Priyadarshini K

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RESEARCH INTERESTS

Multisensory Perception Modeling, **Data-Efficient Representation Learning**, **Distributed machine learning**, **Uncertainty Estimation**

My research is motivated by the goal of *modeling* and *synthesizing* a multisensory (vision, speech, haptic, olfaction, and taste) perception system using ML tools. To achieve data efficiency, I also work on developing *active learning* algorithms to reduce the annotation load in supervised methods. So far, I've applied my research primarily in computer vision and haptics applications, such as object retrieval, recommendation systems, and haptic texture recognition, but I've also been motivated by other machine senses such as olfaction and taste.

APPOINTMENTS

– *Research Scientist,* **Sony AI, Tokyo**	Sept 2021 - present
– *Project Research Engineer,* **IIT Bombay**	Aug 2015 - Dec 2015
– *Risk Analyst,* **CitiCorp Service India Ltd, Pune**	Jul 2013 - Oct 2014
– *Research Associate,* **IIT Bombay**	Jul 2010 - Jun 2013

EDUCATION

Indian Institute of Technology Bombay — 2016 - 2021
Ph.D. in Electrical Engineering
Thesis: *Label-Efficient Metric Learning*
Advisor: Prof. Subhasis Chaudhuri and Prof. Siddhartha Chaudhuri

Indian Institute of Technology Bombay — 2011 - 2013
Masters in Electrical Engineering
Thesis: *Multimodal Rendering of 3D Objects at Different Scales*

AWARDS AND HONORS

- TCS Ph.D. Research Fellowship for 4 years (2016 - 2019) – Awarded to four students across all 15 departments at IIT Bombay

- Qualcomm Innovation Fellowship Finalist, 2019 – 28 finalists were selected to present their research ideas from 11 participating Indian institutes

- Department Excellence in Teaching Assistantship (TA), 2018 – Awarded to 20 TAs among 300 nominees

- Recipient of MHRD PhD Fellowship 2016

- Recipient of MHRD Post-Graduate fellowship 2011

PUBLICATIONS

1. **Priyadarshini K** and Subhasis Chaudhuri. BEnhancing Haptic Distinguishability of Surface Materials with Boosting Technique. IEEE Haptics Symposium 2022

2.* **Priyadarshini Kumari**, Siddhartha Chaudhuri, Vivek Borkar and Subhasis Chaudhuri. A unified batch selection policy for active metric learning, ECML-PKDD , 2021

3.* **Priyadarshini Kumari**, Ritesh Goru, Siddhartha Chaudhuri, and Subhasis Chaudhuri. Batch Decorrelation for Active Metric Learning, IJCAI-PRICAI, 2020.

4.* **Priyadarshini Kumari**, Siddhartha Chaudhuri, and Subhasis Chaudhuri. PerceptNet: Learning Perceptual Similarity of Haptic Textures in Presence of Unorderable Triplets. IEEE World Haptics Conference (IEEE WHC), 2019.

5. **Priyadarshini Kumari**and Subhasis Chaudhuri. Haptic Rendering of Thin, Deformable Objects with Spatially Varying Stiffness. EuroHaptics, 2016.

6. Praseedha K., Sreeni K., **Priyadarshini Kumari**, Subhasis Chaudhuri. Combined Hapto-Visual and Auditory Rendering of Cultural Heritage Objects. Asian Conference on Computer Vision (ACCV) e-Heritage Workshop, 2014.

7. **Priyadarshini Kumari**, Sreeni K.G. and Subhasis Chaudhuri. Scalable Rendering of Variable Density Point Cloud Data. IEEE World Haptics Conference (IEEE WHC), 2013.

8. Sreeni K.G., **Priyadarshini Kumari**, A.K. Praseedha and Subhasis Chaudhuri. Haptic Rendering of Cultural Heritage Objects at Different Scales. EuroHaptics, 2012.

BOOK CHAPTER

Subhasis Chaudhuri and **Priyadarshini Kumari**. Cultural Heritage Object: Bringing Them Alive Through Virtual Touch, *Digital Hampi: Preserving Indian Cultural Heritage*, Springer, 2018.

TECHNICAL SKILLS

- **Languages:** Python, C, C++, MATLAB, and LaTeX
- **Libraries:** PyTorch, NumPy, Pandas, OpenCV, and OpenGL

TEACHING

Computer Vision [Spring 2016, Spring 2017, Spring 2018], Statistical Signal Analysis [Fall 2019], Wavelet [Spring 2020] ,Signals and System [Fall 2017, Fall 2018], Digital Signal Processing [Spring 2019], Communication Lab [Fall 2016]

COURSEWORK

Machine learning, Reinforcement learning, Computer vision, Computer graphics, Image processing, Applied linear algebra, Matrix computation, Linear optimization, Convex optimization, Probability and stochastic process, Digital signal processing, Signal and system, Wavelet, Adaptive signal processing

MASTERS THESIS

Multimodal Rendering of 3D Objects at Different Scales

– **Summary:** Developed a **multimodal rendering** technique to synthesize a combined *hapto-visual-auditory* perceptual experience of interaction with 3D model of objects. The goal of this project was to provide access to the heritage objects to visually-impaired people.
– **Domains involved:** Image Processing, Computer Graphics, Computer Vision, Haptic Signal Processing.

TRAVEL GRANTS

- NeurIPS 2020 Financial Assistance Award
- Awarded IJCAI Student Travel Grant 2020
- Awarded TCS Travel Grant 2019 for WHC 2019
- Awarded EE, IIT Bombay Travel Grant for EuroHaptics 2016

References

Available upon Request