Bohan WANG

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EDUCATION BACKGROUND & SCHOLARSHIPS

Emory University 01/2025 - Current

PhD in Computer Science advised by Prof. Wei Jin.

École Polytechnique Fédérale de Lausanne (EPFL) 09/2020 - 10/2023

Master of Science (MSc) in Electrical and Electronic Engineering with a Minor in Data Science; GPA: 5.38/6.0

University of Nottingham, Nottingham United Kingdom (UoN) 09/2016 - 07/2020

First-class BEng. (Hons) in Electrical and Electronic Engineering; GPA: 85.0/100 (Ranked Top 10% in Department of Electrical and Electronic Engineering)

- Honor: Nottingham Engineering Excellence Scheme (2018-2019, Top 5% in Department)
- Scholarship: Awarded Dean's Scholarship for Academic Excellence (2017-2018, Top 10% in Department)

PUBLICATIONS(*indicates equal contribution)

Conference Papers

- **Graph odes and beyond: A comprehensive survey on integrating differential equations with graph neural networks**
  Zewen Liu*, Xiaoda Wang*, **Bohan Wang**, Zijie Huang, Carl Yang, and Wei Jin.
  Proceedings of the 31th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 2025
  Paper link: https://arxiv.org/abs/2503.23167
- **Mitigating Graph Covariate Shift via Score-Based Out-of-Distribution Augmentation**
  Bohan Wang, Yurui Chang, Lu Lin.
  arXiv
  Paper link: https://www.arxiv.org/abs/2410.17506
- **DiGress: Discrete Denoising diffusion for graph generation**
  Clément Vignac*, Igor Krawczuk*, Antoine Siraudin, **Bohan Wang**, Volkan Cevher, Pascal Frossard.
  The International Conference on Learning Representations (ICLR), 2023
  Paper link: https://arxiv.org/abs/2209.14734
- **Regularization of polynomial networks for image recognition**
  Grigorios G Chrysos, **Bohan Wang**, Jiankang Deng, Volkan Cevher.
  The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR), 2023
  Paper link: https://arxiv.org/abs/2303.13896
- **ALO-VC: Any-to-any Low-latency One-shot Voice Conversion**
  Bohan Wang, Damien Ronssin, Milos Cernak.
  INTERSPEECH Conference, 2023
  Paper link: https://arxiv.org/abs/2306.01100
- **Detection of Typical Sentence Errors in Speech Recognition Output**
  Bohan Wang*, Ke Wang*, Siran Li*, Mark Cieliebak.
  Junior track, The 7th Swiss Text Analytics Conference (SwissText)
  Paper link: https://ceur-ws.org/Vol-3361/paper1.pdf

RESEARCH & INTERNSHIP EXPERIENCES

Research Assistant, The Pennsylvania State University 01/2024 - 10/2024

(Supervisor: Prof. Lu Lin)

- Exploring graph-generation-based strategies to address the Out-of-Distribution (OOD) problem in machine learning on graph-structured data.
- **Submitted a paper to the International Conference on Learning Representations (ICLR) 2025 as the first author.**

Engineering Internship focusing on deep learning, Logitech 09/2022 - 03/2023

(Supervisor: Dr. Milos Cernak)

- Designed and implemented a Conformer based deep learning model to capture Phonetic posteriorgrams (PPGs) from a speech.
- Designed and implemented a deep learning model to generate a sequence of converted acoustic features for LPCNet to synthesize target speaker speech with the same linguistic content as the source speech.
- Designed and implemented a non-parallel low-latency real-time any-to-any voice conversion system.
- **First-authored a paper accepted by the INTERSPEECH Conference 2023.**

Research Assistant, Signal Processing Laboratory (LTS4), EPFL 07/2022 - 09/2022

(Supervisors: Clément Vignac and Prof. Pascal Frossard)

- Visualized the diffusion process and denoising process of a discrete diffusion model for graph generation.
- Studied the discrete denoising diffusion model for generating graphs.

