

# Soham Rohit Chitnis

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## Education

### Birla Institute of Technology and Science, Pilani

Goa, India

B.E COMPUTER SCIENCE, MINOR IN DATA SCIENCE

Nov. 2020 -Present

- **CGPA** - 8.43/10
- **Relevant Completed Official Coursework:** Machine Learning, Deep Learning, Fundamentals of Data Science, Linear Algebra, Probability & Statistics, Calculus, Operating Systems, Computer Architecture, Computer Programming, Data Structures & Algorithms, Discrete Structures for Computer Science
- **Relevant Ongoing Official Coursework:** Thesis at TCS Research

### Thakur College of Science & Commerce

Mumbai, India

CLASS XII, MAHARASHTRA STATE BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

2019 - 2020

- **Percentage:** 90.77%

## Research Interests

Computer Vision, Deep Learning, Machine Learning, Artificial Intelligence

## Research Experience

### Tata Consultancy Services Research

Pune, India

RESEARCH INTERN

Sept. 2023 - Present

- **Project:** Grounding Large Language Models for Chart Understanding
- **Supervisor:** Dr. Manasi Patwardhan
- Conducting a literature review, implementing vision-language models, and experimenting. Work as part of the Thesis.
- Goal: Exploring grounding large language models to charts, investigating the impact of the type of language-image pre-training in visual encoders on Chart VQA task.

### Visual Computing Lab, Ontario Tech University

Toronto, Canada

VISITING SCHOLAR | [WEBSITE](#) | [CERTIFICATE](#)

June 2023 - August 2023

- **Project:** Hyperspectral Pixel Unmixing using Latent Dirichlet Variational Autoencoder for Remote Sensing
- **Supervisor:** Prof. Faisal Qureshi
- Extending the [Latent Dirichlet VAE](#) to incorporate spatial information. Proposed an isotropic spatial attention CNN encoder that improves RMSE (abundance estimation) and SAD (endmember extraction) metrics for the unmixing task.
- Contributed patch-level data loader for HSI Dataloader python library. Wrote a research paper. Work done as part of MITACS Globalink Research Internship

### APP Center for AI Research (APPCAIR), BITS Pilani

Goa,India

UNDERGRADUATE RESEARCHER | [WEBSITE](#)

Feb. 2022 - June 2023

- **Project 1:** Deep-learning methods for digital pathology image analysis
- **Supervisor:** Prof. Tanmay Verlekar, Dr. Tirtharaj Dash, Prof. Ashwin Srinivasan
- **Collaborators:** Dr. Sidong Liu, Macquarie University, Sydney
- Proposed domain-specific pre-trained feature extraction model for Whole Slide Image Classification using the state-of-the-art multiple instances learning methods: CLAM & TransMIL and a new metric, Confidence for the same. The proposal improves confidence and achieves a new state-of-the-art performance of WSI-based glioma subtype classification, showing high clinical applicability in assisting glioma diagnosis.
- **Project 2:** Molecule Generation using Graph Autoencoders & Variational Graph Autoencoders.

### The Kwon Lab for Low Vision and Brain Research, Northeastern University

Boston, USA

RESEARCH ASSISTANT | [WEBSITE](#)

Oct. 2022 - April 2023

- **Project:** Investigating the oblique effect in Deep Neural Networks (DNNs)- CNNs & ViTs
- **Supervisor:** Alish Dipani, Prof. MiYoung Kwon
- Creating synthetic benchmark datasets from ImageNet- Stylized, Randomized, Phase Scramble, Metameric, White Noise. Conducted literature review, trained ResNets, Vision Transformers (ViTs) on datasets, and devised an evaluation for investigating the Oblique Effect in DNNs.

### Central Electronics Engineering Research Institute (CSIR-CEERI)

Chennai,India

RESEARCH INTERN | [WEBSITE](#) | [CODE](#) | [REPORT](#)

May 2022 - July 2022

- **Project:** Automated Plastic Segregation using Hyperspectral Imaging for Recycling Plant
- **Supervisor:** Dr. Madan Kumar Lakshmanan, Prof. Amalin Prince A.
- Implemented Pre-processing pipeline for HSI data and CNN models
- Built a dedicated data augmentation module: Random Crop & Resizing, Horizontal Flip, Colour Jitter for HSI and experimented with Self-supervised learning method: SimCLR for HSI.

