Renee Zbizika

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Education

Stanford University — Stanford, CA
M.S. in Computer Science — *Apr. 2026 – Present*
Stanford University — Stanford, CA
B.S. in Computer Science (Artificial Intelligence) — *Sep. 2022 – Jun. 2026*

Experience

Undergrad Researcher – Robotics Embodied AI Lab @ SAIL — Jan 2025 – Present
C++, Python, ROS — *Stanford, CA*

- Refactored teleoperation stack from ROS1→ROS2 with multithreading, reducing latency in a distributed robot sys
- Built cross-machine comm. pipeline to stream proprio state from closed-source controllers via synchronized messaging
- Debugged distributed sys. failures including clock desync, message drift, and inter-process dependency ordering
- Designed embodiment-agnostic teleoperation (VR + mobile base + manipulators) with frame-consistent pause–resume control

Undergrad Researcher – Stanford Vision & Learning Lab @ SAIL — Sep. 2023 – Sep. 2024
Brain-Robot Interface for Everyday Activities with Dexterous Robot Control — *Stanford, CA*

- Develop modular learning framework targeting robotic control via brain signals
- Optimized logistic regression for degree-of-freedom prediction through feature engineering and dimensionality reduction with PCA, cutting training time by over 14% and improving performance.
- Evaluated logistic regression vs. CNN for accuracy-efficiency trade-offs in a closed-loop control system
- Prototyped robotic action states using predicate logic, developing evaluation metrics to target specific motor skills

Data Science Intern – Data Science for Social Good — June 2023 – Sept. 2023
Python, NumPy, Pandas, Flask, React, TypeScript, JS, HTML/CSS — *Palo Alto, CA*

- Built full-stack web app supporting real-time, interactive data visualizations
- Performed statistical analysis on food bank and census datasets to model relationships between nutritional availability and socio-economic indicators
- Partnered with stakeholders (USDA, FoodMaven, Google Food for Good) to translate policy questions into data requirements, iteratively refining metrics, visualizations, and model outputs

Projects

AgentPuzzler: Reinforcement Learning for Jigsaw Puzzles – Github — Feb 2025 – Mar 2025

- Developed novel RL agent using Monte Carlo Tree Search (MCTS) with CNNs for policy and value estimation
- Designed novel geometric compatibility features (curvature-based edge signatures) and visual similarity metrics (SSIM) to improve state evaluation accuracy
- Implemented neural network architectures that integrate raw visual input and derived geometric features for enhanced puzzle-solving performance

TurtleBot Robot Autonomy: Obstacle Course — Sep 2024 – Jan 2025

- Developed an autonomy software stack for a TurtleBot, integrating trajectory optimization, motion planning, perception, localization, and SLAM using ROS
- Implemented frontier exploration with visual stop sign detection, integrated into a heading controller and A* planner

Publications

Zbizika R, Pakszys P , Zielinski T. Deep Neural Networks for Aerosol Optical Depth Retrieval. Atmosphere. 2022; 13(1):101 doi.org/10.3390/atmos13010101

Punamiya, R., Kareer, S., Liu, Z.,..., Zbizika, R.,... Xu, D. EgoVerse: An Egocentric Human Dataset for Robot Learning from Around the World. Proceedings of Robotics Science & Systems, 2026.

Technical Skills

Languages: Python, C++, C, TypeScript, JavaScript, ChucK
Frameworks & Libraries: PyTorch, TensorFlow, ROS2, OpenCV, NumPy, SciPy, React
Tools & Systems: Git, Linux (Ubuntu), Docker, VS Code, Vim, XCode, Blender, OnShape