Anush Sankaran
Researcher, IBM-India Research Labs

CONTACT INFORMATION

IBM-India Research Labs,
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Bengaluru - 560045

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RESEARCH INTERESTS

Deep Learning, Reinforcement Learning, Machine Learning, Image Analysis, Biometrics.

INDUSTRIAL QUALIFICATION

Researcher, IBM - India Research Labs, India (November, 2015 - Present)

Leading technical efforts in two projects:

- DARVIZ (`https://darviz.mybluemix.net`): Its a visual programming IDE, where you could design a deep learning model using an intuitive drag-and-drop framework.
- Machine Learning for Creativity (`https://ml4creativity.mybluemix.net/`): The goal is to create creative assistants to help augment human creative experts in various fields.

ACADEMIC QUALIFICATION

Ph.D. Scholar (July 2010 - August 2017) **9.50/10**

Indraprastha Institute of Information Technology-Delhi, New Delhi, India

- Dissertation Topic: "Learning Representations for Fingerprint Variants"
- Advisors: Dr. Mayank Vatsa, Dr. Richa Singh

Bachelor of Engineering (Computer Science Engineering) (2006 - 2010) **9.45/10**

Coimbatore Institute of Technology, Coimbatore, Tamilnadu, India

Higher Secondary (2005 - 2006) **94.75%**

Bharathiya Vidya Bhavan, Coimbatore, Tamilnadu, India

COLLABORATIONS

Lane Department of Computer Science & Engineering, West Virginia University

- *With:* Prof. Afzel Noore
- *Duration:* June 2014 - October 2014
- *Problem:* **Eye Gaze Analysis for Latent Fingerprint matching**

Department of Computing, The Hong Kong Polytechnic University

- *With:* Dr. Ajay Kumar
- *Duration:* June 2011 - August 2011
- *Problem:* **Feature level fusion of fingerprints**

PUBLICATIONS

Journals

1. **A. Sankaran**, A. Majumdar, M. Vatsa, and R. Singh, Group Sparse Autoencoder, *Image and Vision Computing, Special Issue on Regularization Techniques for High-Dimensional Data Analysis*, Elsevier, vol. 60, pp. 64-74, 2017. **Impact Factor: 2.671**
2. **A. Sankaran**, A. Jain, T. Vashisth, M. Vatsa, and R. Singh, Adaptive latent fingerprint segmentation using feature selection and random decision forest classification, *Information Fusion*, Elsevier, vol. 34, pp. 1-15, 2017. **Impact Factor: 5.667**
3. **A. Sankaran**, G. Goswami, M. Vatsa, R. Singh, and A. Majumdar, Class Sparsity Signature based Restricted Boltzmann Machines, *Pattern Recognition, Special Issue on Deep Image Video*, Elsevier, vol. 61, pp. 674-685, 2017. **Impact Factor: 4.582**

4. **A. Sankaran**, M. Vatsa, R. Singh, Multisensor Optical and Latent Fingerprint Database, *IEEE Access*, vol. 3, pp. 653 - 665, 2015. **Impact Factor: 3.244**
5. **A. Sankaran**, M. Vatsa, R. Singh, Latent Fingerprint Matching: A Survey, *IEEE Access*, vol. 2, pp. 982-1004, 2014. (*Appeared as one of the top-10 highly viewed publication of 2014*). **Impact Factor: 3.244**

Book Chapters

1. **A. Sankaran**, A. Malhotra, M. Vatsa, and R. Singh, Learning Representations for Uncontrolled Fingerprint Recognition, *Deep Learning in Biometrics*, CRC Press, 2017 (In Press).
2. A. Malhotra, **A. Sankaran**, A. Mittal, M. Vatsa, and R. Singh, Fingerphoto Authentication using Smartphone Camera captured under Varying Environmental Conditions, *Human Recognition in Outdoor Unconstrained Environments: Using Computer Vision, Pattern Recognition and Machine Learning Methods for Biometrics*, Elsevier, 2016 (Accepted). Editors: Maria De Marsico, Michele Nappi and Hugo Proenca.