Publications & Preprints

1.

**Chitnis, S.R.**, Liu, S., Dash, T., Verlekar, T.T., Di Ieva, A., Berkovsky, S., Vig, L. and Srinivasan, A., 2023.  
**Domain-Specific Pre-training Improves Confidence in Whole Slide Image Classification.**  
(Published & Accepted at IEEE EMBC 2023 as Oral Presentation) Link: [Paper](#), [Slides](#) & [Code](#)
2.

**Chitnis, S.**, Mantripragada, K., Qureshi, F.Z., 2023. **SpACNN-LDVAE: Spatial Attention Convolutional Latent Dirichlet Variational Autoencoder for Hyperspectral Pixel Unmixing** Link: [Paper](#) & [Code](#)

Teaching Experience

**Introduction to Deep Learning, Quark Controls BITS Pilani Goa**

INSTRUCTOR

Online

July 2022 - August 2022

- Taught the course “Introduction to Deep Learning” to 200+ students and mentored first-year students for the final project.

**Computer Programming, BITS Pilani**

TEACHING ASSISTANT

Goa, India

May 2022 - August 2022

- Conducted doubt solving sessions, evaluated labs and assisted Prof. Anup B Mathew & Prof. Arnab K Paul.

**Mathematics-I (Multivariate Calculus), Academic Assistance Program CTE**

MENTOR

Goa, India

Dec. 2021 - May 2022

- Mentored first-year students for Mathematics-I (Multivariate Calculus) and conducted doubt-solving sessions.

Selected Projects

**Video Vision Transformers (ViViT) for 3D Medical Images**

April 2023

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

**Implementation of Super-Resolution ResNet(SRResNet) & Super-Resolution CNN(SRCNN)**

March 2022

[CODE & REPORT](#)

- Implemented SRResNet & SRCNN paper on Oxford-IIIT Pet Dataset, Conducted experiments and study on interpolation modes & upsampling methods.

**Comparative Study of Reward functions with Policy gradient (RL)**

August 2021

[CODE & REPORT](#)

- Conducted a comparative study on different reward functions with Policy gradient algorithm to find minima of two variable quadratic function

**Project Kratos**

August 2021 - April 2023

[WEBSITE](#)

- Developing Mars Rover for Rover Challenges. Worked on developing models for Rock analysis using Computer Vision to detect the presence of life in rocks.
- Selected as Top 36 Teams for University Rover Challenge, USA; Scored 95/100 in Life Sciences Task; Awarded Asia 2nd Best Rover

Skills

- Languages:** Python, C/C++, Matlab, Java
- Deep Learning Frameworks:** PyTorch, Tensorflow, Keras
- Tools:** GIT, LaTeX, Linux, Windows, MS Office
- Python Libraries:** Numpy, Scikit-Learn, OpenCV, Matplotlib, Pandas, Scipy, Pyro

Co-curricular Activities

- Core member of the Society for Artificial Intelligence & Deep Learning (SAIDL), Electronics & Robotics Club and Life Sciences Team, Project Kratos.
- 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 organized by the Center for Technical Education in the college.

Extracurricular Activities

Took the initiative in implementing a Butterfly Garden in the nearby Municipal Garden with the help of a Local Municipal Corporator and planted around 100 plants to enrich and conserve biodiversity: flora and fauna of the neighborhood. Inspired by my work, the local governing body has implemented in several municipal parks.

Honors, Scholarships & Awards

2023	<b>MITACS Globalink Research Scholarship for Internship</b> , MITACS, Canada	Goa, India
2021	<b>Silver prize</b> , Machine Learning Hackathon, Center for Technical Education, BITS Pilani	Goa, India
2020	<b>100 percentile (Physics-Chemistry-Mathematics &amp; Mathematics)</b> , Maharashtra Common Entrance Test	Mumbai, India
2020	<b>INSPIRE Scholarship (For securing rank in the top 1 percentile in Class XII Examination)</b> , MSBSHSE	Mumbai, India
2018	<b>Rising Star Award for Mathematics</b> , Cambridge School	Mumbai, India
2017	<b>Silver Medal</b> , Dr. Homi Bhabha Young Scientist Competition (State-level)	Mumbai, India