

# TUSHAR PRAKASH

Delhi, India

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## EDUCATION

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**Delhi Technological University (Formerly DCE), Delhi, India**

Aug'19 - May'23

Bachelor of Technology, Department of Electronics and Communication Engineering

**CGPA: 8.58/10.0**

## ACHIEVEMENTS

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**Best Paper Award:** Awarded the best paper award for my paper, "*MVBN: Enhancing Social Recommendation with Multi-View BERT Network*", at the SONY yearly conference in 2023.

**Mitacs Globalink Research Internship (June 2022):** Selected for the Mitacs GRI'22 for an in-person research internship at the University of Alberta, Canada.

## RESEARCH/WORK EXPERIENCE

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ML Researcher, **Sony Research India**, Bangalore

Jan'23 - Present

*Data Science—Recommendation Systems*

- Proposed two methods for social recommendation: first introduced an item-centric view alongside user-item interactions in collaborative filtering, accepted at IEEE ICDM (A\*), outperforming SOTA by 45.74% in the NDGC@10 metric, and the second applied consistency regularization to enhance generalization, accepted at ACM RecSys (A), outperforming SOTA by 45.60%.
- Proposed a method that generates global user preferences using LLMs, which can be integrated with collaborative filtering to enhance session-based recommendations. This paper was accepted at the Gen IR workshop at ACM SIGIR (A\*), outperforming SOTA by 7.3% in NDGC metric.
- Developed a modular framework for efficient training of recommendation models and bias mitigation (e.g., popularity, recency, and cold-start) for SonyLIV (OTT), achieving a significant performance of 35% in the CTR metric.
- Improved training speed threefold by increasing the number of user trains per GPU from 1.7 million to 5.4 million by deferring the parameter initialization. Furthermore, scaled recommendation model pipeline to train 102 million users using model distributed computing.

Research Intern, **University of Alberta**, Edmonton, Canada

Jun'22 - Aug'22

*Mitacs GRI'22, Supervisor: Dr. Xingyu Li*

- Enhanced the robustness of deep learning models by detecting adversarial images of the CIFAR dataset generated through black-box attacks.
- Proposed reverse knowledge distillation combined with multi-layer feature fusion for detecting adversarial images, resulting in a 5.5% improvement in PSNR over the SOTA.
- Completed this project during an in-person internship through the Mitacs Globalink Research Internship (GRI) program.

Software Engineer Intern, **Microsoft**, Bangalore

Apr'22 - May'22

- Built an API testing framework for 5G network infrastructure.
- Developed and deployed multiple testbeds with PyATS to verify communication between interdependent APIs in a Kubernetes environment.

Research collaboration, **INRIA Sophia Antipolis, France**

Dec'21 - Apr'22

*STARS Research Team, Supervisor: Dr. Antitza Dantcheva*

- Applied Multi-Task Learning and Self-Supervised Learning to address the domain shift problem in fingerprint denoising models.

- Proposed two methods to bridge the domain shift: a multi-task learning framework with a self-supervised image rotation auxiliary task, achieving a 8.60% improvement in quality scores over SOTA, and a self-supervised jigsaw puzzle auxiliary task, resulting in a 5.83% improvement.

## PUBLICATIONS

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R. Jalan\*, **T.Prakash\***, N. Pedanekar. Dynamic Task-adaptive Meta Optimization for User Cold-Start Recommendation. In Submission at **47th European Conference on Information Retrieval (ECIR), Tuscany, Italy, 2024**

R. Jalan\*, **T.Prakash\***, N. Pedanekar. LLM-BRec: Personalizing Session-based Social Recommendation with LLM-BERT Fusion Framework. In Proceedings of Gen-IR Workshop, **47th ACM SIGIR Conference on Research and Development in Information Retrieval, Washington D.C., USA, 2024** [Paper Link](#)

**T.Prakash**, R. Jalan, N. Onoe. MVBN: Enhancing Social Recommendation with Multi-View BERT Network. In Proceedings of the **23rd IEEE International Conference on Data Mining (ICDM), Shanghai, China, 2023.** [Paper Link](#)

**T.Prakash\***, R. Jalan\*, B. Singh, N. Onoe. CR-SoRec: BERT driven Consistency Regularization for Social Recommendation. In Proceedings of the **17th ACM Conference on Recommender Systems (RecSys), Singapore, 2023.** [Paper Link](#)

I. Joshi\* and **T. Prakash\*** and R. Kumar and Antitza Dantcheva. Unsupervised domain alignment of fingerprint denoising models using pseudo annotations. Published in **Springer's Multimedia Tools and Applications Journal (Q1), 2023.** [Paper Link](#)

I. Joshi, **T. Prakash**, R. Kumar, A. Dantcheva, S. Dutta Roy, P. K. Kalra. Context-Aware Restoration of Noisy Fingerprints. Published in **IEEE Sensors Letters, 2022.** [Paper Link](#)

**T.Prakash**, T. Dhamija, R. Kumar, J. Panda. Leveraging Explainable Artificial Intelligence for Understanding the Effect of Model Capacity on Training Dataset Size. In Proceedings of **17th IEEE International Conference on Service Operations and Logistics, and Informatics (SOLI), Delhi, India, 2023.** [Paper Link](#)

## PROJECTS

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### Deepfake detection using Multi-Task learning with Task Uncertainty

In this project, I integrated age and gender classification as auxiliary tasks into a state-of-the-art deepfake detection model to boost accuracy. I applied task uncertainty estimation to dynamically learn the relative task weights, enabling adaptive balancing based on uncertainty rather than using fixed weights.

### Adversarial attacks vs Explainable AI (XAI)

Performed an FGSM adversarial attack on the MNIST dataset and used the SHAP library to analyze how the image signature changes under the attack. Leveraging these altered signatures demonstrated a method for detecting adversarially attacked images.

## TECHNICAL SKILLS

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Python, C/C++, PyTorch, TensorFlow, MATLAB, OpenCV, scikit-learn, Pandas, and Numpy.

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\* represents equal contribution