Max Zuo

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Education

BROWN UNIVERSITY — **Providence, RI**
Ph.D. Program in Computer Science advised by Michael Littman and Steve Bach.
Ph.D.: Aug '23 –
GPA: 4.00 / 4.00

GEORGIA INSTITUTE OF TECHNOLOGY — **Atlanta, GA**
- MS in Computer Science with a specialization in Machine Learning
- Relevant courses: *Artificial Intelligence, Machine Learning, Probability & Statistics, Combinatorics, Networking, Algorithms Honors, Computer Vision, NLP, Machine Learning Theory, Interactive Robot Learning, Deep Learning, Cognitive Science*

BS: Aug '18 – May '21
GPA: 4.00 / 4.00
MS: Aug '21 – Dec '22
GPA: 4.00 / 4.00

Publications

Planetarium: A Rigorous Benchmark for Translating Text to Structured Planning Languages 2024
Zuo, M.*, Piedrahita-Velez, F.*, Li, X., Littman, M., Bach, H.S. (2024).

Unifying exemplar and prototype models of categorization. [Accepted poster presentation] 2023
Zuo, M., Marupudi, V., & Varma, S. (2023). *Proceedings of the 45th Annual Cognitive Science Society Conference, Sydney, Australia.*

ConSOR: A Context-Aware Semantic Object Rearrangement Framework for Partially Arranged Scenes 2023
Ramachandruni, K., **Zuo M.**, & Chernova S. (2023). *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems.*

ATCON: Attention Consistency for Vision Models 2022
Mirzazadeh, A., Dubost, F., Pike, M., Maniar, K., **Zuo, M.**, Lee-Messer, C., & Rubin, D. (2022). *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (pp. 1880-1889).*

Efficient Exploration via First-Person Behavior Cloning Assisted Rapidly-Exploring Random Trees 2022
Zuo, M., Schick, L., Gombolay, M., & Gopalan, N. (2022). *HRI 2022 Workshop - MLHRC.*

Work Experience

GOOGLE — **MTV, CA**

Software Engineering Intern *May '23 – Sep '23*
Developed new OCR algorithm for Google StreetView images using Tensorflow on the **Google Geo** StreetSmart with linearized attention and ultra-lightweight feature extractors. (OneShot v2)
- 20% faster with 10% fewer errors
- 30% fewer errors at peak performance / 15% fewer errors at the same speed
- ½ the memory footprint

Software Engineering Intern *May '22 – Aug '22*
Worked on the machine learning research teams **Tensorflow Model Garden** & **Tensorflow Vision** under CoreML to code, train, and improve open-vocabulary object detection models.
- Worked on implementing the **ViLD** object detection framework.

OCULOGYX (OX) — **Bentonville, AR**

Research Engineer *May '21 – Sep '21*
Led the development of mapping warehouse floors with SKU-level info to ~1m accuracy.
Involved in business decisions with the CTO and CEO of the company.
Worked on developing **Ox Orion**, a near real-time computer vision recognition for groceries.
- Deep learning one-stage one-shot object detection.

United States Citizen

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- Pipelined algorithm using SIFT features, RANSAC homography, and triplet loss for object recognition and geometric verification.

Developed **Ox Automapper** product from scratch, a pedestrian GraphSLAM algorithm mapping warehouse and supermarket store floors with SKU-level information.

- GraphSLAM for pedestrian data using inertial (IMU) odometry.
- Deep learning sensor correction and sensor fusion for natural pedestrian walk routines.

- **GEORGIA INSTITUTE OF TECHNOLOGY** — **Atlanta, GA**

Graduate Researcher (AI/ML & Robotics) — *Aug '21 – May '22*

Conducted research under Prof. Sonia Chernova on semantic rearrangement: the ability for a robot/planner to organize a scene without explicit detailed human instruction.

- Working with PDDLStream, Graph NNs, and pose graphs.

Graduate Researcher (Computer Vision & Unsupervised Learning) — *Aug '20 – May '22*

Conducted research under Prof. Thad Starner on AI Through Symbiosis (wearable technology, unsupervised learning) specializing in computer vision and SLAM.

- Developed a new HMM-based algorithm, utilizing its model capacity to recover event labels in a weakly supervised manner, used to train deep vision and time-series models.

Graduate Teaching Assistant — *Aug '21 – Dec '21*

TA/Head TA of the *Mobile & Ubiquitous Computing* course (i.e. wearables, HCI). — *Jan '22 – May '22* ***(HEAD TA)***

- focus on teaching applied research methods, conducting user studies, and prototyping.
  - ***Undergraduate Teaching Assistant*** — *Jan '20 – May '20*
  - Lead teaching assistant for *Machine Learning* (CS 4641), a fourth-year level course.

IBM — **Littleton, MA**

Software Engineering Intern — *Jun '20 – Aug '20*

Worked on IBM Food Trust Blockchain Transparent Supply, significantly expanded open-source Recall Assistant capabilities.

- Worked directly with customers to support complex, real recall scenario types.
- Used by customers, including Walmart, for faster, more accurate recall assistance.

Developed IBM cloud solutions for improving the internal production pipeline.

Awards & Achievements

GVU Distinguished Masters' Finalist '22
HackGT '21 – First place overall & best design
GT Highest Honors '21 – 4.00 GPA for BS in CS
GT Sports Innovation '20 – Winner, computer vision football analysis
HackGT '19– NSA: Secure Code Challenge Winner
MIT Blueprint 2017 – First place

Personal Projects

All: github.com/maxzuo

Hypercut (HackGT, Oct 2021) – Video summary generator

Using sentence transformers MPNet and TextRank to reduce the content of a video while maintaining as much pertinent information as possible.

- Wav2Vec2 + CTC for offline transcription, Google Cloud Speech API for online transcription

Datalytics (GT Sports Innovation, Mar 2020) – Computer vision tool to automatically analyze football footage

- Yard line extraction, score information extraction, team formation extraction, and action segmentation

Skills

Software Languages	Python, Java, Go, C, SQL, JavaScript, TypeScript, HTML, CSS
Libraries	transformers, tensorflow, pytorch, scikit-learn, opencv
Machine Learning	Computer vision, Transformers, LLMs, Mixture of Experts, Object detection, Few-shot learning, Convolutional Neural Networks, Graph Neural Networks, HMMs, Autoencoders, SVM, Random Forests, Text/PageRank, Inverse Reinforcement Learning, Self-supervised learning
Robotics	SLAM, Planning (PDDL/PDDLStream), Scene graphs, Learning from demonstrations,
Foreign Languages	Fluent Mandarin, Spanish (National Spanish Exam 3 Bronze, NSE2 Silver)

United States Citizen