Dr. Aneeshan Sain

Computer Vision & Machine Learning Researcher
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Education

- **University of Surrey** — Guildford, United Kingdom
  PhD *— SketchX Lab, Centre for Vision, Speech and Signal Processing (CVSSP)* — *Oct 2019 — Oct 2023*
  Research Field: Computer Vision & Deep Learning
  Supervisor: Prof. Yi-Zhe Song
  Co-Supervisor: Prof. Tao (Tony) Xiang
  Top-Venue Publications: 22 × CVPR, 4 × ICCV, 2 × ECCV, 1 × BMVC (ORAL)

- **West Bengal University of Technology** — Kolkata, India
  B. Tech *— Electrical Engineering* — *Aug 2013 — June 2017*

Skills Summary

- **Languages**: Python (PyTorch, Tensorflow), C, C++
- **Subjects**: Computer Vision, Sketch Analysis, Image/Video Denoising
- **Dev Tools**: GitHub, VSCode, LaTeX

Professional Experience

- **Sony Interactive Entertainment** — Sony PlayStation, London
  Research Scientist — *December 2023 — Present*
  - Involved in the core R&D team on providing deep-learning based solutions for enhancing gaming experience.

- **iSIZE Technologies** — London
  Research Scientist — *July 2022 — November 2023*
  - Research and prototyping efficient computer vision methods for video streaming quality enhancement.
  - Hands-on experience with **GAN**, **VAE**, **Transformers**, **Flow-network** and **Diffusion** Models.
  - Key contributor for the product *BitClear* – a project on Video Denoising, which:
    * won the **Best of Show Award** at IBC 2022.
    * won **NAB product of the Year** (2022) under the AI/ML category – the largest show for media, entertainment, and technology.
  - This startup was successfully **acquired by Sony PlayStation**, UK.

Selected First Author Publications

1. CLIP for All Things Zero-Shot Sketch-Based Image Retrieval, Fine-Grained or Not.
   Aneeshan Sain, Ayan Kumar Bhunia , Pinaki Nath Chowdhury, Subhadeep Koley, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2023**.

2. Exploiting Unlabelled Photos for Stronger Fine-Grained SBIR.
   Aneeshan Sain, Ayan Kumar Bhunia, Vaishnav Potlapalli, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2023**.

3. Sketch3T: Test-time Training for Zero-Shot SBIR.
   Aneeshan Sain, Ayan Kumar Bhunia, Vaishnav Potlapalli, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2022**.

4. StyleMeUp: Towards Style-Agnostic Sketch-Based Image Retrieval.
   Aneeshan Sain, Ayan Kumar Bhunia, Yongxin Yang, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2021**.

5. Cross-Modal Hierarchical Modelling for Fine-Grained Sketch Based Image Retrieval.
   Aneeshan Sain, Ayan Kumar Bhunia, Yongxin Yang, Tao Xiang, Yi-Zhe Song.
   British Machine Vision Conference (**BMVC**), **2020 [Oral]**.

6. Multi-Oriented Text Detection and Verification in Video Frames and Scene Images.
   Aneeshan Sain, Ayan Kumar Bhunia, Partha Pratim Roy, Umapada Pal.
   Neurocomputing, Elsevier, **2018**.

Co-authored Refereed Research Publications

1. Text-to-Image Diffusion Models are Great Sketch-Photo Matchmakers.
   Subhadeep Koley, Ayan Kumar Bhunia, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

2. How to Handle Sketch-Abstraction in Sketch-Based Image Retrieval?
   Subhadeep Koley, Ayan Kumar Bhunia, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

3. It's All About Your Sketch: Democratising Sketch Control in Diffusion Models.
   Subhadeep Koley, Ayan Kumar Bhunia, **Aneeshan Sain**, D. Sekhri, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

4. You'll Never Walk Alone: A Sketch and Text Duet for Fine-Grained Image Retrieval.
   Subhadeep Koley, Ayan Kumar Bhunia, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

5. SketchINR: A First Look into Sketches as Implicit Neural Representations
   Hmrishav Bandyopadhyay, Ayan Kumar Bhunia, Subhadeep Koley, Pinaki Nath Chowdhury, **Aneeshan Sain**, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

6. Doodle Your 3D: From Abstract Freehand Sketches to Precise 3D Shapes.
   Hmrishav Bandyopadhyay, Subhadeep Koley, A. Das, Ayan Kumar Bhunia, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

7. A Little Trust Goes a Long Way: What Sketch Explainability Really Means for Downstream Tasks.
   Hmrishav Bandyopadhyay, Pinaki Nath Chowdhury, Ayan Kumar Bhunia, **Aneeshan Sain**, Tao Xiang, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

8. DemoCaricature: Democratising Caricature Generation with a Rough Sketch.
   Dar-Yen Chen, Ayan Kumar Bhunia, Subhadeep Koley, **Aneeshan Sain**, Pinaki Nath Chowdhury, Yi-Zhe Song.
   IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2024**.

