

Oshin Dutta

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SUMMARY

Passionate and driven researcher specializing in model compression and optimization for resource-constrained environments. Proven expertise in designing, implementing, and testing compressed AI models on both classification and generative tasks. Adept at applied research and development, with a track record of publishing high-impact research and delivering practical solutions for industrial applications.

EDUCATION

Ph.D. in Compressing AI Models

Indian Institute of Technology Delhi

(2019 – present, Synopsis completed))

- Area: Model compression, Generative AI, Computer Vision, NLP
- Thesis: Optimizing Deep Learning Models for Resource Constrained Environments supervised by Sumeet Agarwal and Prathosh A.P.
- Relevant Coursework: Machine Learning, Deep Learning and Generative AI, Compressed Sensing
- Key Achievements: Developed novel compression algorithms for popular AI models like LLMs; tested models on a wide range of classification and generative tasks.

Master of Technology, Electronics and Communication

Indian Institute of Technology Dhanbad

(2016 – 2018)

- Area: Machine Learning, Audio Signal Processing
- Thesis: Tempo estimation and Octave Correction using vibrato suppression and Support Vector Machines

PUBLICATIONS

- **Dutta, O.**, Gupta, R., & Agarwal, S. (2024). Efficient LLM Pruning with Global Token-Dependency Awareness and Hardware-Adapted Inference. In Workshop on Efficient Systems for Foundation Models II@ ICML 2024. ([link](#))
- **Dutta, O.**, Kanvar, T., & Agarwal, S. (2023, December). Search-Time Efficient Device Constraints-Aware Neural Architecture Search. In International Conference on Pattern Recognition and Machine Intelligence (**PReMI**) (pp. 38-48). Cham: Springer Nature Switzerland. ([link](#))
- **Dutta, O.**, Srivastava, A., AP, P., Agarwal, S., & Gupta, J. (2020). A Variational Information Bottleneck Based Method to Compress Sequential Networks for Human Action Recognition. Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**). ([link](#))
- **Dutta, O.** (2018, April). Tempo Octave Correction Using Multiclass Support Vector Machine. In 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT) (pp. 1333-1337). IEEE. ([link](#))

Under Review:

- **Dutta, O.**, Gupta, R., & Agarwal, S. (2024). VTrans: Accelerating Transformer Compression with Variational Information Bottleneck based Pruning. arXiv preprint arXiv:2406.05276. ([link](#))

SKILLS

Programing Languages: Python, C, Java, MATLAB

Frameworks and Libraries: PyTorch, TensorFlow, OpenCV

Scientific Paper Documentation: LaTeX

Hardware: Distributed Computing Systems, Edge Devices like Orin, Raspberry Pi, Digital Signal Processors

Data-efficient Learning, Generative AI, Self-supervised Learning, Explainable AI

PROJECTS

- **Neural Network Model Compression, IIT Delhi** ([link](#)) (Sept 2019-present)
 - Developing algorithms to obtain memory and computation efficient models for deployment to edge applications. Pushing the boundaries of Neural Architecture Search for resource constrained devices.
 - Framework used- PyTorch
- **Rhythm estimation of various genres of music, IIT (ISM) Dhanbad** ([link](#)) (June 2017 – May 2018)
 - Rhythm extraction in polyphonic music and tempo octave correction using Support Vector Machines
 - Dominant Technologies: MATLAB, Python

- **Fuel-Optimal Soft Lunar Landing Using Generalized Model Predictive Static Programming (GMPSP) algorithm**, IISc Bangalore (Feb 2015 - May 2015)
 -Coding and simulating an advanced guidance algorithm on a TMS320C6748 digital signal processor to achieve soft lunar landing
 -Software used: MATLAB, CC studio
- **Analysis of Hypersonic Shockwave Data for Missile Technology**, CMR Institute of Technology ([link](#)) (April to May 2014)
 -Analysis of the shock waves registered during hypersonic speed of travel.
 -Software used: MATLAB

EXPERIENCE

- **Research Assistant, Indian Institute of Technology, Delhi**, Oct 2019- 2024
 -Compression of popular deep neural networks like transformer-based LLMs, Diffusion Models
 -Attended International Conferences and workshops of ICML, ACML, PReML, Google Research Week
- **Intern, Aerospace Dept., IISc Bangalore**, Feb 2015- May 2015
 -Simulation of an optimal control guidance algorithm on DSP processor TMS320C6748 and MATLAB.

SERVICES

- **Teaching Assistant** for courses- Cognitive and Intelligent Systems (2023), Introduction to Machine Learning (2022), Machine Intelligence and Learning (2021), Introduction to Electrical Engineering (2021), Signal Processing (2014)
- **Reviewer** for various conferences-WACV, Women in Machine Learning (WiML), AISTATS, ICML, IJCAI