Dongheng Lin

(+1) 4479020436 | dl58@illinois.edu | rathgrith.github.io/ | Rathgrith | @rath6406135287

Education

University of Illinois at Urbana Champaign — *Illinois, United States*

MEng Computer Engineering, GPA: 3.94/4.0 — *Aug. 2023 – Dec. 2024 (expected)*

- **Selected Coursework:** ECE 428, Distributed Systems, ECE 438, Communication Network, etc.

University of Liverpool & Xi'an Jiaotong-Liverpool University — *Liverpool, United Kingdom*

BSc Information and Computing Science, GPA WES GPA: 3.91/4.0, Ranked: 6/295 — *Sep. 2019 – Jun. 2023*

- **Honours:**
  - Graduated with a First-Class distinction degree.
  - 2022-2023 University Academic Excellence Award — *Scholarship Fund for top 5% students*
- **Qualifications:**
  - GRE: 323/340 — *Verbal: 157, Quantitative: 166*
  - IELTS Band Score 8 — *Listening 8, Reading 8.5, Speaking 8, Writing 7*

Publications

What Time Tells Us? Time-Aware Representation Learning from Static Images

- **Dongheng Lin***, Han Hu*, Jianbo Jiao. "What Time Tells Us? Time-Aware Representation Learning from Static Images." *Under review.*

SPSS: A Salience-Based Poisoning Selection Strategy for Selecting Backdoor Attack Victims

- Zihan Lyu*, **Dongheng Lin***, Shengkai Sun, Ruiming Zhang, Jie Zhang†. "SPSS: A Salience-Based Poisoning Selection Strategy for Selecting Backdoor Attack." *2024 International Joint Conference on Neural Networks (IJCNN),* Yokohama, Japan, 2024, pp. 1-9, doi: 10.1109/IJCNN60899.2024.10650242. Available at: `https://ieeexplore.ieee.org/document/10650242`.

Novel Conditional Metadata Embedding Data Preprocessing Method

- Juntuo Wang[1], Qiaochu Zhao[1], **Dongheng Lin**[1], Erick Purwanto†, Ka Lok Man[2]. "Novel Conditional Metadata Embedding Data Preprocessing Method." *2022 International Conference on Cyber-Enabled Distributed Computing and Knowledge Discovery (CyberC)*, Suzhou, China, 2022, pp. 303-311, doi: 10.1109/CyberC55534.2022.00057. Available at: `https://ieeexplore.ieee.org/document/10090205/`.

Research Experiences

The MIx Group @ University of Birmingham

Research Intern — *Dec. 2023 - Present*

- Currently conducting independent research under the supervision of Prof. Jianbo Jiao.
- Focusing on metadata-aware Feature Engineering and Representation Learning, particularly applied to large-scale social media images.

Salience-based Backdoor Attack on DNN Models

Research Assistant (Project Leader) — *Jun. 2023 - Dec. 2023*

- Led the design and implementation of a sample selection algorithm prior to the backdoor learning process.
- The sample selction algorithm considered multiple desired traits of poisoning sample coverage, including benign feature salience and diversity within the sample selection pool.
- Achieved a data-efficient backdoor attack algorithm for DNN models, reaching the same attack success rate with only 38.44% of poisoned samples.

Novel Convolutional Embeddings for Domain Adaptation in Medical Segmentation — *Suzhou, China*

Research Assistant — *Jun. 2022 - Oct. 2022*

- Developed a novel model that incorporates metadata embeddings as additional input for Medical Semantic Segmentation across different domains.
- Applied Vahadane-based color normalization to construct a pseudo-class representing various domains of biopsy scans.
- Addressed the inconsistency of sample sources in medical image processing by introducing this method.
- Achieved a 26% improvement in mean Intersection over Union (mIOU) compared to the baseline model.

Work Experience

Wensi Haihui Information Technology Co., Ltd. (Pactera) — *Wuxi, China*

Back-end Intern (Full-time) — *Jun. 2021 - Sep. 2021*

- Served as a full-stack developer within a collaborative team environment.
- Developed and optimized site routing logic using Spring Boot Rest Controller, ensuring efficient back-end functionality.
- Implemented key features for the administrator dashboard of a civil water management system, utilizing Vue.js for front-end and Spring Boot for back-end development.

Skills

Programming Java, C++, JavaScript, HTML, CSS, MySQL, Python, C#, LaTeX, Golang

Miscellaneous Linux, Shell (Bash/Zsh), Android Studio, Unity, Git, Jupyter, Django, PyTorch, SpringBoot, OpenGL, Vue.js, ProtoBuf

University Projects

Arxiv Explorer: Efficient Paper Recommendation System (Python, FAISS, HITS)

Text Information System Project *Feb. 2024*

- Developed a paper recommendation system using the full dataset of all Arxiv papers available until Feb. 2024.
- Compressed papers into embeddings using category, abstract, and title, and stored them in a FAISS indexing system for fast retrieval.
- Modeled a co-authorship map and applied HITS (Hyperlink-Induced Topic Search) to re-rank recommendations based on authority and hub scores.
- Codes are available at: `https://github.com/Rathgrith/CS410Project`

MapleJuice: An Efficient Hadoop Counterpart for Small Clusters (Golang, gRPC, ProtoBuf)

Distributed System Project *Aug. 2023 - Present*

- Built a distributed system with a custom file system similar to GFS, incorporating NameNode and DataNode functionality.
- Implemented a Gossip-style failure detection protocol using UDP packets, with a Bully-algorithm-based re-election process for leadership in case of master node failures.
- Designed a task scheduling mechanism similar to MapReduce, ensuring parallelism among nodes. Tested on a cluster of 10 VMs, showing 25% faster performance than Hadoop in small cluster environments.
- Partial code and demo available at: `https://github.com/Rathgrith/ece428_mp4`

StyleDiffuser: Cartoon-style Image Creation Algorithm using StyleGAN and Diffusion

Final Year Research Project *Sep. 2022 - Sep. 2023*

- Developed a Python web scraper to gather training data and used YOLOv5 object detection to crop sample images.
- Integrated Generative Adversarial Networks (GANs) as intermediate feature maps for a Stable Diffusion model, significantly improving the quality of image generation.
- Thesis available at: `https://rathgrith.github.io/assets/FYP_Thesis.pdf`

Android University Library Seat Manager App (Java, Android Development)

Mobile Computing Group Project *Oct. 2022 - Nov. 2022*

- Developed an Android app for students to track and update library seat status in real-time.
- Created responsive user interfaces and connected the front-end with a Spring Boot-based back-end server using the OkHttp API.
- Project archived at: `https://github.com/Rathgrith/CAN301`

XJTLU Bonding Forum Program (Spring Boot, Vue.js, Axios, MyBatis)

Software Engineering Group Project *Apr. 2022 - Jun. 2022*

- Developed a fully functional web forum with an expected user base of over 10,000 university students using Spring Boot and Vue.js.
- Led front-end development, designed consistent pages, built complex routing logic, and managed data transmission between Spring Boot and Vue.js.
- Project available at: `https://github.com/Rathgrith/XJTLUbonding`

LEFT: Large, Efficient, Flexible, and Trustworthy File Sharing System (Socket Programming)

Computer Networking Project *Nov. 2021 - Jan. 2022*

- Implemented an Application-Layer Protocol with a local file transfer history for state-based P2P file sharing.
- Achieved efficient transfer of large files (up to 10GB) between VMs in under 5 seconds.
- Code available at: `https://github.com/Rathgrith/python_peer_file_sharing`