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: Projects in Advanced Machine Learning, 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

Work Experience

Rubicon Robotics Inc. 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, empowering users to manage and block inappropriate smart tags for assets, ensuring content appropriateness and brand compliance.
- 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 – Aug 2024

- 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.

Publication

- Rishabh Srivastava, Addrish Roy, "Abstract Art Interpretation Using ControlNet," arXiv preprint, 2024 [arXiv:2408.13287]

Projects

FOMC Statement Hawkish-Dovish Analysis Using LLMs | *Transformers, BeautifulSoup* | Jun 2024 - Aug 2024

Supervisor: Prof Ali Hirsa, and associated with Morgan Stanley

- Used CentralBankRoBERTa to predict market dovishness/hawkishness from FOMC statements and meeting minutes from Jan 2019 to July 2024.
- Web scraped, cleaned, and extended the dataset, then prompt-engineered GPT-4 to classify text into pre-defined categorical labels, benchmarking results against the CentralBankRoBERTa model and MacroMicro AI Hawkish-Dovish index.
- Stress tested models by modifying prompts, data size, and order of inputs, and analyzed label consistency across models using Kendall's W.

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

Supervisor: Prof Ali Hirsa, and associated with European Investment Bank

- 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.

Technical Skills

Languages: Python, CUDA, C++, Java, MySQL, MongoDB, MATLAB, React, NodeJS, TypeScript

Frameworks: PyTorch, Scikit-learn, TensorFlow, OpenCV, vLLM, Wandb, AWS, GCP, Kubernetes, Docker, GitHub