Eric Xue

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EDUCATION

University of Toronto   Toronto, ON

Honours Bachelor of Science in Computer Science; GPA: 3.93/4.00   *Sep 2021 – Jul 2025*

RESEARCH EXPERIENCE

Computational Social Science Lab @ UofT   Toronto, ON

Undergraduate Researcher   *Apr 2022 - Present*

- Supervisor: Dr. Ashton Anderson
- Simulated **individual speech patterns** using LLMs by analyzing dialogue acts and incorporating style embeddings.
- Worked extensively on troubleshooting outdated CUDA dependencies, package version conflicts, and broken interdependencies in a partially refactored codebase using **Docker**.

SocialAI Research Group @ UofT   Toronto, ON

Undergraduate Researcher   *Sep 2022 - Present*

- Supervisor: Dr. William Cunningham
- Led the development of Gem, a Python **reinforcement learning (RL) framework**, designed to facilitate research into psychologically plausible interactions between agents and environments.
- Developed Minagen, a Python library for constructing and evaluating cognitive architectures of **generative agents** through simulations of their interactions with physical and social environments.

DREAM Lab @ UIUC   Remote

Undergraduate Researcher   *Jun 2022 - Present*

- Supervisor: Dr. Haohan Wang
- Led a study as **first author** for a paper accepted at AAAI 2025, introducing curvature regularization to enhance the inherent **adversarial robustness** of condensed datasets, achieving significant improvements in both clean and robustness accuracy.
- Independently developed AutoModel, an **LLM agents** framework for automating the training and evaluation of model pipelines for vision tasks, achieving a 20% accuracy improvement over vanilla LLM-generated code.

PUBLICATIONS

Towards Adversarially Robust Condensed Dataset by Curvature Regularization

Accepted at AAAI 2025   *Mar 2024*

- Authors: **Eric Xue**, Haoyang Liu, Yifan Shen, Haohan Wang
- Proposed a novel method to enhance the adversarial robustness of models trained on condensed datasets through curvature regularization, informed by theoretical insights and supported by empirical investigations.

AutoModel: Autonomous Model Development for Image Classification with LLM Agents

Under Review for ICLR 2025   *Sep 2024*

- Authors: **Eric Xue**, Zeyi Huang, Yuyang Ji, Haohan Wang
- Built an LLM agents framework that autonomously optimizes object classification model training pipelines, significantly outperforming vanilla LLMs and achieving human expert-level accuracy on Kaggle datasets.

Towards Machine Theory of Mind with Large Language Model-Augmented Inverse Planning

Under Review for ICLR 2025   *Sep 2024*

- Authors: Rebekah A. Gelpí, **Eric Xue**, William A Cunningham
- Integrated LLM agents with Bayesian inverse planning models to accurately predict human mental states on theory of mind tasks.

Learning to Imitate with Less: Efficient Individual Behavior Modeling in Chess

Under Review for ICLR 2025   *Sep 2024*

- Authors: Zhenwei Tang, Difan Jiao, **Eric Xue**, Reid McIlroy-Young, Jon Kleinberg, Siddhartha Sen, Ashton Anderson
- Leveraged a two-stage fine-tuning method utilizing pre-trained population models and prototype player models to efficiently model individual behaviors in chess.

Granular Analysis of Pretrained Object Detectors

ICAIIC 2022 Conference Paper   *Feb 2022*

- Authors: **Eric Xue**, Tae Soo Kim
- Performed detailed analysis on the performance of pretrained **YOLOv3** with respect to different image subgroups and perturbations under the setting of autonomous driving.

Work Experience

Cowork AI   Toronto, ON
ML Engineer   *Sep 2023 - Dec 2023*
- ○ Led the model development team at an AI startup, focusing on branding content and advertisement generation.
- ○ Conducted in-depth research and fine-tuned state-of-the-art **stable diffusion** models, achieving approximately 50% improvement in text legibility for generated product imagery.

aUToronto   Toronto, ON
ML Engineer   *Sep 2022 - Apr 2023*
- ○ Enhanced the **2D object detection** system for **autonomous vehicles** by optimizing **YOLOv5** models, achieving a 10% improvement in detection accuracy over previous performance.
- ○ Captured and labeled over 1,000 images of real traffic props, including cones, traffic lights, and pedestrians, to construct a **custom dataset** essential for fine-tuning the vision system.
- ○ Integrated **Weights & Biases** into the training pipeline, automating hyperparameter experiments to significantly improve experiment efficiency.

MOZI AI   Remote
Software Intern   *Jul 2020 - Aug 2020*
- ○ Worked on development of a **knowledge graph-based gene annotation tool** at a biotech startup in HK, China
- ○ Wrote a parser tool to convert JSON data to Atomese (a knowledge representation language in OpenCog Atomspace).

Independent Projects

Mirai AI   *Oct 2023 - Feb 2024*
- ○ Mirai AI is a **MERN** (MongoDB, Express.js, React.js, Node.js) stack web application designed to assist students in reviewing and refining their undergraduate application personal statements.
- ○ Scraped, parsed, and curated a large text dataset to fine-tune LLMs, enabling the generation of professional-grade feedback.
- ○ Implemented a secure account system integrated with **Google OAuth 2.0** for user authentication.
- ○ Utilized **Redux** for efficient state management and integrated the **Stripe API** for seamless subscription management and payment processing.

WebChar   *Oct 2023 - Feb 2024*
- ○ WebChar is a **MERN** stack web application that allows users to engage in conversations with AI characters.
- ○ Independently developed the entire frontend, including the chat interface, character search, character creation, and account management features.
- ○ Utilized **LangChain** in the backend for memory and context management in conversations.

Coveet   *Oct 2021 - Dec 2021*
- ○ Coveet is a Python-based application for interactive analysis and visualization of Twitter sentiment, featuring a graphical user interface (GUI) built with tkinter, enabling dynamic data exploration by geographical regions and time periods.
- ○ Employed **NLTK** for advanced text parsing and sentiment analysis, efficiently handling over 10GB of tweet data.

Buddybreed   *Jan 2020 - Apr 2020*
- ○ Buddybreed is an **iOS app** written with Swift, designed to identify dog breeds from a single photo with high accuracy.
- ○ Achieved 90% identification accuracy by integrating a pretrained ResNet-50 model for reliable breed prediction.

Awards

- **Woodsworth College Scholarship - 2024**: Awarded to high-achieving students in Woodsworth College at the University of Toronto in the amount of $750.00.
- **Dean's List Scholar - 2022, 2023, 2024**: Awarded to **top 15%** of Faculty of Arts & Science students at the University of Toronto in recognition of academic excellence.
- **BC Achievement Scholarship - 2021**: Awarded to **top 8,000 high school graduates** in the British Columbia province in the amount of $1,750.
- **District/Authority Scholarship - 2021**: Awarded to **5,500 high school graduates** in the British Columbia province who have demonstrated excellence in a specific area (computer science) for $1,250.
- **Google Code-in Runner Up - 2019**: Nominated by Copyleft Games as one of the top contributors in this Google-hosted open-source competition with 3500+ participants.
- **RoboCupJunior Soccer Worlds - 2nd Place 2019, 3rd Place 2017**: Our team of three **represented Canada** and won top places among 10+ countries in this competition where autonomous robots compete in a highly dynamic soccer environment.