

Soham Chitnis

✉ sc11537@nyu.edu | 📞 (201) 920-3972 | 🌐 soham-chitnis10.github.io | 🌐 soham-chitnis | 🌐 soham-chitnis10

Education

New York University, Courant Institute of Mathematical Sciences
Master of Science in Computer Science (GPA: 4.0/4.0)

New York, NY
September 2024 - May 2026

Birla Institute of Technology and Science Pilani (BITS Pilani)
Bachelor of Engineering in Computer Science, Minor in Data Science

Goa, India
November 2020 – July 2024

Relevant Courses

Machine Learning, Deep Learning, Foundations of Data Science, Reinforcement Learning, Natural Language Processing (Ongoing), Deep Learning for Computer Vision (CS 231N, Stanford online)

Skills

Languages: (Advanced): Python , (Intermediate): C++ , C, Java, SQL, HTML, CSS

Deep Learning frameworks: PyTorch, Tensorflow, JAX (Beginner), HuggingFace, PyTorch-Lightning

Python Libraries: Numpy, Scikit-Learn, OpenCV, Matplotlib, Seaborn, Pandas, DSPy, Langchain, Weights and Biases

Tools: GIT, LaTeX, Linux, Windows, Microsoft Office, Postman

Experience

Graduate Student Researcher, CILVR Lab, New York University

January 2025 – Present

- **Project:** Exploring training paradigms for JEPA and Hierarchical JEPA
- Exploring the JEPA model for learning dynamics from offline-RL data.

Undergraduate Student Researcher, APP Center for AI Research, BITS Pilani

February 2022 – May 2024

- **Project 1:** Deep learning for digital pathology image analysis
- Proposed domain-specific pre-trained feature extraction model for Whole Slide Image Classification using the state-of-the-art multiple instances learning methods and a new metric, Confidence, for the model's reliability.
- Improved confidence and achieved a new state-of-the-art performance of WSI-based glioma subtype classification (96.85 % AUC ROC), showing high clinical applicability in assisting glioma diagnosis.
- **Project 2:** LLM Agents for Critical Analysis and Review of Research Manuscripts
- Developed AutoRef, a multi-agent LLM-based system for generating reviews of scientific articles (reviewer agent), feedback of reviews (feedback agent), and an iterative algorithm to refine a review given the reviewing guidelines.
- Evaluated AutoRef on a subset of ICLR 2023 papers, the feedback scores improved by 15 % and 217 % when starting with machine-generated and human reviews, respectively.
- Presented at Association for Computational Linguistics (ACL) 2024

Research Intern, TCS Research, Pune, India

September 2023 – December 2023

- **Project:** Grounding Large Language Models for Chart Understanding
- Developed a multimodal model by grounding large language models to the charts domain. Fine-tuned CLIP with charts (ChartCLIP). Investigated the impact of different language-image pre-training of visual encoders on VQA.
- Found contrastively pre-trained models (CLIP & ChartCLIP) more efficient than non-contrastively pre-trained (DePlot) during training while achieving similar results.

Visiting Scholar, VC Lab, Ontario Tech University, Ontario, Canada

June 2023 – August 2023

- **Project:** Hyperspectral Pixel Unmixing using Latent Dirichlet Variational Autoencoder for Remote Sensing
- Proposed spatial attention CNN encoder by extending Latent Dirichlet VAE that improves RMSE and SAD metrics with consistently low standard deviation as compared to other methods.
- Delivered oral presentation at IEEE IGARSS 2024. Work as part of the MITACS Globalink Research Internship.

Research Assistant, Northeastern University, Boston, USA

October 2022 – April 2023

- **Project:** Investigating the oblique effect in Deep Neural Networks (DNNs)- CNNs & ViTs
- Generated synthetic benchmark datasets from ImageNet1K- Stylized, Randomized, Phase Scramble, Metameric, White Noise. Trained ResNets and Vision Transformers (ViTs) with generated datasets in a distributed setting.

Publications

- AutoRef: Generating Refinements of Reviews Given Guidelines August 2024
Chitnis S., Patwardhan, M., Srinivasan, A., Verlekar, T.T., Vig, L., Shroff, G. SDP Workshop, ACL 2024
- SpACNN-LDVAE: Spatial Attention Convolutional Latent Dirichlet Variational Autoencoder for July 2024
Hyperspectral Pixel Unmixing
Chitnis S., Mantripragada, K., Qureshi, F.Z. IEEE IGARSS 2024
- Domain-Specific Pre-training Improves Confidence in Whole Slide Image Classification July 2023
Chitnis S.R., Liu, S., Dash, T., Verlekar, T.T., Di Ieva, A., Berkovsky, S., Vig, L., Srinivasan, A. IEEE EMBC 2023

Selected Projects

JEPA World Model using Psuedo Recurrent Networks December 2024

- Trained and successfully avoided collapse while training the JEPA world model. Based on the Markov property, the Psuedo Recurrent Network was implemented (without any hidden state).
- Achieved 3rd rank by performance on hidden datasets. Work as part of Deep Learning taught by Prof. Yann LeCun & Prof. Alfredo Canziani.

Video Vision Transformers (ViViT) for 3D Medical Images April 2023

- Implemented Video Vision Transformer (Original Implementation in JAX) with all variants for 3D Medical Images: MRIs, CT scan in PyTorch. Work done as part of Deep Learning (CS F425)

Super-Resolution ResNet (SRResNet) & Super-Resolution CNN (SRCNN) March 2022

- Implemented SRResNet & SRCNN paper on Oxford-IIIT Pet Dataset, Conducted experiments and study on interpolation modes & upsampling methods. Code: [github/SRCNN-implementation](https://github.com/ChitnisS/SRCNN-implementation)

Project Kratos August 2021 - April 2023

- Developing Mars Rover for Rover Challenges. Worked on developing models for Rock analysis using Computer Vision to detect the presence of life in rocks.

Co-curricular Activities

- A core member of the Society for Artificial Intelligence & Deep Learning (SAiDL), Electronics & Robotics Club and Life Sciences Team, Project Kratos during undergrad.
- Organized annual AI Symposium with APPCAIR in 2022 as a member of SAiDL. I hosted a talk on Graph Neural Networks during the Symposium.
- Organized a Machine Learning Hackathon for the TechWeek, Center for Technical Education in the college.

Honors & Awards

MITACS Globalink Research Internship at Ontario Tech University 2023
Silver Prize, Machine Learning Hackathon by CTE, BITS Pilani 2021
100 percentile in Maharashtra (State-level) Engineering Entrance Test 2020
(Physics-Chemistry-Mathematics & Mathematics)