Ramana Sundararaman

Email | Github | Linkedin | Google Scholar

https://sentient07.github.io/

Education

PhD, *Ecole Polytechnique, IP Paris* **10/2021 - 03/2025**

Title: 3D Shape Analysis with Learning-based Approaches.

Advisor: Maks Ovsjanikov

MSc&T, *Ecole Polytechnique, IP Paris* **09/2020 - 09/2021**

Subject: Artificial Intelligence and Advanced Visual Computing.

CGPA: 3.98 / 4

B.E(Hons.), *Birla Institute of Technology and Science Pilani* **07/2013 - 08/2017**

Subject: Electronics and Instrumentation Engineering.

EXPERIENCE

Research Scientist Intern, *Meta AI* **06/2024 - 12/2024**

- Designed a novel category-agnostic object canonicalization framework using pre-trained ViTs.
- Improved the PSNR by 1.5 for the novel-view synthesis task through canonicalization.
- Implemented custom Triton kernels in LightPlane library to render high-dimensional feature volumes, enabling joint 3D reconstruction and semantic segmentation from posed images.

Research Assistant, *Ecole Polytechnique* **04/2021 - 09/2021**

- Developed a physically plausible 3D generative modeling framework by optimizing latent spaces constructed with neural fields.
- Enhanced physical properties facilitated the design of new plastic bottles with improved topload performance, contributing to reduced plastic consumption.

Research Engineer, *INRIA* **10/2019 - 09/2020**

- Designed and developed a novel object tracking method for pedestrian head tracking in densely crowded environments, achieving a new state-of-the-art.
- Created and open-sourced a dataset with annotated pedestrian heads, published at CVPR.
- Deployed and scaled a real-time object tracking system on AWS with Kinesis-based streaming, enabling live inference at 25 FPS across multiple public surveillance cameras.

Deep Learning Engineer, *SciSports* **11/2018 - 08/2019**

- Developed real-time 2D pose tracking algorithms for video analysis to infer actions performed by football players.
- Performed architecture pruning, achieving a 2.2x speedup with less than 2% AUC reduction, and assisted in deployment.
- Deployed real-time 2D pose tracking system on GCP, streaming joint-level player data across matches; integrated model outputs into downstream analytics for performance insights.

Research Engineer, *Dublin City University* **11/2017 - 10/2018**

- Implemented a deep residual architecture for simultaneous crowd counting and violent behavior detection, resulting in a 4% boost in AUC.
- Integrated IBM Streams on AWS to enable real-time video analytics.
- Optimized intra-node communication, reducing end-to-end latency by ~18%.

Open-Source Contributions

Google Summer of Code, *Theano* **05/2016 - 08/2016**

- Built a new “GraphToGPU” optimizer, resulting in a 2-3x faster compilation of standard Deep Neural Networks such as ResNet50.
- Refactored Theano’s computation graph using a CGT-style optimizer to group GPU-compatible ops, reducing CPU-GPU memory transfers.
- Implemented Spatial Pyramid Pooling and ROI Pooling layers in Theano with C++ and CUDA backends for fixed-size feature extraction from variable-sized inputs.

Google Summer of Code, *OSUOSL* **05/2015 - 08/2015**

- Extended PGD’s PostgreSQL schema and Django ORM logic to support OCCm/OCCs attributes and deposition-date filtering.
- Redesigned PGD’s user and search systems using Django’s auth framework and AngularJS, extending the PostgreSQL schema to support occupancy metrics, timestamp filtering, and tagged saved-searches.

Publications

1. **Deformation Recovery: Localized Learning for Detail-Preserving Deformations.**
   Ramana Sundararaman, Nicolas Donati, Simone Melzi, Etienne Corman, Maks Ovsjanikov
   ACM Transactions on Graphics (ToG) and *SIGGRAPH-ASIA* 2024.
2. **Self-Supervised Dual Contouring.**
   Ramana Sundararaman, Roman Klokov, Maks Ovsjanikov
   IEEE/CVF *Computer Vision and Pattern Recognition (CVPR), 2024*. **(Spotlight)**
3. **Reduced representation of deformation fields for effective non-rigid shape matching.**
   Ramana Sundararaman, Riccardo Marin, Emanuele Rodola, Maks Ovsjanikov
   Neural Information Processing Systems (NeurIPS), 2022.
4. **Implicit field supervision for robust non-rigid shape matching.**
   Ramana Sundararaman, Gautam Pai, Maks Ovsjanikov
   European Conference in Computer Vision (ECCV), 2022 **(Oral)**
5. **Tracking Pedestrian Heads in Dense Crowds.**
   Ramana Sundararaman, Cedric Braga, Eric Marchand, Julien Pettre
   IEEE/CVF *Computer Vision and Pattern Recognition (CVPR)*, 2021.

Leadership Experiences

- **Graduate Teaching Assistant:** Computer Graphics, Geometric Deep Learning, Computer Animation, Introduction to Computer Science.
- **Mentoring:** Mentored two undergraduate students in designing and developing a chatbot application in Java from scratch as part of the Technology Incubator Program.

Technical Strengths

Programming Languages: Python, JAX, Triton, C++, CUDA, Java, SQL, JavaScript.

Tools and Technology: PyTorch, TensorFlow, OpenCV, NumPy, SciPy, Blender, Git, Docker, LaTeX, SLURM, AWS, GCP, IBM Streams, Kafka, PostgreSQL, Docker, Kubernetes, GraphQL.