# RISHABH SRIVASTAVA

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## Education

**Columbia University** — New York, NY
*MS in Computer Science (Machine Learning Track), GPA: 3.99/4.00* — Expected Dec 2024
*Relevant Courses*: Natural Language Processing, Machine Learning, High-Performance ML, Databases
*TA for*: Topics in Software Engineering, Advanced Software Engineering
Recipient of Data Science Institute Scholarship (Fall 2024)

**Indian Institute of Technology Guwahati** — Assam, IN
*BTech in Electronics and Electrical Engineering, Minor in Computer Science* — Jul 2021
*Relevant Courses*: Computer Vision, Probability, Data Structures and Algorithms
Recipient of Samsung Fellowship Award

## Technical Skills

**Languages**: Python, CUDA, C++, Java, MySQL, MongoDB, MATLAB, React, NodeJS, TypeScript
**Technologies/Frameworks**: PyTorch, Scikit-learn, TensorFlow, OpenCV, Wandb, AWS, GCP, Kubernetes, Docker, GitHub

## Work Experience

**Rubicon Robotics** — New York, NY
*Software Engineer Intern* — May 2024 – *Present*
- Developed and implemented CV algorithms for swimmer detection by SwimBot, attaining a **90%** accuracy rate. Employed OpenPose model for comprehensive posture analysis.
- Created Django backend interfacing with AWS RDS, deployed site using AWS EC2 behind Application Load Balancers and Route53 for custom domain assignment.
- Established CI/CD pipeline using GitHub Actions, ensuring automatic deployment of changes after successful test passes, boosting development efficiency and site reliability.

**Adobe Inc. - Adobe Experience Manager (AEM) Assets** — Noida, IN
*Software Development Engineer Level II* — Jul 2021 – Aug 2023
- Solved **30+** localization, accessibility and vulnerability issues, fortifying the platform's resilience and reliability.
- Volunteered as the DevOps Champion, managed and maintained the CI/CD pipeline deployed on Jenkins to enable seamless integration and delivery of code changes.
- Spearheaded enhancement of AEM Assets Search by utilizing Lucene indexing for efficient information retrieval, Hugging Face's BLIP APIs for asset auto-captioning and GPT-4 for query pre-processing.
- Led end-to-end implementation of Smart Tags Block-list in AEM Assets Essentials. Users can block smart tags considered inappropriate for an asset and maintain a list of such tags to be blocked for all assets.
- GenAI Hackathon - integrated Adobe Firefly to improve search experience for AEM Assets Essentials, allowing customers to generate custom images if search results are irrelevant; selected to be presented at Adobe EMEA Summit 2023.

## Research Experience

**Advanced Research in Software Engineering (ARISE) Lab, Columbia University** — New York, NY
*Research Assistant under Prof. Baisakhi Ray* — May 2024 – Present
- Fine-tuned DeepSeek-Coder-V2-Lite-base using custom-built PYX dataset to get SemCoder-S, a semantic-aware CodeLLM.
- Conducted experiments comparing SemCoder-S with other CodeLLMs , achieving superior performance with F1 score of **0.678** for code correctness and **62.4%** accuracy for execution prediction on HumanEval-based dataset.

**Adobe Inc.** — Noida, IN
*Media and Data Science Research Intern* — Apr 2020 – Jul 2020
- Implemented Reinforcement Learning-based algorithms to extract top relevant patterns from temporal, sequential datasets.
- Trained Deep Q-Network using TF-Agents and extracted patterns ranked by user-specified measure of interest.
- Proposed algorithm allowed monitoring and improving user-targeting based on certain Key Performance Indicators.

**Hanyang University**                                                                                   Ansan, KR
*Research Intern under Prof. Frank Rhee*                                                   May 2019 – Jul 2019

- Designed a new algorithm Adaptive Shadowed C-Means (ASCM), to cluster data using fuzzy and shadowed sets.
- Reduced impact of noise in clustering by keeping outliers concentrated in shadow region.
- Implemented algorithm on Iris dataset and Breast Cancer Wisconsin data set, and demonstrated its use for image segmentation.

## Projects

**Inference Acceleration of Stable Diffusion** | *PyTorch Lightning, Transformers, Wandb* |          Apr 2024 - May 2024
GitHub: RishabhS66/Inference-Acceleration-of-Stable-Diffusion

- Devised Time-step calibrated quantization for Stable Diffusion, achieving the lowest FID score and highest CLIP score compared to other quantization techniques.
- Conducted L1-unstructured pruning and combined quantization, compressing the model by **20%** and reducing inference time by **5%** without significant performance loss.

**Clustering Emission Intensities Dataset for Better Data Imputation** | *Scikit-learn, Pandas* |      Jan 2024 - Apr 2024

- Implemented clustering techniques on European Central Bank's Company Emission Intensities data to facilitate enhanced imputation methods, enabling more accurate predictions in subsequent analyses.
- Employed TF-IDF for obtaining features from text data and PCA for dimensionality reduction, enhancing computational efficiency and interpretability of dataset.
- Utilized DBSCAN to uncover clusters of varying shapes and sizes, providing valuable insights into underlying structures and relationships within the dataset, crucial for further analysis and prediction tasks.

**Abstract Art Interpretation Using ControlNet** | *PyTorch Lightning, Transformers, BLIP* |                    Apr 2024
GitHub: RishabhS66/Abstract-Art-Interpretation-Using-ControlNet

- Leveraged ControlNet and Stable Diffusion to enhance spatial control over image composition and enable interpretation of abstract art through detailed geometric conditions.
- Developed a custom dataset of **14,279** image pairs to train model, achieving high-quality image generation with innovative artistic representations.

**Lexical Substitution Task with WordNet, Word2Vec Embeddings, and BERT** | *NLTK, Transformers* |      Nov 2023
GitHub: RishabhS66/Lexical-Substitution-using-BERT

- Devised a novel fusion strategy, combining BERT's contextual understanding with Word2Vec's semantic similarity and WordNet's semantic relations, to improve lexical substitution accuracy and suggest contextually fitting word replacements.
- Attained a precision of **0.189** and recall of **0.189** on 206 attempted instances with mode-specific scoring.

**Expense Management Software** | *Java, PostgreSQL, React, Redux, Cypress* |                                 Sep 2021
GitHub: RishabhS66/Expense-Management-Software-React-App

- Engineered full-stack web application for automating business expense management, featuring user authentication, role-based access, and expense claim approval workflows.
- Implemented JWT authentication, protected routing, and a dynamic dashboard for managing employees, clients, projects, and expenses, enhancing organizational efficiency.

**Codeforces Problem Recommender** | *HTML, CSS, JavaScript* |                                              Aug 2020
GitHub: RishabhS66/Codeforces-Problem-Recommender

- Built a website for Codeforces users to suggest unsolved problems based on their rating, categorized into Easy, Medium, and Hard levels.
- Utilized mathematical analysis and curve fitting to define problem rating ranges, improving problem selection accuracy.