Soham **Chitnis**

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Education

Birla Institute of Technology and Science, Pilani — *Goa, India*

B.E(Hons.) In Computer Science with Minor in Data Science — *Nov. 2020 -Present*

- **CGPA** - 8.6/10
- **Relevant Completed Coursework:** Computer Programming, Linear Algebra, Probability and Statistics, Calculus, Object-Oriented Programming, Data Structures and Algorithms
- **Relevant Ongoing Coursework:** Fundamentals of Data Science, Applied Statistical Methods

Thakur College of Science & Commerce — *Mumbai, India*

Class XII, Maharashtra State Board of Secondary and Higher Secondary Education (MSBSHSE) — *2019 - 2020*

- **Percentage:** 90.77%

Cambridge School — *Mumbai, India*

Class X, Indian Certificate of Secondary Education (ICSE) — *2017 - 2018*

- **Percentage:** 96.42%

Research Interests

Computer Vision, Reinforcement Learning, Graph Representation Learning, Cognitive Neuroscience

Research Experience

The Kwon Lab for Low Vision and Brain Research, Northeastern University — *Boston, USA*

Research Assistant | Website — *Oct. 2022 - Present*

- **Supervisor: Alish Dipani**, **Dr.MiYoung Kwon**
- Understanding statistical regularities in **amodal completion** in the context of the **Gestalt Law of grouping: closure** for Deep Neural networks
- Creating benchmark datasets to understand the statistical regularities- **Proportion and Size of Occlusion**.
- **Training** the state-of-the-art DNNs for the task & **quantifying** the statistical regularity

APP Center for AI Research, BITS Pilani — *Goa,India*

Undergraduate Researcher | Website — *Feb. 2022 - Present*

- **Project:** Interpretable deep-learning methods for digital pathology image analysis
- **Supervisor: Dr. Tanmay Verlekar**, **Dr. Tirtharaj Dash**, **Prof. Ashwin Srinivasan**,
- **Collaborators: Dr. Sidong Liu**, Macquarie University, Sydney
- Proposed the use of **Domain-specific pre-trained** models for **multiple instance learning-based** cancer diagnosis models using Whole Slide Images.
- MIL-based cancer diagnosis requires encoding the smaller patches of gigantic histopathology images we proposed use of Domain-specific pre-trained models for encoding.
- Previously worked on Molecule Generation using **Graph Autoencoders** & **Variational Graph Autoencoders.**

Central Electronics Engineering Research Institute (CSIR-CEERI) *Chennai,India*

RESEARCH INTERN | WEBSITE CODE & REPORT *May 2022 - July 2022*

- **Project:** Hyperspectral Imaging for Plastic Segregation
- **Supervisor: Dr. Madan Kumar Lakshmanan, Dr. Amalin Prince A.**
- Conducted **pre-processing** of data and **benchmarking** models.
- Used Spectral Pre-processing methods: Smoothing & Standard Normal Variate
- Built a **data augmentation** module for **Hyperspectral Images**.
- Implemented Deep CNNs for Hyperspectral Images
- Trained models using **Self-supervised learning** method: SimCLR

Teaching Experience

Introduction to Machine Learning and Deep learning, CTE BITS Pilani Goa *Goa, India*

INSTRUCTOR *Nov. 2022 - Present*

- Teaching an introductory course in Machine Learning & Deep Learning to freshman year students.

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

INSTRUCTOR *July 2022 - August 2022*

- Taught an introductory course on Deep learning with focus on Computer Vision and mentored freshman students in the final project.

Computer Programming, BITS Pilani *Goa, India*

TEACHING ASSISTANT *May 2022 - August 2022*

- Worked as Teaching Assistant for the course Computer Programming, which teaches C programming to freshman students
- Conducted doubt solving sessions, evaluated labs and assisted **Prof. Anup B Mathew** & **Prof. Arnab K Paul**.

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

MENTOR *Dec. 2021 - May 2022*

- Mentored freshman students for the course Mathematics-I and helped them in solving doubts and understanding the concepts

Projects

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

CODE & REPORT

- Implemented **Super-Resolution CNN** & **Super-Resolution ResNet** with an upsampling factor of 2
- Conducted experiments and study on interpolation modes: **Bi-cubic**, **Bi-linear** and **Nearest Neighbour** and upsampling methods: **Sub-pixel** and **Transpose Convolutions**.

Comparative Study of Reward functions on Policy gradient *August 2021*

CODE & REPORT

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

Robot for Autonomous Indoor Navigation *September - December 2021*

CODE

- Deployed **Semantic Segmentation** model for Scene parsing on the robot Trotbot.
- Trained using MIT ADE20K Dataset

Project Kratos *August 2021-Present*

WEBSITE

- Developing Mars Rover for the University Rover Challenge (URC). At URC 2022,the team stood 1st in India, 2nd in Asia and 20th globally.
- Working on Rock analysis using Computer Vision. Building a End-to-end Deep Learning model for detecting presence of life in rocks.

A review of "A ConvNet for 2020s" *March 2022*

CODE & REPORT

- Reviewed the paper **A ConvNet for 2020s**
- Conducted a study over the activation functions used

Bayesian Neural Network for Noisy XOR using Markov Chain Monte Carlo *March 2022*

CODE

- Implemented Bayesian Neural Network using No-U-turn Sampler

Adversarial Deep Learning *September - December 2021*

CODE

- Worked as Contributor to this Project. This project is a part of a book being written of same name where this project involves tutorials for the book.

MLDataset.jl *March 2022*

CODE

- Worked as Contributor. Added PolBlogs Graph Datasets to Julia from Torch-geometric.

Online Courses & Summer Schools

2022	**CS 285: Deep Reinforcement Learning (Ongoing),** UC Berkeley	*Online*
2022	**AI Summer School,** CVIT,IIIT Hyderabad	*Online*
2022	**Deep Learning Specialization,** DeepLearing.AI	*Online*
2022	**CS231n-Deep Learning for Computer Vision,** Stanford	*Online*
2022	**Building Transformer-Based Natural Language Processing Applications,** NVIDIA Deep Learning Institute	*Online*
2021	**Machine Learning,** Coursera	*Online*
2021	**Fundamentals of Deep learning,** NVIDIA Deep Learning Institute	*Online*

Skills

- **Languages:** Python, C/C++, Matlab
- **Frameworks:** PyTorch, Tensorflow, Keras
- **Tools:** GIT, Linux
- **Python Libraries:** Numpy, Scikit-Learn, OpenCV, Matplotlib, Pandas, Scipy

Honors & Awards

2022	**2nd Rank, Team Project Kratos,** Anatolian Rover Challenge(ARC)	*Istanbul, Turkey*
2021	**Silver Prize,** CTE ML Hackathon	*Goa, India*
2020	**100 percentile (Physics-Chemistry-Mathematics & Mathematics) ,** Maharashtra Common Entrance Test	*Mumbai, India*
2017	**Silver Medal,** Dr. Homi Bhabha Young Scientist Competition	*Mumbai, India*
2016	**5th Rank,** CV Raman Science Competition	*Mumbai, India*

Committees

2022	**Member,** Society for Artificial Intelligence and Deep Learning	*Goa, India*
2021	**Core Member,** Electronics and Robotics Club	*Goa, India*
2021	**Core Member, Life Detection,** Project Kratos	*Goa, India*