LI WEI 李巍

MPhil Student ⋄ Department of Computer Science & Engineering
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RESEARCH INTERESTS

- Electronic Design Automation (Physical Design, Design for Manufacturability).
- Study on Graph Neural Network (GNN), especially theoretical analysis and its application in VLSI design.

EDUCATION

The Chinese University of Hong Kong, Hong Kong Aug. 2019 – Aug. 2021(as expected)
Master of Philosophy, Department of Computer Science and Engineering
Supervisor: Professor Bei Yu
GPA: 3.970/4.000
TOEFL(Overall: Reading/Listening/Speaking/Writing): 106: 30/30/23/23 Thesis Title: Irregular Deep Data Embedding and Learning

The Chinese University of Hong Kong, Hong Kong Aug. 2014 – Aug. 2018
Bachelor of Science, Department of Computer Science and Engineering
ELITE Stream student
Cumulative/Major GPA: 3.529/3.606 Dissertation: "Deep Learning for Breast Cancer Diagnosis"
Advisor: Professor Michael R. Lyu

RESEARCH EXPERIENCE

MPhil Student, The Chinese University of Hong Kong, Hong Kong Aug. 2019 – Present
Routing Tree Construction ***[ASP-DAC'21, Best Paper Award]***

- Formalized special properties of the point cloud for the routing tree construction with theoretical proof.
- Proposed an adaptive flow, which used the cloud embedding obtained by a specifically-designed model based on special properties, to select the best approach and predict the best parameter;
- Outperformed previous methods by a large margin yet being extensible and flexible.

Adaptive Layout Decomposition ***[DAC'20]***

- Proposed an adaptive workflow for efficient decomposer selection and graph matching using graph embeddings.
- Designed a graph library construction algorithm based on graph embeddings for small graphs excluding isomorphic ones.
- Reduced the runtime by 87.7% while still preserving the optimality compared with the ILP-based decomposer.

Reviewed paper for ICCV'21

Research Assistant, The Chinese University of Hong Kong, Hong Kong Feb. 2019 – July. 2019
Open-source Layout Decomposition Framework ***[TCAD'21]***

- Presented an open-source layout decomposition framework, with efficient implementations of various state-of-the-art simplification and decomposition algorithms.
- Discovered a set of issues of previous algorithms and proposed corresponding solutions.

Acceleration and Compression of DNNs ***[ICTAI'19, Best Student Paper Award]***

- Proposed a unified framework to compress CNNs by combining both lowrankness and sparsity.
- Compressed the model with up to 4.9× reduction of parameters at a cost of little loss.

Research Assistant, Southern University of Science and Technology, China June. 2018 – Jan. 2019
Testing of Auto-driving Systems ***[ICSE'20]***

- Introduced a joint optimization method to systematically generate adversarial perturbations to mislead steering of an autonomous driving system physically.
- Demonstrated the possibility of continuous physical-world tests for auto-driving scenarios as the first study.

Fault Localization ***[ISSTA'19, Distinguished Paper Award]***

- Proposed a hierarchical DL approach to automatically learn the most effective features for precise fault localization.

- Significantly outperformed state-of-the-art with over 20% improvement.

TEACHING ASSISTANT

Spring 2020	CENG3420 Computer Organization and Design
Spring 2021	CENG2030 Fundamentals of Embedded Systems

SELECTED AWARDS AND HONORS

Best Paper Award	ASP-DAC	2021
Richard Newton Young Student Fellow	DAC	2020
Best Student Paper Award	ICTAI	2019
Distinguished Paper Award	ISSTA	2019
Full Postgraduate Studentship	CUHK	2019-
2nd Place Award in CAD Contest	ICCAD	2018
ELITE Stream Student Scholarship	Faculty of Engineering, CUHK	2018
Dean' s List	Faculty of Engineering, CUHK	2015,2017,2018
Best Undergraduate Summer Project Award	Faculty of Engineering, CUHK	2017

PUBLICATIONS

Preprint

[C10] **Wei Li**, Ruxuan Li, Yuzhe Ma, Siu On Chan, Bei Yu, "Rethinking Graph Neural Networks for Graph Coloring", submitted to International Conference on Computer Vision (ICCV) 2021, under review.