9. Bi-Directional Ensemble Feature Reconstruction Network for Few-Shot Fine-Grained Classification.
   Jijie Wu, Dongliang Chang, **Aneeshan Sain**, Xiaoxu Li, Zhanyu Ma, Jie Cao, Jun Guo, Yi-Zhe Song. IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), **2024**.

10. Democratising 2D Sketch to 3D Shape Retrieval Through Pivoting.
    Pinaki Nath Chowdhury, Ayan Kumar Bhunia, **Aneeshan Sain**, Subhadeep Koley, Tao Xiang, Yi-Zhe Song.
    IEEE International Conference on Computer Vision (**ICCV**), **2023**.

11. What Can Human Sketches Do for Object Detection?.
    Pinaki Nath Chowdhury, Ayan Kumar Bhunia, **Aneeshan Sain**, Subhadeep Koley, Tao Xiang, Yi-Zhe Song.
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2023**. **(Best Paper Award Candidate (12/9155 papers), top 0.13%, the only paper selected from the entire UK)**

12. Picture that Sketch: Photorealistic Image Generation from Abstract Sketches.
    Subhadeep Koley, Ayan Kumar Bhunia, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2023**.

13. SceneTrilogy: On Human Scene-Sketch and its Complementarity with Photo and Text.
    Pinaki Nath Chowdhury, Ayan Kumar Bhunia, **Aneeshan Sain**, Subhadeep Koley, Tao Xiang, Yi-Zhe Song.
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2023**.

14. Sketch2Saliency: Learning to Detect Salient Objects from Human Drawings.
    Ayan Kumar Bhunia, Subhadeep Koley, Amandeep Kumar, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
    IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2023**.

15. Mind the Gap: Open Set Domain Adaptation via Mutual-to-Separate Framework
    Dongliang Chang, **Aneeshan Sain**, Zhanyu Ma, Yi-Zhe Song, Ruiping Wang, Jun Guo
    IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), **2023**.

16. Sketch-Segformer: Transformer-based segmentation for figurative and creative sketches
    Yixiao Zheng, Jiyang Xie, **Aneeshan Sain**, Yi-Zhe Song, Zhanyu Ma
    IEEE Transactions on Image Processing (**TIP**), **2023**.

17. Bi-directional feature reconstruction network for fine-grained few-shot image classification.
Jijie Wu, Dongliang Chang, **Aneeshan Sain**, Xiaoxu Li, Zhanyu Ma, Jie Cao, Jun Guo, Yi-Zhe Song.
Proceedings of the AAAI Conference on Artificial Intelligence (**AAAI**), **2023 [Oral]**.

18. ENDE-GNN: An Encoder-decoder GNN Framework for Sketch Semantic Segmentation.
Yixiao Zheng, Jiyang Xie, **Aneeshan Sain**, Zhanyu Ma, Yi-Zhe Song, Jun Guo.
IEEE International Conference on Visual Communications and Image Processing (**VCIP**), **2022**.

19. FS-COCO: Towards Understanding of Freehand Sketches of Common Objects in Context.
Pinaki Nath Chowdhury, **Aneeshan Sain**, Ayan Kumar Bhunia, Tao Xiang, Yulia Gryaditskaya, Yi-Zhe Song.
European Conference on Computer Vision (**ECCV**), **2022**.

20. Adaptive Fine-Grained Sketch-Based Image Retrieval.
Ayan Kumar Bhunia, **Aneeshan Sain**, Parth Shah, Animesh Gupta, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
European Conference on Computer Vision (**ECCV**), **2022**.

21. Doodle It Yourself: Class Incremental Learning by Drawing a Few Sketches.
Ayan Kumar Bhunia, Viswanatha Reddy Gajjala, Subhadeep Koley, Rohit Kundu, **Aneeshan Sain**, Tao Xiang, Yi-Zhe Song.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2022**.

