Sharat Agarwal
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RESEARCH INTEREST

My research interest currently lies in computer vision and Deep Learning; research topics include Active Learning, Data Fairness and Domain Adaptation.

For comprehensive and effective training of deep models, our focus should be on proposing methods to utilize the available data efficiently. Thus, my research investigates visual data's contextual aspect and uses it to train deep networks effectively.

EDUCATION

- **Indraprastha Institute of Information Technology Delhi** — Delhi, India
  PhD Candidate, Computer Science and Engineering — *August 2017 - Present*

  Thesis: Context Is All You Need

  Advisors: Dr. Saket Anand and Dr. Chetan Arora

  Courses: Machine Learning, Deep Learning, Advanced Computer Vision, Computer Vision, Image Processing, Probability and Random Process, Natural Language Processing

- **Graphic Era University** — Dehradun, India
  Bachelor of Technology - Information Technology; GPA: 8.8 — *July 2012 - June 2016*

  BTP: Human Activity Recognition

  Advisor: Dr. Vikas Tripathi

  Courses: Operating Systems, Data Structures, Analysis Of Algorithms, Networking, Databases, Automata

TECHNICAL EXPOSURE

- **Languages:** Python, C, C++
- **Frameworks:** Scikit, NLTK, SpaCy, PyTorch, TensorFlow, OpenCV, Matlab

RESEARCH PROJECTS

- **Active Domain Adaptation for Semantic Segmentation**: (Work in progress) (November 2021)
- **Curating Contextually Fair Data**: We introduce a data repair algorithm using the coefficient of variation, which can curate fair and contextually balanced data for a protected class(es). This helps in training a fair model irrespective of the task, architecture or training methodology.(November 2020)
- **Contextual Diversity for Active Learning**: We introduce the notion of contextual diversity (CD) that captures the confusion associated with spatially co-occurring classes. CD hinges on a crucial observation that the probability vector predicted by a CNN for a region of interest typically contains information from a larger receptive field.(November 2018)
- **Human Activity Recognition using Dynamic Time Warping**: We proposed an enhanced version of DTW by calculating mean and standard deviation of the minimum warping path and also introduced a fusion of DTW with Histogram of Gradients (HOG) as it helped in extracting both temporal and spatial information of the human activity. (November 2015)

PUBLICATIONS

- **S. Agarwal**, S. Muku, S. Anand and C. Arora, *"Does Data Repair Lead to Fair Models? Curating Contextually Fair Data To Reduce Model Bias"* IEEE Winter Conference on Applications of Computer Vision **(WACV), 2022** [PDF][Code]
- **S. Agarwal**, H. Arora, S. Anand and C. Arora, *"Contextual Diversity for Active Learning"*, European Conference on Computer Vision **(ECCV), 2020**.[PDF][Code]
- V. Tripathi, **S. Agarwal**, A. Mittal, D. Gangodkar, *"Improved Dynamic Time Warping Based Approach for Activity Recognition"*, Frontiers of Intelligent Computing: Theory and Applications **(FICTA), 2017**.
- V. Tripathi, Piyush Bhatt, **S. Agarwal**, M. Semwal, *"Modified Dense Trajectory for Real Time Action Recognition"*, International Journal of Control Theory and Applications,**(IJCTA), 2016**.

ACADEMIC PROJECTS

- **Domain Adaptation for Semantic Segmentation**: Course: Deep Learning
- **Detecting people with Down Syndrome**: Course: Image Processing
- **Pairwise Confusion Loss for Semantic Segmentation**: Course: Advanced Computer Vision
- **Depression Detection Using Tweets**: Course: Natural Language Processing
- **Quora Question Duplicate Detection**: Course: Machine Learning
- **Driver Drowsiness Detection on Long Videos**: Course: Computer Vision
- **Improved Study of Heart Disease Detection using Data Mining**: Course: Data Mining for Health Care

Teaching Assistant

- Computer Vision, Winter 2021
- Machine Learning, Monsoon 2020
- Affective Computing, Winter 2020
- Machine Learning, Monsoon 2019
- Deep Learning, Winter 2019
- Image Processing, Monsoon 2018
- Object Oriented Programming, Monsoon 2017

Professional Service

- Reviewed Conference: ICCV, ECCV, CVPR
- Committee Member, ICVGIP Data Challenge 2021
- Deep Learning Tutorial , AI Assisted Data Analytic (AIDA) 2020, IIITD
- Machine Learning Tutorial, Economics Workshop 2019, IIITD