

Agneet Chatterjee

Ph.D. Student (1st Year)
Computer Science
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EDUCATION

Arizona State University

Ph.D. in Computer Science

Tempe, AZ
Spring 2023 –

- **Advisors:** Dr. Chitta Baral, Dr. Yezhou Yang
- **CGPA:** 4/4
- **Awards:** SCAI Doctoral Fellowship

Jadavpur University

B.E (Hons) Computer Science

Kolkata, India
2015-2019

RESEARCH INTERESTS

I work on problems in the Vision and Language domain. My current research interests are :

- Exploring the role of language-guided knowledge in aiding low-level computer vision tasks
- Benchmarking and improving instruction-following abilities of generative models

TECHNICAL SKILLS

Languages : Python, C++, JAVA, R, MATLAB

Libraries & Tools : PyTorch, CUDA, FSDP, NCCL, TensorBoard, NumPy, Matplotlib, Scikit-Learn, NLTK, OpenCV, Kornia, Huggingface, Diffusers, GIT, Linux, Amazon Mechanical Turk

SELECTED PUBLICATIONS

1. Training-Free Improvement of Spatial Fidelity in Text-to-Image Generation

Under Review, 2023

- Introduced a training-free T2I method that leverages spatially accurate image as additional guidance for diffusion models. Demonstrated state-of-the art performance on Stable Diffusion and ControlNet in generating spatially faithful images, outperforming existing open-source methods on the VISOR benchmark.
- Proposed a dataset of 190k text-image pairs, where each image is guaranteed to follow the spatial instruction mentioned in the corresponding text. Developed an extendable framework which currently covers 80 MS-COCO objects, 3 diverse backgrounds, and includes GPT-4 as an additional coordinate generator.
- Examined the trade-off between diversity and controllability introduced by our method on T2I generation. Through human studies, showed that the method is generalizable to out-of-distribution scenarios and complex prompts.

2. Quantifying and Benchmarking the Efficacy of Language-Guided Depth Estimators

Under Review, 2023



- Quantified the impact of low-level language as additional conditioning for depth estimation, in both zero-shot and supervised settings.
- Empirically showed that current use of language for depth estimation works only in a constrained setting. With adversarial inputs and domain shift, language-guided estimators exhibit lower robustness compared to vision-only depth estimators like IDisc and AdaBins.
- Systematic generation of additional knowledge for depth estimators through ground-truth segmentation and depth maps along with object-level image masking.

3. Reliability Checklist - An unified framework for reliability of NLP Systems

Under Review, 2023

- Developed a versatile tool that comprehensively assesses the reliability-related aspects of NLP systems. This tool is not tied to any specific model, can be customized for different datasets, and comes with strong visualization features.
- This tool currently supports 5 datasets from the GLUE benchmark (e.g. MNLI, MRPC), 6 discriminative models (e.g. ALBERT-base, BERT-base-uncased) and 7 task-independent augmentations.
- Through evaluations on calibration (ECE, OCE) and sensitivity based metrics, we find previously unreported failures of language models and document the trade-off between performance and robustness.


PRE-DOCTORAL PUBLICATIONS

- 1. A two-phase gradient based feature embedding approach**  J. of Information Security and Applications, 2021
Agneet Chatterjee, Soulib Ghosh, Anuran Chakraborty, Sudipta Kr Ghosal, Ram Sarkar
- 2. LSB based steganography with OCR: an intelligent amalgamation**  Multimedia Tools and Applications, 2020
Agneet Chatterjee, Sudipta Kumar Ghosal & Ram Sarkar

EXPERIENCE

- Salesforce** June 2019 - July 2022
Software Engineer 2 *Hyderabad, India*
- Lead developer on a 15-person global team in the QTC domain, aiming to unlock a revenue of \$1B in India by FY27.
 - Spearheaded the development and deployment of a full-stack application to automate 70k monthly emails, creating a modular and configurable microservice-based subscription model that was adopted organization-wide, with potential earnings of \$7M+.
 - Developed a scalable, OAuth 2.0-secure, data extraction solution utilising Mulesoft and Heroku, facilitating 35M+ transactions and achieving a 200x performance improvement over the preceding reporting-based solution.
- Samsung R&D Institute** May 2018 – July 2018
Research Intern *Bangalore, India*
- As part of the the Graphics and VR team, worked on Physically Based Rendering (PBR) of 3D models creating a C# and Java-based application using Unity's Rendering API's.

OPEN-SOURCE CONTRIBUTIONS

- SunPy** 2017
Open-source Contributor
- Python-based implementation of a Multi-Scale Gaussian Normalisation Algorithm, as well as refactoring of existing codebase, released as part of v0.8. 

HONORS AND AWARDS

- SCAI Doctoral Fellowship, 2023 (ASU)
- 1st position - 2020, Summer Hackathon (Salesforce)
- INSPIRE Scholarship - 2020, Govt. of India

SERVICE

- Reviewer for CVPR workshop (Open-Domain Retrieval Under a Multi-Modal Setting)
- Project Mentor, CSE 576 - Natural Language Processing, ASU

RESEARCH AREAS

Computer Vision	Natural Language Processing	Multimodal Large Language Models	Generative Models
Text-to-Image Generation	Reasoning & Robustness		