RISHIK SARKAR

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EDUCATION

Cornell University New York, NY
Master of Engineering in Computer Science *Aug 2024 - (May 2025)*

- *Relevant Coursework:* Applied Machine Learning, Machine Learning Engineering, Virtual and Augmented Reality, HCI and Design

Rutgers University-New Brunswick New Brunswick, NJ
Bachelor of Science in Computer Science, Cognitive Science *Sep 2020 – (May 2024)*

- GPA: 3.9/4.0
- Honors: Summa Cum Laude, SAS Honors Program, Phi Beta Kappa, Dean's List
- *Relevant Coursework:* Data Structures, Design and Analysis of Computer Algorithms, Principles of Programming Languages, Numerical Analysis and Computing, Principles of Data Management, Formal Languages and Automata, Introduction to Artificial Intelligence (Graduate)

INDUSTRY EXPERIENCE

Full-Stack Developer Intern Jun 2023 – Dec 2023
Provenir *Parsippany, NJ*

- Implemented Decision Trees, Random Forests, XGBoost, and RNNs into FLAML using scikit-learn and TensorFlow for automated model training and deployment with AutoML; tuned hyperparameters and added monotonic constraints to elevate average model accuracy up to 95%
- Integrated artifact, SHAP, and LIME plot generation capabilities, enabling deep insights into model behavior and resulting in an improved UX
- Implemented over 100 unit tests using MockMvc and demoed deployment with Minikube to ensure robust performance and early issue detection
- Improved API endpoints for model log retrieval and PDF export, enhancing data accessibility and facilitating streamlined documentation

SAT/ACT Tutor Feb 2023 – Jun 2023
The Princeton Review *Princeton, NJ*

- Utilized innovative teaching technologies and instructional design principles to motivate students and promote academic excellence
- Frequently stayed after hours to address individual student queries, ensuring thorough understanding and boosting confidence in test preparation

RESEARCH EXPERIENCE

Research Assistant Sep 2023 – Aug 2024
Princeton University (CCNP) *New Brunswick, NJ*

- Created Python scripts to transform Excel, CSV, and JSON files from five labs into consolidated SQLite tables within a unified database
- Designed a Tkinter-based GUI to simplify database interactions for researchers without SQL knowledge
- Integrated advanced functionality within the GUI, allowing for the execution of custom SQL queries for CRUD operations through Pandas and SQLite cursor with dedicated buttons for tailored database manipulations

ML Research Intern May 2022 – Jun 2022
Abraira Lab *New Brunswick, NJ*

- Employed Motion Sequencing to preprocess and create a dataset of over 10,000 high-quality training samples for an unsupervised ML model in a Computational Neuroethology observation study
- Analyzed behavioral syllables identified by the model and rectified anomalous keypoint results, leading to a significant improvement in data quality

Leadership / Service

Chief Technology Officer Sep 2023 – Aug 2024

Health Model United Nations *New Brunswick, NJ*

- Orchestrated the design, development, and maintenance of the conference website utilizing Next.js and Tailwind CSS, ensuring real-time updates and a user-friendly interface
- Collaborated intimately with other executive board members, playing a pivotal role in establishing communication infrastructures and social media platforms, as well as spearheading fundraising ventures
- Took an active role in the recruitment process, assisting in the interviewing and evaluation of potential board and staff candidates to uphold the standards of the conference

Co-Founder Mar 2022 – May 2023

The Verbose Project *New Brunswick, NJ*

- Developed a non-profit tutoring platform catering to incoming and first-year college undergraduates, focusing on fostering academic growth and empowerment
- Produced and released a series of "Introduction to Python" tutorial videos, which garnered positive feedback and enriched the learning experiences of students
- Provided supplemental tutoring assistance to students at Rutgers learning centers, augmenting the resources available to them and ensuring a solid foundational understanding

