

# Shruti Singh

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## EDUCATION

University of Dayton

Dayton, Ohio

*Masters in Computer Science (4.00 GPA)*

January 2021 - August 2022

*Doctorate (PhD), in Computer Science (3.95 GPA)*

August 2023 - December 2026 (Expected)

**Focus:** Safe Reinforcement Learning, Adversarial Robustness, Optimization

## WORK EXPERIENCE

University of Dayton

Dayton, Ohio

*Graduate Research Assistant*

August 2023 - Present

- Developed an **entropy-driven adversarial defense framework** in RL environments (Gym Lunar Lander, Bipedal Walker), achieving **94–95% accuracy**, surpassing KL divergence and joint entropy baselines.
- Simulated adversarial attacks in RL pipelines to evaluate model resilience and optimize policy behavior.
- Built a **facial recognition attendance system** with Python, OpenCV, dlib (99.39% accuracy), deployed for online learning sessions.

Walmart

Bentonville, Arkansas

*Intern*

June 2022 - August 2022

- Researched GS1 barcode standards to address 10 case exceptions like oversized, perishable, hazardous items at distribution centers.
- Replicated and validated barcode logic in Python by developing a three-phase function to validate structure, generate checksums, and encode data into barcode symbology, optimizing scanning processes.
- Compiled a big query search using SQL to collect over 100 test inputs for the standard logic, including barcode types, product categories, and case exceptions.
- Queried and analyzed 100+ test cases using SQL, achieving 100% accuracy compared to legacy logic, with results visualized.

## RESEARCH PROJECTS

### Adversarial Resilience via Entropy-Driven Feature Selection

- Engineered a novel entropy-driven feature selection model, achieving 94% accuracy in Gym's Lunar Lander and 95% in Bipedal Walker, surpassing baseline models.
- Designed and executed adversarial attack simulations to evaluate the robustness of reinforcement learning environments, to showcase attack vulnerabilities and test the feature selection algorithm.
- Evaluated algorithmic effectiveness by outperforming KL Divergence and Joint Entropy in detecting and mitigating adversarial noise.

### Deep Learning for Temporal Data Prediction

- Developed and applied LSTM model to predict time series trends, leveraging advanced data preprocessing, model training, and evaluation strategies.
- Enhanced model efficiency and performance by fine-tuning hyperparameters and integrating techniques such as learning rate scheduling and early stopping.
- Conducted performance benchmarking against traditional models (MLP, CNN, CNN-LSTM), demonstrating LSTM's effectiveness in capturing sequential patterns and dependencies.

## TECHNICAL SKILLS

**Skills:** Python, R, SQL, NOSQL

**Frameworks & Technologies:** TensorflowPyTorch, Scikit-learn, Keras, Pandas, NumPy, Matplotlib, OpenCV

**Coursework:** LLMs, Sentiment Analysis, CNNs, RNNs, LSTMs, Object Detection, Deep Learning

**Publications:** “[Multi Output Career Prediction - Dataset, Method, and Benchmark Suite](#)”, CISS, 2023;

“Imposter Injection - Learning to Select Features in Reinforcement Learning”, KSE, 2024.

**Relevant Coursework:** LLMs, RL, Object Detection, CNNs, RNNs, Sentiment Analysis