Chang Liu

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GitHub Profile
Personal Profile

Education

- **University of Ottawa, Ottawa, ON, Canada** *Sept.2022 - October.2024(Expected)*
  Master of Computer Science and Concentration Applied Artificial Intelligence CGPA: 9.6/10
- **Carleton University, Ottawa, ON, Canada** *Sept.2017 - August.2022*
  Bachelor of Computer Science Honours CGPA: 10.18/12

Experience

- **IBM** *Feb.2023 - Present*
  CAS Project Student Ottawa, ON
  – Integrating AI into database optimization to advance the next generation of database technology, with a focus on the join order selection problem using Deep Reinforcement Learning.
  – Work in an interdisciplinary environment, bringing academic research into industry applications and collaborate with IBM researchers and developers on high-impact projects.
- **Ford Motor Company** *Sept.2020 - Dec.2021*
  Test Automation (Co-op) Ottawa, ON
  – Performed automated software testing for Ford vehicle Electronic Control Units (ECUs) using Python.
  – Participated in continuous quality improvement initiatives, including root cause analysis, defect triage, and fix validation.
  – Developed working proficiency in issue tracking and project management using Jira.
  – Developed and hosted various scripts on Jenkins to reduce redundant tasks and improve overall team efficiency.
- **Carleton University / University of Ottawa** *Sept.2020 - Apr.2024*
  Teaching Assistant Ottawa, ON
  – Conducted seminars, discussion groups, and lab sessions to complement lectures.
  – Grade examinations and assignments.

Projects

- **Join Order Selection Using Deep Reinforcement Learning** *2023*
  Master Thesis, University of Ottawa
  – **Objective:** To develop an advanced query plan enumerator using deep reinforcement learning to optimize query execution efficiency in relational databases by determining the optimal join order.
  – **Techniques Used:** Python, PyTorch, PostgreSQL, Tree-LSTMs, GNNs, DRL
  – **Key Contributions:**
    * Deployed various neural networks to capture information at different levels (e.g., column level, table level, query level).
    * Designed a new reward function to adapt to varying costs of different queries.
    * Conducted extensive experiments on a benchmark designed for the join order selection problem, achieving a 40% performance improvement over PostgreSQL within 24 hours of training.
- **December - Animal Saving Shelter Application** *2022*
  Honours Project, Carleton University
  – **Objective:** To create an Android application named December that supports animal shelters by allowing users to contribute through online pet adoption and food supply purchases. The app aims to sustain shelters and provide a platform for animal lovers to contribute. It was developed using Android Studio and Java, with data stored in Firebase, and integrates PayPal for payment processing.
  – **Technologies Used:** Android Studio, Java, Firebase
  – **Key Contributions:**
    * Developed user-end processes such as 'register' and 'find password'.
    * Stored all user and pet information in Firebase.
    * Implemented PayPal integration to enable users to make donations through the app.

Technical Skills

Programming Languages: Python, C++, Java, SQL
Machine Learning & AI: DQN, Actor-Critic, GNNs, MLP, LSTMs, Classification, Decision Tree, Random Forest
Tools: Jenkins, Jira, Git, Jupyter Notebook
Operating system: Linux, Windows

Achievements

- **Deans' Honour List** Carleton University *2020*
- **Murdoch Maxwell MacOdrum Scholarship** Carleton University *2020*