Sanjana Srivastava

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Education

University of Virginia Ongoing
Master of Science in Data Science *May 2025*

Indian Institute of Technology, Roorkee CGPA: 8.202
Master & Bachelor of Technology in Geological Technology, Minor in Mathematics *July 2022*

Experience

Research Scientist, University of Virginia, VA 2022 – 2024
Advisors - Dr. Sana Syed, Dr. Donald E. Brown

- Worked with a multi-disciplinary team of medical professionals and engineers to study gut functions
- Researched and implemented novel Deep Learning models for disease diagnosis and quantification
- Used Machine Learning for pattern recognition in tissue images, clinical data, and transcriptomic data

Software Development Intern, BNY Mellon, India Summer 2021

- Implemented functional and unit testing for internal applications
- Developed a custom XML to CSV Parser Utility
- Fixed application and security vulnerabilities of the internal applications

Software Development Intern, ZestMoney, India Summer 2019

- Integrated a Payment Gateway at checkout using SpringBoot & MySQL database
- Implemented a custom user Signup interface using Retrofit (Android) with MVVM architecture
- Developed a Base Adapter to reduce the code redundancy thus maintaining code's usability

Projects

Comparative study of LLM evaluation frameworks with a focus on NLP vs LLM-as-a-judge metric

- Analyzing large language model evaluation frameworks like AWS Bedrock, GCP Vertex, and RAGAS
- Comparing traditional NLP metrics (e.g., VADER) to new LLM-as-a-judge metrics for evaluating LLM workflows
- Investigating six dimensions of LLM assessment, including bias, hallucination, and toxicity detection

Evaluating efficacy of synthetic images generated using diffusion models, [Code]

- Trained diffusion models to generate histology patches conditioned on nuclei locations
- Evaluated the use of synthetic patches for improving downstream segmentation and classification tasks

Deep learning based detection and visual understanding of diseases using medical imaging data, [Code]

- Performed patch-based invasive ductal carcinoma (breast cancer) and gastrointestinal disease detection
- Implemented convolutional neural networks (CNN) for classifying whole slide images and biomarker data
- Implemented Gaussian clustering methods to identify recurring visual patterns in diseased biopsies

Humorous image captioning system

- Designed a self-attentive encoder-decoder framework to generate humorous captions for images
- Trained an image-conditioned language model on a self-curated meme dataset

Correlating disease gene signature with imaging data, [Code]

- Designed a deep learning framework to identify image features associated with functional gene clusters
- Identified important gene signatures and their correlation with visual patterns in biopsies

Petrographic characterisation of a chondrite sample | *Advisor - Dr. Nachiketa Rai, IIT Roorkee*

- Investigated the mineralogy and major element geochemistry of mineral phases present in the chondrite section
- Performed Electron Probe Micro Analysis to obtain backscattered electron images of the sample

Buy and sell application | *IIT Roorkee*

- Developed an intranet application for buying, selling and requesting goods among campus residents
- Features include categorization of goods, subscribing, filtering, and searching based on users input

Publications

- **Efficay Of Synthetic Histopathological Images In Enhancing Nuclei Segmentation Tasks**
  S. Srivastava, A. Shrivastava, S. Rhoads, P.T. Fletcher, S. Syed, D.E. Brown. [Under Review]
- **What Is Normal? Characterization Of Control Pediatric Duodenal Biopsies Using Clinical Data, Machine Learning Image Analysis, And Transcriptomics**
  F. Rhoads, J. Sessions, **S. Srivastava**, F. Zulqarnain, V. Jain, ..., S. Syed. [Poster Presentation] ***ESPGHAN 2024***
- **Machine-learning-based integrative–'omics analyses reveal immunologic and metabolic dysregulation in environmental enteric dysfunction**
  F. Zulqarnain, X. Zhao, K. Setchell, Y. Sharna, P. Fernandes, **S. Srivastava**, ..., S. Syed. [Link] ***iScience 2024***
- **What Is Normal? Characterization Of Control Pediatric Duodenal Biopsies Using Clinical Data, Machine Learning Image Analysis, And Transcriptomics**
  J. Sessions, F. Rhoads, **S. Srivastava**, F. Zulqarnain, V. Jain, ..., S. Syed. [Oral Presentation] ***DDW 2024***
- **Identifying Metabolic Signatures Of Environmental Enteric Dysfunction In Pakistani Mothers And Children Using Tissue-Specific Metabolic Modeling**
  S. Syed, F. Zulqarnain, **S. Srivastava**, W. Khan, I. Nisar. [Poster Presentation] ***Bill & Melinda Gates Foundation Grand Challenges Annual Meeting 2023***
- **What Is Normal? Characterization Of Variations In Control Duodenal Biopsies By Machine Learning Image Analysis**
  F. Rhoads, J. Sessions, **S. Srivastava**, V. Jain, ..., S. Syed. [Poster Presentation] ***NASPGHAN 2023***
- **Quantitative Morphometry and Machine Learning Model to Explore Duodenal and Rectal Mucosal Tissue of Children with Environmental Enteric Dysfunction**
  M. Khan, Z. Jamil, L. Ehsan, F. Zulqarnain, **S. Srivastava**, ..., S. Syed. [Link] ***ASTMH' 2023***

Interests & Competences

Interests: Computer Vision, Multimodal learning, Natural language processing, Healthcare/Medical Imaging
Languages: Python, R, C/C++, Java, JavaScript, Kotlin, LaTeX
Packages/Tools: PyTorch, TensorFlow, Keras, Django, React, Git, MySQL

Awards & Achievements

- Recipient of **IIT Roorkee Award: Nayyar Award for Excellence in Communication** for winning in a multi-round competition involving debating, speech giving, essay writing, and published writing.
- Recipient of **Indian Ministry of Human Resource and Development (MHRD) Assistantship** for meeting the graduate CGPA criterion, demonstrating academic excellence exceeding the required limit.
- Cleared **Joint Entrance Examination (JEE) with All India Rank 5047 (99.6 percentile)**.

Positions of Responsibility & Extra Curriculars

- **Project Leader** at Information Management Group - Official Coding Society of IIT Roorkee
- **Editor-in-chief** at Geek Gazette - Official Technical Magazine of IIT Roorkee
- **Actor/Director/Producer** at Dramatics Section, IIT Roorkee
- **Council Member** of Hostel Management at Kasturba Bhawan, IIT Roorkee
- **Team Member** of Table Tennis National Sports Organization, IIT Roorkee