

Aadarsh Sahoo

Pre-doctoral Student Researcher
MIT-IBM Watson AI Lab, Cambridge, MA, USA

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EDUCATION AND POSITIONS

MIT-IBM Watson AI Lab, Cambridge, USA July 2022 - Present
Pre-doctoral Student Researcher

Indian Institute of Technology Kharagpur, India July 2017 - Apr 2022
Major in Computer Science & Engineering, Dual Degree GPA **9.41/10.00**

INTERESTS

My research interests lie in understanding the *principles of learning* from multiple modalities and exploring how knowledge from one modality can be transferred to applications in others, with a goal to design embodied multimodal agents benefiting humanity.

PUBLICATIONS (ACCEPTED)

Aadarsh Sahoo, Rutav Shah, Rameswar Panda, Kate Saenko, Abir Das. *Contrast and Mix: Temporal Contrastive Video Domain Adaptation with Background Mixing*.
Accepted at **NeurIPS 2021**.

Aadarsh Sahoo, Rameswar Panda, Rogerio Feris, Kate Saenko, Abir Das. *Select, Label, and Mix: Learning Discriminative Invariant Feature Representations for Partial Domain Adaptation*.
Accepted at **WACV 2023**, **DistShift Workshop at NeurIPS 2021**.

Aadarsh Sahoo, Ankit Singh, Rameswar Panda, Rogerio Feris, Abir Das. *Mitigating Dataset Imbalance via Joint Generation and Classification*.
Accepted at **IPCV Workshop at ECCV 2020**.

PUBLICATIONS (UNDER REVIEW)

Aadarsh Sahoo, Anshuman Senapati, Abir Das, Yoon Kim, Rogerio Feris, Rameswar Panda. *Frustratingly Simple Contrastive Prompt Tuning for Vision-Language Models*
In submission at **CVPR 2023**.

Omprakash Chakraborty, Aadarsh Sahoo, Rameswar Panda, Abir Das. *Anytime Domain Adaptation*.
In submission at **ICLR 2023**.

INTERNSHIPS AND RESEARCH EXPERIENCE

MIT-IBM Watson AI Lab – Prompt Tuning for Vision-Language Models July 2022 - Nov 2022
Advisors: Dr. Rameswar Panda, Dr. Rogerio Feris, Prof. Yoon Kim

- Worked on Prompt Tuning for Vision-Language Models for improving generalization.
- Proposed a relational contrastive learning based approach called CPT for cross-modal consistency.
- Experimented on 4 different generalization task on 15 datasets using 10 vision-language backbones.
- Implemented codes in PyTorch and obtained SOTA performance. Draft in submission at CVPR 2023.
- CPT is being used to develop a FMaaS (Foundation Model as a Service) product with a TAM of USD 9 Billion.
- Working with the IBM Research team for DARPA LwLL evaluation in image classification.

CVIR IIT Kharagpur – Anytime Domain Adaptation Jan 2022 - May 2022
Advisors: Prof. Abir Das (IIT Kharagpur), Dr. Rameswar Panda (MIT-IBM Watson AI Lab)

- Worked on training a single network deployable at various computational budgets for domain adaptation.
- Proposed a framework using bootstrapped recursive distillation for learning robust low-budget networks.
- Implemented codes in PyTorch and performed experiments to achieve SOTA. Draft in submission at ICLR 2023.

UC Berkeley and Boston University – DARPA LwLL

May 2021 - Aug 2021

Advisors: Prof. Trevor Darrell, Prof. Kate Saenko

- Worked on the video classification task for the DARPA LwLL Project, as part of the UC Berkeley team.
- Experimented with various algorithms to compete for the best performance in few-shot action recognition.
- Contributed a Spatio-Temporal Contrastive Learning algorithm leveraging temporal & spatial invariance in videos.
- Implemented codes in PyTorch and integrated it to a central framework developed and maintained by Kitware Inc.