Peer Reviewed Conference Articles

1. Akshay Sethi, **Anush Sankaran**, Naveen Panwar, Shreya Khare, and Senthil Mani, DLPaper2Code: Auto-generation of Code from Deep Learning Research Papers, *Association for the Advancement of Artificial Intelligence (AAAI)*, 2018
2. Senthil Mani, Neelamadhav Gantayat, Rahul Aralikatte, Monika Gupta, Sampath Dechu, **Anush Sankaran**, Shreya Khare, Barry Mitchell, Hemamalini Subramanian, and Hema Venkatarangan, Hi, How can I help you?: Automating enterprise IT support help desks, *Innovative Applications of Artificial Intelligence (IAAI)*, 2018.
3. **Anush Sankaran**, Naveen Panwar, Shreya Khare, Senthil Mani, Akshay Sethi, Rahul Aralikatte, and Neelamadhav Gantayat, Democratization of Deep Learning using DARVIZ, *AAAI - Demo Track*, 2018.
4. Senthil Mani, Neelamadhav Gantayat, Rahul Aralikatte, Monika Gupta, Sampath Dechu, **Anush Sankaran**, Shreya Khare, Barry Mitchell, Hemamalini Subramanian, and Hema Venkatarangan, Agent Assist: Automating enterprise IT support help desks, *AAAI - Demo Track*, 2018.
5. **Anush Sankaran**, Rahul Aralikatte, Senthil Mani, Shreya Khare, Naveen Panwar, and Neelamadhav Gantayat, DARVIZ: deep abstract representation, visualization, and verification of deep learning models, *International Conference on Software Engineering: New Ideas and Emerging Results Track*, 2017.
6. A. Taneja, A. Tayal, A. Malhotra, **A. Sankaran**, M. Vatsa, and R. Singh, Fingerphoto Spoofing in Mobile Devices: A Preliminary Study, *International Conference on Biometrics: Theory, Applications and Systems*, 2016.
7. **A. Sankaran**, A. Malhotra, A. Mittal, M. Vatsa, and R. Singh, On Smartphone Camera based Fingerphoto Authentication, *International Conference on Biometrics: Theory, Applications and Systems*, 2015.
8. **A. Sankaran**, A. Agarwal, R. Keshari, S. Ghosh, A. Sharma, M. Vatsa, and R. Singh, Latent Fingerprint from Multiple Surfaces: Database and Quality Analysis, *International Conference on Biometrics: Theory, Applications and Systems*, 2015.
9. **A. Sankaran**, P. Pandey, M. Vatsa, R. Singh, On Latent Fingerprint Minutiae Extraction using Stacked Denoising Sparse AutoEncoders, In Proceedings of *International Joint Conference on Biometrics*, 2014 (**Best Poster Award**).
10. **A. Sankaran**, M. Vatsa, R. Singh, Automated Clarity and Quality Assessment for Latent Fingerprints: A Preliminary Study, In Proceedings of *International Conference on Biometrics: Theory, Applications and Systems*, 2013 (**Best Poster Award**).

11. **A. Sankaran**, M. Vatsa, R. Singh, Hierarchical Fusion for Matching Simultaneous Latent Fingerprint, In Proceedings of *International Conference on Biometrics: Theory, Applications and Systems*, 2012.
12. **A. Sankaran**, T.I. Dhamecha, M. Vatsa, R. Singh, On Matching Latent to Latent Fingerprints, In Proceedings of *International Joint Conference on Biometrics*, 2011.
13. T.I. Dhamecha, **A. Sankaran**, R. Singh, M. Vatsa, Is Gender Classification Across Ethnicity Feasible using Discriminant Functions?, In Proceedings of *International Joint Conference on Biometrics*, 2011.

