

Bingru (Benson) Li

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EDUCATION

University of Toronto (St. George Campus)

2021-09 – 2025-06

Honours Bachelor of Science - Computer Science & Mathematics

Co-op Program

GPA: 4.00/4.00; Average: A+; Rank: 1%

Graduate Courses: Deep Learning, Natural Language Processing, Convex Optimization, Probabilistic Graphical Model

Undergraduate Courses: Machine Learning, Data Structures Analysis, Algorithm Design, Relational Database

EXPERIENCE

Vector Institute

Toronto, ON

Machine Learning Researcher with Prof. [Rahul G. Krishnan](#)

2023-04 – Present

- Investigated the mechanisms driving Large Language Models (LLMs) in processing causal inquiries, significantly advancing understanding of their decision-making dynamics. Conducted extensive literature reviews to remain up-to-date with the latest advancements and breakthroughs in the field of causal inference and natural language processing.
- Led the development and implementation of a training algorithm for LLMs, focusing on optimization for causal queries.
- Designed experiments across five varied datasets, setting new benchmarks by outperforming existing leading models, culminating in a remarkable 15% accuracy enhancement in LLMs for causal question handling.
- Authored a comprehensive 8-page report documenting the methodologies, results, and insights derived from the research.

Royal Bank of Canada (RBC)

Toronto, ON

Full-Stack Software Developer (Internship)

2023-05 – 2023-08

- Worked on improving the quality of a software product. Identified and resolved 25 software bugs, resulting in a 40% reduction in user-reported issues. Additionally, introduced 5 innovative features that increased user engagement by 18.2%.
- Revolutionized SQL performance through strategic optimization efforts. Implemented cutting-edge algorithms, resulting in an impressive 34% reduction in time complexity and a 12.3% enhancement in overall system performance.
- Recognized by colleagues and superiors for adeptly navigating complex technical concepts and translating them into practical solutions, establishing a reputation as a trusted and proficient technology developer.

SKILLS

Languages Python, Java, C/C++, PHP, HTML/CSS, JavaScript, SQL, Bash, LaTeX

Libraries & Tools PyTorch, TensorFlow, Numpy, Scikit, NLTK, SpaCy, Django, Flask, Node.JS, Vue.JS, Psycop

PROJECTS

Seq2Seq Models for Text-to-Text Translation

2023-01 – 2023-04

- Developed and fine-tuned six state-of-the-art Seq2Seq models using PyTorch to facilitate text-to-text translation from French to English. Employed a combination of recurrent neural network (RNN), long short-term memory (LSTM), and Transformer architectures to achieve superior translation accuracy and fluency.
- Engaged in extensive model training for over 72 hours using the technique of teacher-forcing, resulting in optimized model performance and increased translation quality with BLEU score of 0.76.
- Conducted a comprehensive analysis of the performance across the different models, evaluating the impact of various factors such as vocabulary size, hidden layer size, and dropout rate on the translation quality.
- Visualized the results using Wandb and Tensorboard Python libraries and presented the findings in a well-structured 10-page report, providing insights into the strengths and limitations of different Seq2Seq architectures and identifying potential areas for future research.

Taxi Database System Design Design

2022-08 – 2022-12

- Designed and implemented a comprehensive taxi schema utilizing an Entity-Relation (E-R) Model, incorporating users' information, request records, and a mutual rating system. Effectively managed and organized taxi-related data.
- Developed and executed intricate SQL queries to extract specific information from the database, such as monthly billing totals for individual clients. Created comprehensive datasets to thoroughly evaluate the functionality of the SQL queries.
- Implemented Python to optimize query algorithms, reducing time complexity from $O(n^2)$ to $O(n \log n)$ by seamlessly integrating SQL queries within Python. This enhancement significantly improved the system's performance and scalability.
- Gained a deep understanding in database management systems, SQL, and Python programming languages. Acquired expertise in data modeling, query optimization, and software testing, demonstrating a strong grasp of these essential skills.

Calendar Software Application Design

2022-05 - 2022-08

- Enhanced leadership skills to effectively lead and coordinate a team of seven members, conducting regular meetings and assigning tasks based on individual strengths and abilities. Resulted in improved project efficiency and timely completion.
- Designed and developed a robust Class-Responsibility-Collaboration (CRC) model, utilizing object-oriented programming principles and clean architecture guidelines to ensure a maintainable software solution.
- Utilized Java programming language to develop an intuitive front-end with a fully functional graphical user interface. Demonstrated adherence to SOLID principles, promoting code extensibility and reusability. Implemented rigorous software testing methodologies to guarantee the application's quality and reliability.
- Developed a comprehensive understanding of the software development life cycle (SDLC) and modern design techniques. This expertise enabled the delivery of a high-quality software solution that surpassed client expectations.