of Computer Science and Engineering, Sun Yat-sen University, 2021

## PUBLICATIONS

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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 Representation Learning for Reinforcement Learning,” *AAAI Conference on Artificial Intelligence (AAAI)*, under review, 2022.

## RESEARCH PROJECTS

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### 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” was 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” was 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*" was 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**

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- **Research Areas:**  
Artificial intelligence in healthcare, medical image analysis, 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.