

XIAOKAI LIU

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EDUCATION

Huazhong University of Science and Technology	<i>2019-2022</i>
Master's of Cyberspace Security	<i>78.83/100</i>
Zhengzhou University	<i>2015-2019</i>
Bachelor's of Mathematics and Applied Mathematics	<i>78.22/100</i>

PUBLICATIONS

Conference Papers

- *HMATT: Long-tail Music Genre Classification via Hierarchical Multi-instance Attention Mechanism*
Xiaokai Liu*, Menghua Zhang
Ready to be submitted to ICASSP'23
- *ANDVARINAUT: Protecting HPC Applications with Arbitrary Input from Silent Data Corruption*
Xiaokai Liu*, Yafan Huang, Guanpeng Li*
Ready to be submitted to DSN'23
- *A Compiler-Directed Multi-Bit-Flip Soft Error Detection Framework for HPC*
Yafan Huang, **Xiaokai Liu**, Guanpeng Li*
Ready to be submitted to IPDPS'23
- *Prophet: An Efficient and Scalable Testing Framework for Autonomous Driving Systems*
Xiaokai Liu, Sheng Di, Guanpeng Li*
Ready to be submitted to DAC'23
- *MATT: A Multiple-instance Attention Mechanism for Long-tail Music Genre Classification*
Xiaokai Liu, Shihui Song, Menghua Zhang, Yafan Huang*
SMC'22: International Conference for High Performance Computing, Networking, Storage and Analysis, 2022
- *LeKAN: Extracting Long-tail Relations via Layer-Enhanced Knowledge-Aggregation Networks*
Xiaokai Liu, *Feng Zhao, Xiangyu Gui, Hai Jin
DASFAA'22: International Conference on Database Systems for Advanced Applications
- *Predicting RNA Molecular Specific Hybridization via Random Forest*
Weijun Zhu, **Xiaokai Liu**, Zhenfei Wang, Yongwen Fan, Jianwei Wang
ICBCB'19: IEEE International Conference on Bioinformatics and Computational Biology

Journal Papers

- *Predicting the results of RNA molecular specific hybridization using machine learning*
Weijun Zhu, **Xiaokai Liu**, Mingliang Xu, Huanmei Wu
IEEE/CAA Journal of Automatica Sinica, 2019, 13 pages

RESEARCH EXPERIENCE

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- | | |
|---|------------------------|
| Research Assistant Internship | <i>02/2022-08/2022</i> |
| <i>Protecting HPC Applications with Arbitrary Input from Silent Data Corruption</i> | |
| · Invested HPC software errors caused by arbitrary input. | |
| · Implemented genetic algorithm to acquire training data. | |

- Leveraged meta-learning to predict the SDC rate of the HPC program.

Research Assistant Internship

02/2022-03/2022

Detecting and Protecting Multi-Bit-Flip Error for HPC Program

- Investigated the software errors caused by multi-bit flip.
- Designed feature extraction methods and machine learning models for predicting multi-bit flip.
- Develop parallel fault injection PinFI tools to improve the efficiency of binary program Fault injection.

Research Assistant Internship

08/2021-12/2022

Improving Test Efficiency and Scalability in Autonomous Driving Software

- Investigated the software deficiencies of Apollo that led to safety violations in autonomous driving.
- Designed an efficient and scalable fuzzing framework and machine learning modeling methods.
- Evaluated our proposed method and compared it with existing state-of-art fuzzing techniques of Autonomous Driving Systems.

Research Assistant Internship

01/2021-07/2021

Designing transferable trust mechanism in Heterogeneous Multi-robot System

- Investigated the transferable factors affecting the trust between human and heterogeneous multi-robot system (HMRS).
- Designed the overall framework of the transferable trust mechanism. Neural Networks were adopted to predict whether the behaviors of HMRS would be trusted by Human. The transforms were used to help HMRS understand the verbal reminders of human.

Project Leader

01/2021-07/2021

Improving performance of long-tailed music genre classification

- Investigated the long-tailed problem in music genre and methods were applied to classify the genre of music.
- Designed novel networks that could boost the performance of the data-poor genres at the tail via leveraging the knowledge from data-rich genres at the head.
- Evaluated our proposed method and compared it with existing state-of-art music genre classification method.

Research Assistant

09/2020-01/2021

Improving performance of long-tailed relation extraction

- Investigated the long-tail problem in relation extraction and methods adopted to extract relations from contexts.
- Designed novel networks and hierarchical attention mechanism to improve performance of long-tailed relation extraction.
- Evaluated our proposed method and compared it with existing state-of-art relation extraction methods.

Research & Development Internship

04/2020-07/2019

Research on the compression of Ray Tracing Algorithm

- Developed cloud rendering algorithm (ray tracing). C++ is used as the main programming language, cmake is used to organize projects. Intel Ospray, Embree and blender are used to render complex scenes.
- Deep neural networks (NeRF, LLFF) are used to accelerate the render. The networks are implemented via Pytorch, and Tensorflow.
- The project involves ray tracing, data retrieval, cost control, data analysis, deep learning and other technologies.

Research Assistant

01/2019-07/2019

Improving efficiency of computing results of molecular hybridization

- Investigated the performance bottlenecks of simulation software for the analysis and design of nucleic acid structures.
- Designed machine learning methods to predict the results of DNA & RNA molecular specific hybridization.
- Evaluated the proposed machine learning methods in predicting the results of molecular hybridization and compare them with the traditional molecular hybridization simulation software.

WORK EXPERIENCE

University of Iowa*Research Assistant*

08/2021-Present

Iowa City, IA

Kent State University*Research Assistant*

01/2021-07/2021

Kent, OH

Huawei Company*Research & Development Assistant Intern*

04/2020-07/2020

Shenzhen, China

Huazhong University of Science and Technology*Research Assistant*

2019-2022

Wuhan, China

Zhengzhou University*Research Assistant*

02/2019-07/2019

Zhengzhou, China

PROFESSIONAL SERVICE

Program Committee: AACL-IJCNLP(SRW-2022)**Reviewer: IJCNN(2022)****Subreviewer: MIDDLEWARE(2022), ISSRE(2022), QRS(2021)****EXTRACURRICULAR ACTIVITIES**

Symphony Orchestra of Huazhong University of Sci. & Tech.*Viola Player*

09/2019-07/2021

Wuhan, Hubei

VOLUNTEER

The 7th CCF Conference on Big Data, China Computer Federation (CCF)

09/2019.

CERTIFICATION

Diploma in Cello Performance, awarded by China Conservatory of Music

10/2012.

Diploma in Violin Performance, awarded by China Conservatory of Music

08/2010.

AWARDS

Excellent Graduate, awarded by HUST

06/2022.

Excellent Social Activist, awarded by HUST

11/2021.

1st Prize of the sixth national college student art exhibition, awarded by MOE 05/2021.**Excellent Student Cadre, awarded by HUST**

09/2020.