Harsh **Kumar**

DEEP LEARNING ENTHUSIAST | THIRD YEAR UNDERGRADUATE | APPLIED MATHEMATICS

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"There will be plenty of time to rest in the grave."

Education

Indian Institute of Technology, Roorkee   *Roorkee, India*

INTEGRATED M.SC. IN APPLIED MATHEMATICS   *2020 - Exp. 2025*

- CGPA: 9.069/10

Work Experience

Bosch Global Software Technologies   *Bangalore, India*

MACHINE LEARNING INTERN   *Jun. 2022 - September. 2022*

- Worked on a contrastive learning-based approach for patch retrieval on an unlabelled dataset of autonomous driving
- Deployed a MoCo v2-based pipeline for identifying labeled patches across the Berkeley DeepDrive dataset
- Worked with different architectures and loss function to familiarise myself with representation based deep learning techniques. **Presentation**
- Contributed to the label converter app, which now receives 100+ daily requests for label conversions across different public and proprietary segmentation labels inside BGSW

Projects

High Fiedelity Model Extraction Attacks

CONTRIBUTOR | ONGOING RESEARCH PROJECT

- Working on a novel approach for high fidelity model extraction attacks by leveraging techniques in adversarial learning literature for model stealing attacks in a black-box setting

Model Extraction on Video Vision Transformers

CONTRIBUTOR | RESEARCH PROJECT FOR INTER IIT TECH MEET 10.0

- Performed Model Extraction of Video Swin Transformer and MoviNet trained on the Kinetics datasets in Black Box and Grey Box settings to obtain competitive results in the task
- Used conditional video generator and adverserial crafting along with knowledge distillation based techniques
- Won the gold medal in the High Prep event amongst 22 IITs across India
- Report can be accessed **here**, code implementation can be found **here**

PAPERS WE READ

CONTRIBUTOR | GITHUB REPOSITORY

- This is an open source repository maintained by Vision And Language Group containing summaries and analysis of recently published research papers. **GitHub Link**
- Contributed to summaries from recent Deep Learning Conferences.

Semantic Segmentation using U-Net

OPEN PROJECT | VISION AND LANGUAGE GROUP

- Implemented the **U-Net** Architecture for semantic segmentation using PyTorch framework on the HELEN* Dataset for performing pixel-level classification of human faces.
- Tried out various loss functions for model training and evaluated the model on class-wise F1 scores.
- Implementation **here**

Algorithmic Backtesting on Indian Stocks

PROJECT | FINANCE CLUB, IIT ROORKEE

- Studied and backtested a long-only trading system based on RSI and SMA
- Created a Profit Booking Logic and outperformed the benchmark on REL. **[GitHub Link]**

Writing

Introduction to Transfer Learning   *Blog*

MAINTAINER   *June 2021*

- Introduce transfer learning and its nuances so that newbies would not get lost in specialized terms and jargons while starting.
- Includes work done with VGG-16 on a kaggle challenge
- **[Link]**

Achievements

2022	**Gold Medal ESC Research Track**, CSAW 2022
2022	**Gold Medal in High Prep Event**, Inter IIT TechMeet 10.0
2021	**Won Silver Medal**, R-Street Quant Challange by Finance Club IIT Roorkee
2021	**Ranked 15 in India**, CSAW 2021
2021	**Ranked Top 300 Globally**, PicoCTF
2021	**2nd Position**, n00bCTF 2021 by InfoSec IITR
2021	**Top 10**, Syntax Error by SDSLabs IITR
2020	**All India Rank - 4000,** Joint Entrance Exam (JEE) Advanced

Skills

Programming	Python, C++, Bash, JAX, HTML, LaTeX, Julia
Packages	Pytorch, TensorFlow, Numpy, sckit-learn, Django
Utilities	Git, Linux Shell, Jupyter Notebooks, SSH, Markdown
Languages	English, Hindi, Japanese

Extracurricular Activity

Vision and Language Group, IIT Roorkee   *Roorkee, India*

CORE MEMBER   *May, 2021 - Present*

- Core member of VLG, a student group that promotes **Deep Learning research culture** at IITR by discussing relevant research papers, organizing workshops and working on related projects.
- Involved in paper discussions, contributing to projects, organizing workshops,etc.

Data Science Group, IIT Roorkee   *Roorkee, India*

CORE MEMBER, OPEN SOURCE AND DEVELOPMENT   *February, 2022 - Present*

- Part of a 30-member strong team which aims to foster the culture of Machine Learning and Deep Learning at IIT Roorkee.
- Organized weekly paper discussions and workshops for the benefit of the IITR student community.

Programming and Algorithms Group, IIT Roorkee   *Roorkee, India*

CORE MEMBER   *October, 2021 - Present*

- Core member of PAG, a student run community that fosters the culture of **Competetive Programming in IITR**
- Involved in conducting contests, organizing open lectures etc.

InfoSec, IIT Roorkee   *Roorkee, India*

CORE MEMBER   *March, 2021 - Present*

- Member of a group of information security enthusiasts who believe in freedom of information and privacy while maintaining ethical and legal acpects. Took part in a lot of **CTFs** around the world
- Involved in organizing CTFs, conducting open discussions, organizing workshops etc.

Finance Club, IIT Roorkee   *Roorkee, India*

JUNIOR MEMBER   *March, 2021 - January, 2022*

- Actively involved in cultivating a robust **financial culture in IITR** by organizing workshops, competitions and writing blogs.
- Enthusiastically participated in various projects and group discussions on the latest research and developments