- Trained a graph transformer network to predict target properties of a clean graph from its noisy version.
- Designed and implemented the conditional denoising process for the discrete denoising diffusion model.
- Implemented molecular scaffold extension using the discrete denoising diffusion model to extend existing subgraphs.
- **Co-authored a paper accepted by the International Conference on Learning Representations (ICLR) 2023.**

Research Assistant, Department of Electrical and Electronic Engineering, UoN 06/2019 - 09/2019

(Supervisor: Prof. Phil Sewell)

- Applied C++ and Qt Creator to design a windows-based Graphical User Interface (GUI) enabling the user to efficiently and conveniently extract and interpret a large amount of experiment data.
- Debugged and optimized code to facilitate a more user-friendly GUI, achieving numerous functions including drag and drop, highlighting, ability to resize panes and record file history, etc.
- Utilized the GUI to read a CSV file and presented the data in a TXT file to clients; visualized raw data into 2D plots based on calculation methods and functions.
- Assisted supervisor with the integration of the GUI with their experiment software and achieved functions of real-time data monitoring, data recording and exporting, and data visualization.

Research Assistant, Department of Electrical and Electronic Engineering, UNNC 06/2018 - 09/2018

(Supervisor: Prof. Jing Wang)

- Conducted a literature review on state-of-the-art optical Fiber Bragg Grating (FBG) biosensors and their applications.
- Reviewed 30 papers (2015-2018) on design methods, manufacturing processes, and applications from IEEE, and Google Scholar.
- Summarized previous methods of applying FBG in biosensors such as etching and coating; explored a wide range of applications of FBG biosensor such as protein detection, genomic DNA detection, and D-glucose and glycated hemoglobin detection.
- Gained a comprehensive understanding of FBG biosensor and produced an extensive literature review for the research.

PROJECT EXPERIENCES

Master Thesis Project, Graph Based Sketch Generation and Globally Accurate Graph Generation Metrics, ETH Zürich 03/2023 - 09/2023

(Supervisors: Karolis Martinkus, Dr. Nathanaël Perraudin, Prof. Pascal Frossard and Prof. Roger Wattenhofer)

- Designed and implemented three diffusion models for sketch graph generation: ConSketchGrapher, MixSketchGrapher, and SpectraSketchGrapher.
- Evaluated three distinct types of graph representations for sketches: multi-line graphs, multi-line graphs with intersection points, and smoothed B-Spline multi-line graphs.
- Explored and compared various evaluation metrics for graph generation. Proposed a spectral-based evaluation metric for graph generation, and subsequently evaluated this newly proposed spectral-based evaluation metric for graph generation.

Group Project, Complete Sentence Detection for Speech Recognition Systems, EPFL 09/2021 - 01/2022

(Supervisor: Prof. Mark Cieliebak)

- Selected four diverse datasets: News reports, Ted 2020 Parallel Sentences Corpus, Wikipedia corpus, and Topical-Chat.
- Preprocessed data using sentence tokenization, removed sentence-ending symbols, short sentences, and duplicates.
- Created negative samples simulating speech recognition system errors, including false boundaries and missing/repeated words.
- Fine-tuned BERT, GPT-2 and BIG-BIRD transformer models to extract sentence embeddings for downstream classification.
- Conducted ensemble learning using random forest for predictions from different transformer models.
- **Co-first authored a paper accepted by the 7th Swiss Text Analytics Conference.**

Master Semester Projects, Regularization of Polynomial Neural Networks, EPFL 02/2021 - 01/2022

(Supervisors: Dr. Grigorios Chrysos and Prof. Volkan Cevher)

- Proposed a recursive equation for regularized polynomial expansion.
- Designed regularized Deep Polynomial Networks (DPNs) using PyTorch based on the proposed parameterization.
- Developed normalization, initialization, and explicit regularization schemes for regularized DPNs (without activation functions).
- Conducted experiments on widely-used datasets (Cifar, STL, Tiny ImageNet) to evaluate regularized DPNs stability and performance.
- Achieved comparable performance to ResNet18 using regularized DPNs (without activation functions) on Cifar, STL, Tiny- ImageNet, and ImageNet datasets.
- Implemented self-supervised models (MoCo, SimCLR) using Lightly library and evaluated DPNs-based encoders on Cifar10 and Tiny ImageNet.
- Designed a new DPN variant with dense connections across polynomials for a higher degree of polynomial expansion.
- Developed a specific regularization scheme to address instability issues in the new DPN variant.
- Demonstrated that the new DPN variant (without activation functions) containing only 7 million trainable parameters matched ResNet18 performance.
- **Co-authored a paper accepted by the IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR) 2023.**

QUALIFICATION & SKILLS

Languages: Chinese Mandarin (Native) and English (Proficient);
Deep Learning Libraries: PyTorch, PyG (PyTorch Geometric), DGL, NetworkX, TensorFlow, Keras, Gensim, OpenCV, MATLAB, etc
Programming Languages: C, C++, Python, Java, SQL