CVIR IIT Kharagpur – Unsupervised Domain Adaptation in Videos

Jan 2021 - May 2021

Advisors: Prof. Abir Das (IIT Kharagpur), Dr. Rameswar Panda (MIT-IBM Watson AI Lab)

- Worked on video domain adaptation for action recognition on various benchmark datasets.
- Proposed a framework using contrastive learning for domain alignment, background mixing for alleviating “shift”.
- Leveraged video speed for domain invariance and target self-supervision for discriminability of the feature space.
- Implemented codes in PyTorch and performed experiments to achieve SOTA. Published the work at NeurIPS 2021.

CVIR IIT Kharagpur – Dynamic Source Selection for Partial Domain Adaptation

May 2020 - Oct 2020

Advisors: Prof. Abir Das (IIT Kharagpur), Dr. Rameswar Panda (MIT-IBM Watson AI Lab)

- Proposed a dynamic source data selection, labeling, and mix-up based approach for partial domain adaptation.
- Leveraged domain discrepancy and Hausdorff distance in the feature space to learn the outlier distribution.
- Incorporated “selection” using a policy network for discrete binary decisions, optimized using Gumbel-Softmax.
- Implemented codes in PyTorch and performed experiments to achieve SOTA. Published the work at WACV 2023.

CVIR IIT Kharagpur – CycleGANs for Dataset Imbalance

May 2019 - Oct 2019

Advisors: Prof. Abir Das (IIT Kharagpur), Dr. Rameswar Panda (MIT-IBM Watson AI Lab)

- Proposed an end-to-end CycleGAN-Classifer architecture to tackle dataset imbalance for image classification.
- Leveraged unsupervised image-to-image translation to design a dataset repairment strategy.
- Demonstrated improvement of Classifier & CycleGAN over prior methods using quantitative and qualitative metrics.
- Implemented codes in PyTorch and performed experiments to achieve SOTA. Published at IPCV at ECCV 2020.

CURRENT PROJECTS

Learning Grounded Foundation Models

Ongoing

Advisors: Prof. Yoon Kim, Dr. Rameswar Panda

- Working on probing foundation models for conceptual knowledge like color, size, shape.
- Studying the effectiveness of existing training techniques in learning grounded knowledge.
- Working on training foundation models using multimodal data with an explicit goal of learning grounded knowledge.

ACTIVITIES

Reviewer. CVPR 2023, ICLR 2023, WACV 2023, TPAMI 2021

Student Volunteer and Reviewer. CVPR-2022 workshop on Dynamic Neural Networks Meets Computer Vision.

Teaching Assistant. CS60010 Deep Learning, CS60077 Reinforcement Learning, IIT Kharagpur.

Mentor. Mentored multiple undergrad students for research.

Student Volunteer and Reviewer. CVPR-2021 workshop on Dynamic Neural Networks Meets Computer Vision.

Student Volunteer. Science Movement, Bhubaneswar; National Service Scheme (NSS) IIT Kharagpur.

HONORS & AWARDS

Received an offer for Pre-doctoral researcher.

Allen Institute for AI, Seattle.

Secured a position in the Top-10; Granted Department Change, 2018.

IIT Kharagpur, India.

All India Joint Entrance Examination, 2017.

Joint Seat Allocation Authority (JoSAA), India.

Secured Rank 2 in Senior School, 2017.

AISSCE, CBSE.

Regional Mathematics Olympiad (RMO), 2014.

Homi Bhabha Centre for Science Education (HBCSE).

PROGRAMMING SKILLS

Languages: Python, C, C++, Matlab, L^AT_EX

Deep Learning: PyTorch, TensorFlow, Keras

RELEVANT COURSEWORK

IIT Kharagpur: Probability and Statistics, Linear Algebra, Machine Learning, Deep Learning, Reinforcement Learning, Artificial Intelligence, Natural Language Processing, Scalable Data Mining, Algorithms, Formal Language and Automata Theory, Operating Systems, Computer Networks, Compilers, Computer Architecture, Discrete Structures.

Online MOOCs: CS231n: CNNs for Visual Recognition by Stanford, CS294-158: Deep Unsupervised Learning by UC Berkeley, Deep Learning Specialization by deeplearning.ai, Machine Learning by Stanford-Online.