Technical Reports

1. Naveen Panwar, Shreya Khare, Neelamadhav Gantayat, Rahul Aralikatte, Senthil Mani, and **Anush Sankaran**, mAnI: Movie Amalgamation using Neural Imitation, arXiv preprint arXiv:1708.04923, 2017.
2. Vitobha Munigala, Srikanth Tamilselvam, and **Anush Sankaran**, "Let me convince you to buy my product...": A Case Study of an Automated Persuasive System for Fashion Products. arXiv preprint arXiv:1709.08366, 2017.

Talks and Presentations

- "Watson Made Simple with Tanmay Bhakshi", 4th episode, Deep Learning using DARVIZ through IBM Facebook Live, Aug 2017.
- Co-organized "Machine Learning for Creativity" workshop at SIGKDD 2017, Halifax, Canada, Aug 2017.
- Deep Learning using DARVIZ, Summer School in Deep Learning, IIIT Hyderabad, July 2017.
- What the fun is Deep Learning?, IEEE-IISc Deep learning Summit, IISC, June 2017.
- Deep Learning Made Easy using DARVIZ, Winter School on Machine Learning in Biometrics, Feb 2017.

Honors and Awards

- TCS (Tata Consultancy Services) Research Fellowship for **August, 2010 - July 2015**.
- Best poster award at IEEE IAPR International Joint Conference on Biometrics, **October 2014**
- Best poster award at IEEE Sixth International Conference on Biometrics: Theory, Applications, and Systems (BTAS), **August 2013**
- First place at the third IDRBT Doctoral Colloquium, **December 2013**.
- "TCS Best Student Project Award" for my undergraduate thesis "Multi-resolution Image Query Using Haar transformation And Image Tagging", **2009-2010**.

Research Projects

IBM- India Research Labs, Bangalore, India

Cognitive Application Support **January 2016 - August 2017**

Creating a cognitive automated system to extract the error for SAP system screenshots and to supply a structured resolution procedure, mined form previous instances of data.

Indraprastha Institute of Information Technology-Delhi, New Delhi, India

Eye gaze analysis for latent fingerprint matching **July 2014 - July 2015**

Analyzing the eye gaze patterns of experts while matching latent prints, provides insights of the process and heuristics used by the experts. The gained insights can be used to design better algorithms for automated latent fingerprint matching.

Smooth learning of Deep Networks **December 2014 - July 2015**

Deep networks along with its successful performance in multiple domains, poses lots of learning challenges such as learning large number of parameters, reduced performance when only limited training data is available. Addressing these challenges, improves the learning capacity and provides flexibility to address deep learning in many new challenges.

Reinforcement based task adaptation framework **Aug 2013 - Jan 2014**

We propose a reward based learning mechanism that learns a classification or regression task completely from unlabeled data. The learnt hypothesis can be used as a supplement to improve the performance of a supervised or semi-supervised classifier.

Tom without a Jerry **Jan 2011 - Feb 2011**
This project involves creating a Windows based stand alone application for controlling the mouse pointer, using only hand movements detected as gestures by a web-camera.

Academic Experience

Indraprastha Institute of Information Technology-Delhi, New Delhi India

Teaching Assistant
Duties included taking a few lectures, conducting tutorials, office hours, and grading papers.

- Machine Learning, Monsoon 2012, Monsoon 2013
- Probability and Statistics, Monsoon 2010, Winter 2014
- Pattern Classification, Winter 2013
- Data Structures and Algorithms, Winter 2011

Professional Activities

Student member – IEEE, IEEE Signal Processing Society, ACM
Reviewer for

- IEEE Transactions on Information, Forensics and Security
- IEEE Transactions on Image Processing
- Pattern Recognition, Elsevier
- Information Fusion, Elsevier
- IEEE International Conference on Image Processing
- IEEE International Conference on Biometrics

Student volunteer – IJCB 2014, ICB 2012.

Computer Skills

- Languages: Matlab, C, C#, HTML, Python
- Machine Learning libraries/tools: TensorFlow, Keras, CAFFE, WEKA
- Computer Vision packages/tools: openCV, emguCV
- Web Scripting: General Javascript, Angular JS, Node JS