

# Shweta Bhardwaj

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## Research Interests

Computer Vision, Deep Learning, Explainability, Interpretability, Model Compression, Dynamic Computations

## Education

**Indian Institute of Technology Madras, India** 2016 - 2019  
M.S. (By Research/Thesis), Computer Science And Engineering C.G.P.A.: 9/10  
Advisor: Mitesh M. Khapra  
Thesis: [Efficient Video Classification With Fewer Frames](#) ([Slides](#))

**Guru Nanak Dev University, India** 2012 - 2016  
B.Tech., Computer Science And Engineering C.G.P.A.: 9.63/10

## Publications

- **Efficient Video Classification Using Fewer Frames**  
Shweta Bhardwaj, Mukundhan Srinivasan, Mitesh M. Khapra [Link](#), [Poster](#)  
In Proceedings of IEEE Conference on Computer Vision and Pattern Recognition, CVPR'2019.
- **Studying the Plasticity of Deep Convolutional Neural Networks Using Random Pruning.**  
Deepak Mittal, Shweta Bhardwaj, Mitesh M. Khapra and Balaraman Ravindran [Link](#), [Poster](#)  
Published at the Journal of Machine Vision And Applications 2019.
- **I have seen enough : A Teacher Student Network for Video Classification Using Fewer Frames.**  
Shweta Bhardwaj, Mitesh M. Khapra [Link](#), [Poster](#)  
In Proceedings of Computer Vision And Pattern Recognition Workshop on Brave New Ideas for Video Understanding, CVPR Workshop 2018.
- **Recovering from Random Pruning: On the Plasticity of Deep Convolutional Neural Networks.**  
Shweta Bhardwaj, Deepak Mittal, Mitesh M. Khapra, Balaraman Ravindran. [Link](#), [Poster](#)  
In Proceedings of Eighteenth IEEE Winter Conference on Applications of Computer Vision, WACV 2018.

## Professional Experience

**Google Research** Aug 2021 - Present  
*Research Associate, (Junior Researcher via Optimum InfoSystems)*

- Develop a fully **dynamic** and **interpretable** computation model for sparse prediction tasks to improve generalisation.
- Underlying goal is to: i) amortize compute load, ii) build scale-aware and iii) inherently intuitive models.

**Flipkart Internet Pvt. Limited** Aug 2019 - July 2021  
*Data Scientist*

- Built a horizontal framework of **explainability** across the different tracks of *User Trust & Safety*.
- Designed a hybrid Decision Tree based solution for detecting real-time **e-commerce fraud** on **returns** transactions.
- Detection of incomplete and suspicious **unstructured customer addresses** by incorporating **structured** information.
- Provided **cloud services** to third-party client (Myntra) for **real-time fraud** management

**Robert Bosch Centre for Data Science and AI** May 2018 - May 2019  
*Student Researcher*

Presented ongoing/published work in Web Science Symposium, two RBC-DSAI poster sessions.

**NVIDIA Bangalore** March 2018 - May 2018  
*Research Intern*

- Investigated the scope of compute-intensive AI models for real-time deployment
- Benchmarked different approaches of video classification models on high-end DGX GPUs

## Research Projects

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### Exploring Teacher Student Paradigm for Efficient Video classification

Jan'18 - Oct'18

Collaborator: Dr. Mitesh M. Khapra

[arXiv](#)

- Proposed an efficient Teacher-Student Framework, wherein a student can learn the overall context of video using fewer frames, which contains the sufficient discriminatory information needed for video classification.
- Focused on reducing the computational cost at inference for multi-label video classification task.
- Initial findings accepted in CVPR'2018 workshop. Complete extension of this work is accepted in CVPR'2019.

### Studying Plasticity of Deep CNNs using Random Pruning

July'17 - Jan'18

Collaborators: Deepak Mittal, Dr. Mitesh M. Khapra, Dr. Balaraman Ravindran

[arXiv](#)

- Explored different model-compression methods (filter-level pruning in CNNs) for various image processing tasks.
- By investigating *Random Pruning*, examined that the comparable performance of pruned network is not due to the specific criterion chosen but due to inherent plasticity of deep neural networks.
- Accepted in WACV'2018. Extended work is accepted in Journal of Machine Vision And Applications 2019.

## Teaching

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### Indian Institute of Technology Madras (IITM)

- *Deep Learning*: Spring 2018 and Spring 2019 Teaching Assistant
- *Introduction to Machine Learning*: Fall 2018 Teaching Assistant
- *Assembly Language Programming Lab*: Spring 2016 Teaching Assistant
- *Programming And Data Structures Course/Lab*: Fall 2016 Teaching Assistant

## Course Work

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- Introduction to Machine Learning, Deep Learning, Topics in Deep Learning, Linear Algebra and Random Processes, Reinforcement Learning.

## Achievements & Responsibilities

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### Scholastic Achievements

- GATE: Graduate Aptitude Test in Engineering | [99.729](#) PERCENTILE
- Poster presentation at [Amazon Research Days 2018](#)

### Service and Reviewer

- Reviewer for ICLR 2022 Conference.
- Workshop Volunteer at ICLR 2021 Conference.
- Internship Mentor for Flipkart Summer Internship 2020.
- Mentor for DL Summer Internship 2017 at IITM RISE-IIL lab.

### Travel Grants

- CVPR 2019 Student Travel Scholarship.
- Microsoft Research India Student Travel Grant 2019.

## Technical Skills and Tools

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- **Languages**:- *Proficient*: Python, PySpark, MATLAB, Java.    *Basic*: C, C++, MySQL.
- **Deep Learning Frameworks**:- *Proficient*: Tensorflow, Keras, PyTorch.    *Basic*: Caffe.
- **Cloud Platforms**:- AWS, Microsoft Azure, Google Cloud Platform