

Qi (Leo) Yu

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RESEARCH INTERESTS

Data mining, machine learning and deep learning on graph data with applications in social networks, e-commerce and bioinformatics

EDUCATION

- University of Illinois at Urbana-Champaign** Champaign, U.S.
• *Master of Computer Science; GPA: 3.94/4.0* Aug. 2022 - May. 2024
Courses: CS446 Machine Learning(A), CS543 Computer Vision(A), CS508 Manycore Parallel Algorithms(A)
- Dalian University of Technology** Dalian, China
• *Bachelor of Engineering - Computer Science; GPA: 90.4/100, 4.04/5.0* Sept. 2018 - Jul. 2022
Courses: Machine Learning, Artificial Intelligence, Numerical Analysis, Information Retrieval
- University of California, Los Angeles** Los Angeles, U.S.
• *Summer Session - Algorithm and Complexity; GPA: 4.0/4.0* Jun. 2020 - Sept. 2020

SKILLS SUMMARY

- **Programming:** Python, C++, Java, MATLAB, JavaScript
- **ML Dev & HPC:** PyTorch, OpenCV, PyG, CUDA, scikit-learn
- **Miscellaneous:** Git, Bash, Z3-solver, Gurobi, L^AT_EX

PROJECTS

- **P-GNN for Network Alignment (Data Mining, Network Alignment, GNN):** Unified consistency based and random walk based network alignment methods and reveals their limitations compared to deep graph models. Developed a shared position-aware GNN model that samples ground-truth anchor nodes as anchor-sets to encode nodes in both networks into a unified embedding space. Project is still in progress. **Tech:** PyTorch, PyG, MATLAB (Feb. 2024)
- **Parallelization over forward-pass of LeNet-5 (Parallel Algorithms, DNN):** Implemented and optimized the forward pass of convolution layers of a modified LeNet-5 through multiple parallelization techniques including input matrix unrolling, fixed point arithmetic, and joint register & shared memory tiling SGEMM. Optimizations achieved up to 10x speed up compared to the baseline. **Tech:** CUDA, C++, Profiling, NVIDIA Nsight Compute (Oct. 2022)
- **Intelligent Handling Robot (Deep Learning, Computer Vision, Robotics):** Led a team of five students to program an intelligent robot capable of detecting and carrying the pillar with the correct facial image to the designated area automatically; Developed a Java mobile application used for controlling robots in a robots boxing competition. Project scores highest in class. **Tech:** Android Development, PyTorch, OpenCV, Raspberry Pi, Socket. (Jul. 2021)
- **Anomalous Behavior Detection under UAV Scenarios (Object Detection, Deep Learning, Drone Platform):** Led a team of four to develop a derivatives of YOLOv3 for detecting abnormal human behavior under an UAV perspective; Boosted the model's performance to 0.76 mAP and 0.85 mAR through a customized game-based dataset. **Tech:** PyTorch, OpenCV. (Feb. 2020)

EXPERIENCE

- **Minimum WCRT under Prioritized List Scheduling** Dalian University of Technology
Undergraduate Research Assistant Feb. 2022 - Jul. 2022
 - **ILP:** Encoded the priority assignment problem for DAG tasks into an Integer Linear Programming (ILP) formulation.
 - **WCRT:** Designed an iterative algorithm to derive the minimum WCRT under PLS algorithm.
 - **Result:** Proposed algorithm solved the ILP formulation optimally by involving only 12.67% variables on average.
 - **Responsibilities:** Implementation of proposed algorithms, Conducting experiments under various settings
- **Drug-drug Interaction Detection in Drug Knowledge Graph** Dalian University of Technology
Undergraduate Project Jan. 2022 - June. 2022
 - **Drug KG:** Constructed a large-scale drug knowledge graph by joining multiple pharmaceutical databases (DrugBank, PharmGKB, etc.) based on drug-related entity alignment.
 - **Model:** Implemented and compared multiple embedding algorithms on the constructed KG, and proposed a lightweight Conv-LSTM model to predict drug-drug interaction based on drug embeddings.
 - **Result:** Proposed model outperformed existing end-to-end GNN models by up to 6% on MCC and 2% on AUPR.
- **UCInspire Summer Research - Personalized ML for Edge Computing** University of California, Irvine
Undergraduate Research Project Jun. 2021 - Oct. 2021
 - **ML for Edge:** Proposed a specialized machine learning schema for resource-constrained edge computing systems by exploiting temporal correlations among stream data.
 - **Model:** Proposed a two-stage classifier model for client-side training and intelligent task-offloading.
 - **Result:** Prototype model significantly improved network congestion and resource utilization on the client side.

PUBLICATIONS

- **Journal:** Chang, S., Bi, R., Sun, J., Liu, W., Yu, Q., Deng, Q., & Gu, Z. (2022). Toward minimum WCRT bound for DAG tasks under prioritized list scheduling algorithms. IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, 41(11), 3874-3885.