22. Sketching without Worrying: Noise-Tolerant Sketch-Based Image Retrieval.
Ayan Kumar Bhunia, Subhadeep Koley, Abdullah Faiz Ur Rahman Khilji, **Aneeshan Sain**, Pinaki Nath Chowdhury, Tao Xiang, Yi-Zhe Song.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2022**.

23. Partially Does It: Towards Scene-Level FG-SBIR with Partial Input.
Pinaki Nath Chowdhury, Ayan Kumar Bhunia, Viswanatha Reddy Gajjala, **Aneeshan Sain**, Tao Xiang, Yi-Zhe Song.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2022**.

24. Text is Text, No Matter What: Unifying Text Recognition using Knowledge Distillation.
Ayan Kumar Bhunia, **Aneeshan Sain**, Pinaki Nath Chowdhury, Yi-Zhe Song.
IEEE International Conference on Computer Vision (**ICCV**), **2021**.

25. Towards the Unseen: Iterative Text Recognition by Distilling from Errors.
Ayan Kumar Bhunia, Pinaki Nath Chowdhury, **Aneeshan Sain**, Yi-Zhe Song.
IEEE International Conference on Computer Vision (**ICCV**), **2021**.

26. Joint Visual Semantic Reasoning: Multi-Stage Decoder for Text Recognition.
Ayan Kumar Bhunia, **Aneeshan Sain**, Amandeep Kumar, Shuvozit Ghose, Pinaki Nath Chowdhury, Yi-Zhe Song.
IEEE International Conference on Computer Vision (**ICCV**), **2021**.

27. PQA: Perceptual Question Answering.
Yonggang Qi, Kai Zhang, **Aneeshan Sain**, Yi-Zhe Song.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2021**.

28. More Photos are All You Need: Semi-Supervised Learning for Fine-Grained Sketch Based Image Retrieval.
Ayan Kumar Bhunia, Pinaki Nath Chowdhury, **Aneeshan Sain**, Yongxin Yang, Tao Xiang, Yi-Zhe Song.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2021**.

29. MetaHTR: Towards Writer-Adaptive Handwritten Text Recognition.
Ayan Kumar Bhunia, Shuvozit Ghose, Amandeep Kumar, Pinaki Nath Chowdhury, **Aneeshan Sain**, Yi-Zhe Song.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2021**.

30. S^3Net:Graph Representational Network For Sketch Recognition.
Lan Yang, **Aneeshan Sain**, Linpeng Li, Yonggang Qi, Honggang Zhang, Yi-Zhe Song.
International Conference on Multimedia & Expo (**ICME**), **2020**.

31. Zone-based keyword spotting in Bangla and Devanagari documents.
Ayan Kumar Bhunia, Partha Pratim Roy, **Aneeshan Sain**, Umapada Pal.
Multimedia Tools and Applications, Springer US, **2020**.

32. Improving Document Binarization via Adversarial Noise-Texture Augmentation.
Ankan Kumar Bhunia, Ayan Kumar Bhunia, **Aneeshan Sain**, Partha Pratim Roy.
International Conference on Image Processing (**ICIP**), IEEE **2019**.

33. Indic Handwritten Script Identification using Offline-Online Multimodal Deep Network.
Ayan Kumar Bhunia, Subham Mukherjee, **Aneeshan Sain**, Ankan Kumar Bhunia, Partha Pratim Roy, Umapada Pal.
Information Fusion, Elsevier, **2019**.

34. Background Subtraction based on Integration of Alternative Cues in Freely Moving Camera.
Chenqiu Zhao, **Aneeshan Sain**, Ying Qu, Yongxin Ge, Haibo Hu.
IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, **2018**.

ACCOMPLISHMENTS

- Full research scholarship to pursue PhD at CVSSP, University of Surrey, United Kingdom.
- Publication selected among **Top 12 Paper Award Candidates** in CVPR 2023 out of 9155 submissions (**0.13%**).

VOLUNTARY WORK

- Serving as reviewer for:
  - IEEE Transactions on Pattern Analysis and Machine Intelligence
  - IEEE Transactions on Circuits and Systems for Video Technology
  - IEEE Transaction Multimedia
  - Artificial Intelligence
  - Various IEEE international conferences including CVPR, ICCV, ECCV, NeurIPS, BMVC and others.