Darsh Kaushik

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EDUCATION

Université de Montréal   **Sep 2023 – Aug 2025**
MSc in Computer Science

National Institute Of Technology (NIT), Silchar   **Jul 2019 – May 2023**
BTech in Computer Science And Engineering   *CGPA:* **9.58/10**

PUBLICATIONS

- **COVID-19 Diagnosis from Cough Acoustics using ConvNets and Data Augmentation** 🔗
  First International Conference on Advances in Computing and Future Communication Technologies (ICACFCT)
  Saranga Kingkor Mahanta, <u>Darsh Kaushik</u>, Hoang Van Truong, Shubham Jain, Koushik Guha. 2021.

- **Wikipedia Current Events Summarization using Particle Swarm Optimization** 🔗
  Proceedings of the 18th International Conference on Natural Language Processing (ICON)
  Santosh Kumar Mishra, <u>Darsh Kaushik</u>, Sriparna Saha, Pushpak Bhattacharyya. 2021.

- **Improved English to Hindi Multimodal Neural Machine Translation** 🔗
  Proceedings of the 8th Workshop on Asian Translation (WAT2021), 155-160
  SR Laskar, AFUR Khilji, <u>Darsh Kaushik</u>, P Pakray, S Bandyopadhyay. 2021.

- **CNLP-NITS@ LongSumm 2021: TextRank Variant for Generating Long Summaries** 🔗
  Proceedings of the Second Workshop on Scholarly Document Processing, 103-109
  <u>Darsh Kaushik</u>, AFUR Khilji, U Sinha, P Pakray. 2021.

- **EnKhCorp1.0: An English–Khasi Corpus** 🔗
  Proceedings of the 4th Workshop on Technologies for MT of Low Resource Languages (LoResMT2021)
  SR Laskar, AFUR Khilji, <u>Darsh Kaushik</u>, P Pakray, S Bandyopadhyay. 2021.

EXPERIENCE

Amazon   **Feb 2022 – Jul 2022**
Applied Scientist Intern | Graph Neural Networks, Representation Learning, Invalid Traffic

- Worked with the **Traffic Quality** team on learning **task-agnostic representations** using **bipartite Graph Convolutional Networks**, trained through the proposed **custom bi-partite GraphSAGE loss**.
- Developed an inductive prototype for **unsupervised fake user detection**, that utilizes the user node embeddings for downstream clustering, leading to a **publication at Amazon Machine Learning Conference (AMLC)**.

Indian Space Research Organisation (ISRO)   **Jul 2021 – Nov 2021**
Research Intern | Computer Vision, Geospatial Big Data, Spatiotemporal Trends

- Worked with **Dr. Santonu Goswami** on characterizing **long-term spatiotemporal trends** of **vegetation, hydrology and climate** in permafrost regions.
- Developed **machine learning based geospatial solutions** to **map permafrost degradation** in the northern hemisphere at large spatial scales from **remote sensing data**.

Indian Institute of Technology (IIT), Patna   **May 2021 – Jul 2021**
Research Intern | Natural Language Processing, Nature-inspired Algorithms

- Worked with **Dr. Sriparna Saha** on **nature-inspired evolutionary algorithms for optimization** to cluster textual data and generate long summaries.
- Used **particle swarm optimized clustering** for **unsupervised extractive multi-document summarization**, resulting in a publication at International Conference on Natural Language Processing (ICON).

KEY PROJECTS

ASyMov | Text-conditioned 3D Motion generation 🔗   **August 2022 – Mar 2023**
Multimodal Deep Learning, Latent Variable Models, 3D Computer Vision

- Guided research project on **text-conditioned 3D motion generation** with **Dr. Arjun Chandrasekaran** of the **Perceiving Systems** department at the **Max Planck Institute for Intelligent Systems, Tübingen, Germany**.
- Working on **temporal discretization of motion sequences** for enhancing human motion generation from textual prompts.

Cough It | Covid-19 diagnosis from Cough Acoustics 🔗   **Feb 2021 – Mar 2021**
Audio Signal Processing, Image Processing, Audio Data Augmentation

- Scalable mobile application for simple, efficient and inexpensive COVID-19 diagnosis from cough audio samples.
- Trained a **deep CNN fed by MFCC matrices** extracted from the **augmented cough audio samples** in **Keras** framework. Resulted in an **accepted publication** at an **IEEE conference.**
- **Winner** of HackHarvard 2021. **Highest ranked model** at DiCOVA Challenge 2021, organised by IISc Bangalore researchers, achieved a Test AUC score of 87.07%.

GradCAM | Skin Lesion Classification and Interpretation 🔗   **Oct 2020 - Nov 2020**
ML Interpretability, Computer Vision, Transfer Learning

- Implemented **Pytorch hooks** to **capture backprop gradients** of a **transfer-learned** skin lesion classifier fine-tuned for **modified Skin Cancer MNIST** dataset.
- Produced **localization maps highlighting responsible regions** in the image using Gradient-weighted Class Activation Mapping **(Grad-CAM)** to better explain the predictions.

OPEN-SOURCE CONTRIBUTIONS

Qiskit   **Jun 2021 - Jul 2021**
qiskit-machine-learning

- Adding callback feature for NN classifier/regressor 🔗
- Fixing missing optimizer in NN classifier/regressor 🔗

SCHOLASTIC ACHIEVEMENTS

2021	**Winner – HackHarvard 2021** | MLH Season 2022
	Cough It - mobile app for efficient and inexpensive COVID-19 diagnosis from cough acoustics
2021	**IBM Qiskit Advocate Program**
	Selected as Qiskit Advocate for contributions made to the qiskit-machine-learning library
2021	**Rank 1 – DiCOVA Challenge 2021** | Track-1
	Top leaderboard position attained by the proposed CNN fed by MFCC matrix extracted from audio samples
2020	**AWS ML Scholarship**
	Top 325 candidates selected worldwide
2019	**JEE (Joint Entrance Examination) Advanced - 2019**
	*All India Rank: **6,095** (amongst 0.16 million candidates)*

TECHNICAL SKILLS AND INTERESTS

Programming	Python, C++, C
Machine Learning	**PyTorch**, PyTorch Lightning, Keras, Sci-kit-learn, Librosa
Cloud Platforms	**AWS**, IBM Watson, Google Earth Engine
Utilities	**SQL**, CUDA, HTML5, JavaScript, LaTeX, Git VCS
Interests	**Multimodal Deep Learning**, **3D Computer Vision**, Self-Supervised Representation Learning, Out-of-Distribution Generalization, ML Interpretability

Positions of Responsibility

Machine Learning Club NITS   **Sept 2020 – Present**
Project Lead   Oct 2022 – Present
Moderator   Sept 2020 – Sept 2022

Computer Science Society NITS   **Nov 2020 – Oct 2022**
ML Wing Head   Nov 2021 – Oct 2022
Lead Instructor (C/C++)   Jan 2021 – Feb 2021