[J2] **Wei Li**, Yuzhe Ma, Yibo Lin, Bei Yu, "Adaptive Layout Decomposition with Graph Embedding Neural Networks", submitted to IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**), under review.

Journal Papers

[J1] **Wei Li**, Yuzhe Ma, Qi Sun, Zhang Lu, Yibo Lin, Iris Hui-Ru Jiang, Bei Yu, David Z. Pan, "OpenMPL: An Open Source Layout Decomposer", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (**TCAD**).

Conference Papers

[C9] **Wei Li**, Guojin Chen, Haoyu Yang, Ran Chen, Bei Yu, "Learning Point Clouds in EDA", ACM International Symposium on Physical Design (**ISPD**), Mar. 21–Mar. 24, 2021.

[C8] **Wei Li**, Yuxiao Qu, Gengjie Chen, Yuzhe Ma, Bei Yu, "TreeNet: Deep Point Cloud Embedding for Routing Tree Construction", IEEE/ACM Asian and South Pacific Design Automation Conference (**ASP-DAC**), Tokyo, Jan. 18–21, 2021. **(Best Paper Award)**

[C7] **Wei Li**, Jialu Xia, Yuzhe Ma, Jialu Li, Yibo Lin, Bei Yu, "Adaptive Layout Decomposition with Graph Embedding Neural Networks", ACM/IEEE Design Automation Conference (**DAC**), San Francisco, July 19-23, 2020.

[C6] Husheng Zhou, **Wei Li**, Yuankun Zhu, Yuqun Zhang, Bei Yu, Lingming Zhang, Cong Liu, "DeepBillboard: Systematic Physical-World Testing of Autonomous Driving Systems", ACM/IEEE International Conference on Software Engineering (**ICSE**), Seoul, May 23–29, 2020.

[C5] Yuzhe Ma, Zhuolun He, **Wei Li**, Tinghuan Chen, Lu Zhang, Bei Yu, "Understanding Graphs in EDA: From Shallow to Deep Learning", ACM International Symposium on Physical Design (**ISPD**), Taipei, Mar. 25–Apr. 01, 2020.

[C4] Yuzhe Ma, Ran Chen, **Wei Li**, Fanhua Shang, Wenjian Yu, Minsik Cho, Bei Yu, "A Unified Approximation Framework for Deep Neural Networks", The IEEE International Conference on Tools with Artificial Intelligence (**ICTAI**) 2019. **(Best Student Paper Award)**

[C3] **Wei Li**, Yuzhe Ma, Qi Sun, Yibo Lin, Iris Hui-Ru Jiang, Bei Yu, David Z. Pan, "OpenMPL: An Open Source Layout Decomposer", IEEE International Conference on ASIC (**ASICON**), Chongqing, China, Oct. 29–Nov. 1, 2019.

[C2] Xia Li, **Wei Li**, Yuqun Zhang, Yuqun Zhang, Lingming Zhang, "DeepFL: Integrating Multiple Fault Diagnosis Dimensions for Deep Fault Localization",The ACM SIGSOFT International Symposium on Software Testing and Analysis (**ISSTA**), 2019. **(Distinguished Paper Award)**

[C1] Bentian Jiang, Xiaopeng Zhang, Ran Chen, Gengjie Chen, Peishan Tu, **Wei Li**, Evangeline F. Y. Young, Bei Yu, "FIT: Fill Insertion Considering Timing", ACM/IEEE Design Automation Conference (**DAC**), Las Vegas, NV, June 2-6, 2019.

TECHNICAL SKILLS

Languages	Mandarin, Cantonese, English
Programming Languages	C/C++, Python, CUDA, LaTeX