# Eric Xue

https://ericxue.com

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## EDUCATION

**University of Toronto**　　　　Toronto, ON
*Honours Bachelor of Science in Computer Science; GPA: 3.94/4.00*　　　　*Sep. 2021 – Jul. 2025*

## EXPERIENCE

**SocialAI Research Group**　　　　Toronto, ON
*Research Student*　　　　*Sep. 2022 - Present*
- **Designing Research Studies**: Collaborated with lab members to ***design research studies on emergent social behaviors*** such as collective action through reinforcement learning (Q-learning) in a simulated environment.
- **Gem**: Helped develop Gem, a general-purpose Python reinforcement learning framework with a focus on accessibility for social scientists to quickly develop and deploy simulated studies.
- **Refactoring**: Refactored and packaged experimental scripts into a higher-level RL interface as a step towards making Gem a general-purpose framework.

**aUToronto**　　　　Toronto, ON
*2D Object Detection Team Member*　　　　*Sep. 2022 - Present*
- **Data Curation**: Collected and curated traffic-oriented image datasets to train ***aUToronto's 2D perception system for self-driving while factoring in variations in perspective while driving.***
- **MLOps**: Intergrated WandB into the training pipeline, improving optimization efficiency by ∼20% through ***automatic tracking hyperparameters and performance metrics*** across experiments to replace manual Excel tracking.

**MOZI AI**　　　　Remote Work
*Software Intern*　　　　*Jul. 2020 - Aug. 2020*
- **Knowledge Graph**: Implemented features for a knowledge graph-based ***gene annotation tool in Python*** using OpenCog AtomSpace.
- **Parser**: Generated parsers to extract data from large Atomese files using ANTLR to replace line-based parsing, improving graph visualizer performance by ∼10%.
- **Software Testing**: Created and developed software testing frameworks to automatically identify and resolve code errors, ***improving development iteration speeds by ∼10%.***

## PUBLICATIONS

**Granular Analysis of Pretrained Object Detectors**　　　　Authors: Eric Xue, Tae Soo Kim
*ICAIIC Conference Paper*　　　　*Feb 2022*
- Published in the 2022 International Conference on Artificial Intelligence in Information and Communication.
- **Project Lead**: Designed and performed experiments for fundamental deep learning research as the first author.
- **Image Perturbation**: Implemented various image perturbations to simulate imperfect image conditions in the real world, demonstrating a decrease in accuracy by up to 25%.
- **Subgroup Analysis**: Performed detailed analysis on the effect of various perturbations on pretrained object detection models such as ***YOLOv3 and Faster R-CNN*** using the KITTI dataset.
- Discovered that geometric effects resulted in greater degradation of performance than those of color.

## PROJECTS

- **YumoBot**: Built a dice-roller bot for TRPGs on Discord messaging platform using Discord.js. with ***MongoDB*** to store and organize user data and refactored code to accommodate updates to the Discord API.
- **Personal Website**: Designed and developed a personal website to showcase past projects with Next.js, and implemented decorative animations and transitions using CSS.
- **Coveet**: Built Coveet, a program that analyzes ***Twitter user sentiment*** using Python in collaboration with a partner. Parsed, analyzed and visualized over 10GB of tweets with NLTK.
- **BuddyBreed**: Published an iOS app that identifies a dog's breed from a single photo with ***90% accuracy*** by ***adopting ResNet-50 model*** for predictions and using Firebase to store uploaded photos and communicate with server.

## PROGRAMMING SKILLS

- **Languages**: Python, JavaScript, Java, Swift, C　　　　**Technologies**: Firebase, MongoDB, Next.js, Unity
- **Machine Learning**: PyTorch, NanoDet, WandB