

HAORAN ZHAO

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EDUCATIONAL BACKGROUND

University of Toronto - St. George Campus

Bachelor of Science: Specialist in Computer Science (focus in AI); Minor in Statistics (CGPA 3.36/4.0)

Toronto, Canada

09/2019 - 06/2024

Core Courses: Introduction to Machine Learning, Computational Linguistics, Natural Language Computing, Neural Networks and Deep Learning, Human Computer Interaction, Software Design, Introduction to Software Engineering.

WORK EXPERIENCE

Software Developer

SOTI Inc.

09/2022 - 09/2023

Mississauga, Canada

- Designed and led the development of two major feature projects with teams of 5-6 members, implementing key components of the company's product. This included developing backend REST APIs using the .NET framework and crafting the frontend with Angular, significantly enhancing product functionality and user experience.
- Closely worked with Architecture, Database, QA, and UI/UX teams on feature projects, resolving customer cases and improving web application performance. Delivered presentations on project progress, consistently recognized by the manager for valuable contributions.
- Implemented various testing methods, including unit, BDD, and integrated testing, along with dotMemory and dotTrace for memory and performance analysis. Led a performance improvement project, enhancing the efficiency of multiple API calls by at least 50%.

Project Leader

TechX Academy

07/2020 - 09/2020

Shanghai, China

- Organized and managed a 12-day summer program, including a Hackathon, for over 300 tech-savvy teens.
- Collaborated with 23 sponsors, 10 guest speakers, and various industry professionals to deliver courses in Software Engineering, Deep Learning & Neural Networks, and Social Sciences, including History and Philosophy.
- Guided over 30 creative projects during a 24-hour Hackathon. Secured direct backing from the ShanghaiTech University incubation program.

RELEVANT PROJECTS

Neural Machine Translation Engineer (Natural Language Processing)

03/2024

- Engineered and trained a Transformer model from scratch to perform English-French translation tasks utilizing Canadian Hansards dataset for training and validation.
- Implemented Greedy and Beam Search algorithms to optimize decoded target sentence generation, and enhance translation accuracy.
- Integrated BLEU scoring system to quantitatively assess translation quality, achieving competitive benchmarks against established NMT models.
- Conducted comprehensive analysis and authored a detailed report on model performance, including empirical studies on models such as GPT2, T5 MT model, and Bart MT model.

Word Sense Disambiguation & Lexical Database Integration (Natural Language Processing)

11/2023

- Implemented the basic Lesk Algorithm with an accuracy for Word Sense Disambiguation (WSD) 39.6%. Improved the Lesk Algorithm by integrating one sided Cosine Similarity to achieve an accuracy of 43.9%.
- Utilized WordNet and NLTK to include synonym/antonym identification and hierarchical word relationships for Lesk Algorithm to achieve an accuracy of 45.8%.
- Further enhanced the Lesk algorithm by incorporating word2vec's skip-gram model. This approach utilized pre-trained word vectors from large datasets, providing richer contextual and semantic understanding and leading to an improvement of sense prediction accuracy to 47.9%.
- Developed a method to create sense vectors by averaging BERT-generated vectors from a sense-annotated training set. This approach enabled accurate word sense identification in sentences by comparing contextualized word vectors with precomputed sense vectors, significantly enhancing sense prediction accuracy to 68%.

Machine Learning in Online Education (Machine Learning)

11/2023

- Implemented diverse machine learning methods like k-NN, Item Response Theory, Matrix Factorization, Autoencoder Neural Networks, and Ensemble Methods to accurately predict student correctness on diagnostic questions, and enhance the efficiency of online education platforms.
- Enhanced the model's architecture with advanced techniques including regularization, neural network layer expansion, and data augmentation. More specifically for data augmentation, we integrated beta (β_j) and theta (θ_j) parameters from Item Response Theory into the training matrix, which represent question difficulty and student ability. This approach has increased the prediction accuracy by 4 ~ 5% to 70%.

SKILLS & INTERESTS

- Technical Proficiencies:** Python, PyTorch, TensorFlow, Numpy, Machine Learning Algorithm, Full-Stack Development, Java, Javascript, AngularJS, ReactJS, .NET Framework, GitHub Enterprise, JIRA, API Development, Linux Operating System, File System Design.
- Qualitative Skills:** Problem-solving, Communication, Leadership and team building, Work in high-pressure situations, Event Planning
- Languages:** English & Mandarin
- Interests:** Badminton, Soccer, Guitar, Photography, Fitness, Movie Editing