Publications / Articles

- Eisdorfer, J.T., Thackray, J., Theis, T., Vivinetto, A., Ricci, M.T., Lin, S., Oputa, O., Martinez, A.M., Nacht, H.D., Tschang, M., Mahmood, M., Tucker, A., Bohic, M., Pusuloori, S., Zmoyro, L., Abraira Lab Computational Group, Popovich, P., Ferguson, A.R., McTigue, D., Tysseling, V.M., Dulin, J., Hollis II, E., Datta, S.R., Abraira, V.E. (2023). *The Behavior Biomarker Scale (BBS): A machine-vision approach for automated locomotor recovery evaluation at millisecond timescales*. bioRxiv. https://doi.org/10.1101/2023.10.31.564826
- Sarkar, R. (2023, August 2). *Student insights: The Dark Side of Chatbot Therapy*. Critical AI. [Online]. Available: https://criticalai.org/2023/07/31/student-insights-the-dark-side-of-chatbot-therapy/

Certifications

- *Deep Learning Specialization*, DeepLearning.AI (Coursera) - Completed Oct 2022
- *Machine Learning Specialization*, Stanford University (Coursera) - Completed Jun 2022
- *AI For Everyone*, DeepLearning.AI (Coursera) - Completed Mar 2022

Projects

Invasion of the Bot-Grabbers | *Python, Jupyter, Pandas, PyTorch, Matplotlib* Sep 2023 – Dec 2023

- Developed a grid maze simulation for a graduate-level course, Introduction to Artificial Intelligence (16:198:520), with a bot navigating to save crew members while avoiding aliens
- Implemented search algorithms including BFS, A*, and D* Lite to facilitate the bot's path-finding through the maze during the first iteration of the project
- Conducted extensive tests by varying the number of aliens and grid sizes, visualizing and analyzing the bot's performance metrics regarding its survivability and the number of crew members it saved
- Enhanced the bot's decision-making in the second iteration by integrating Bayesian networks; utilized sensors to determine optimal paths to crew members probabilistically
- Trained two logistic regression models to predict the bot's moves and win probabilities in the third iteration, incorporating features engineered from the probability matrices calculated earlier, enhancing efficiency
- Advanced the bot's performance further by implementing reinforcement learning with PyTorch, using an ACTOR-CRITIC framework. The ACTOR network predicted the bot's next move and the CRITIC network predicted the alternate move with the highest probability of success, enabling iterative improvement

Tch.ai | *Next.js, Tailwind, Flask, Keras, OpenCV, Pandas, MySQL* Apr 2023 – Jul 2023

- Innovated a full-stack web application to deploy a Keras image classifier and tokenizer that recommend songs based on mood predictions from facial expressions or textual data
- Trained the classification model on the FER-2013 dataset and utilized OpenCV and a Haar Cascade classifier to preprocess datasets: achieving a training accuracy of around 96% and a validation accuracy of over 70%

- Designed a Next.js and Tailwind frontend that supports three genre selection methods–image, text, and manual choice–thus elevating user engagement with seamless data uploads and song recommendations
- Crafted a Flask REST API backend for image data preprocessing, providing personalized playlists from a CSV of 114,000+ songs, fine-tuned using genre, mode, valence, and other features
- Integrated a remote MySQL database, allowing users to create accounts and manage liked songs

UniDB | *MySQL, Java, Python, JDBC, Beautiful Soup, Jupyter* Mar 2023 – Apr 2023

- Compiled data for 100 students using various scripts and scraped course details from Rutgers University sites via Beautiful Soup and requests
- Constructed a MySQL database with simulated student data, including majors, minors, credits, and schedules from 250+ scraped classes
- Developed a Java application using JDBC to offer users a selection of 10 preconfigured or custom queries

Technical Skills

- Programming Languages: Python, Java, C++, C, JavaScript, MATLAB
- Web Technologies: HTML, CSS, JavaScript, Flask, Next.js, Tailwind
- Frameworks and Databases: TensorFlow, Docker, Spring, OpenCV, JavaFX, MySQL, MongoDB
- Libraries: Pandas, Keras, scikit-learn, Beautiful Soup
- Development Tools and Platforms: Git, Jupyter, Jira, Docker, Kubernetes, AWS

Extracurricular Activities

- *Undergraduate Student Alliance of Computer Scientists* - Member, *2021 - 2023*
- *Cognitive Science Club* - Member, *2021 - 2023*

Languages

- English (Native)
- Bengali (Native)
- Hindi (Advanced)
- Japanese (Intermediate)
- German (Beginner)