Tarang Chugh

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Objective: Looking for a challenging **Full-time Research Scientist** position in machine learning with applications in computer vision and biometrics.

Education

		GPA
Michigan State University (2015-Present)	PhD in Computer Science & Engineering Advisor: Prof. Anil K. Jain	4.0 / 4.0
IIIT-Delhi (2009-2013)	B. Tech. (Hons.) in Computer Science & Engineering Graduated with 2nd Rank	9.42 / 10.0

Work Experience

PRIP Lab, MSU (Aug'15 - Present)

Graduate Research Assistant - Pattern Recognition and Image Processing Lab
Advisor: Prof. Anil K. Jain
- Design of a real-time fingerprint spoof detector; one of the best performing algorithms in IARPA Odin evaluation
- Latent fingerprint value determination: crowd-based learning

NEC Labs, Princeton, NJ (Jun'18 - Aug'18)

Research Intern - Integrated Systems Group
Managers: Dr. Yi Yang, Dr. Srimat Chakradhar
- Know Your Ink: Automated Tattoo Detection and Recognition

IBM Research, New Delhi (Feb'14 – Aug'15)

Software Engineer - Information Management & Analytics Group
- Detecting and ranking law & safety disrupting events using social media mining
- Automating Name Normalization based on text matching

IIIT Delhi (Dec'13 - Feb'14)

Research Assistant - Image Analysis & Biometrics Lab
Advisor: Dr. Mayank Vatsa and Dr. Richa Singh
- Matching age-separated composite sketches and digital face photos

INRIA, Nancy, France (May'12 - Nov'12)

Software Engineer Intern - MADYNES Team
Manager: Dr. Isabelle Chrisment
- Designed a P2P to I2P multi-bridge network and defined network protocol

Publications

Google Scholar: http://bit.do/gs-tarangchugh

Journal Articles:

- **T. Chugh**, K. Cao, and Anil K. Jain, Fingerprint Spoof Buster: Use of Minutiae-centered Patches, IEEE Transactions on Information Forensics and Security, Vol. 13, No. 9, pp. 2190-2202, Sept. 2018
- **T. Chugh**, K. Cao, J. Zhou, E. Tabassi and A. K. Jain, Latent Fingerprint Value Prediction: Crowd-based Learning, IEEE Transactions on Information Forensics and Security, Vol. 13, No. 1, pp. 20-34, Jan 2018.

Conference Papers / Technical Reports:

- **T. Chugh**, A. K. Jain, OCT Fingerprints: Resilience to Presentation Attacks, arXiv: *1908.00102*, 2019
- **T. Chugh**, A. K. Jain, Fingerprint Presentation Attack Detection: Generalization and Efficiency, *International Conference on Biometrics (ICB)*, Crete, Greece, 2019
- R. Gajawada, A. Popli, **T. Chugh**, A. Namboodiri, A. K. Jain, Universal Material Translator: Towards Spoof Fingerprint Generalization, *International Conference on Biometrics (ICB)*, Crete, Greece, 2019
- E. Tabassi, **T. Chugh**, D. Deb, A. K. Jain, Altered Fingerprints: Detection and Localization, *International Conference on Biometrics: Theory, Applications and Systems (BTAS), Los Angeles, 2018*

- **T. Chugh**, K. Cao, A. K. Jain, Fingerprint Spoof Detection Using Minutiae-based Local Patches, *International Joint Conference on Biometrics (IJCB)*, Denver, 2017
- **T. Chugh**, S. S. Arora, A. K. Jain, and N. G. Paulter Jr., Benchmarking Fingerprint Minutiae Extractors, in *IEEE Biometrics Special Interest Group (BIOSIG)*, Darmstadt, 2017
- **T. Chugh**, M. Singh, S. Nagpal, R. Singh, and M. Vatsa, Transfer Learning based Evolutionary Algorithm for Composite Face Sketch Recognition, in *IEEE CVPR Workshop (CVPRW) on Biometrics*, Honolulu, 2017
- K. Cao, **T. Chugh**, J. Zhou, E. Tabassi, A. K. Jain, Automatic Latent Value Determination, *International Conference on Biometrics (ICB)*, Halmstad, Sweden, 2016
- **T. Chugh**, H.S. Bhatt, R. Singh, and M. Vatsa, Matching Age Separated Composite Sketches and Digital Face Images, *International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, Washington D.C. 2013

Software Skills

Programming Languages	Python, C, C++, Java, C#
Tools & Technologies	TensorFlow, TensorFlow-lite, PyQT5, Android and Web App Dev., HTML5/CSS3, PyCharm, MATLAB, Visual Studio, Latex
Environment	Mac, Linux, Windows

Graduate Courses at MSU

Machine Learning, Data Mining, Pattern Recognition, Computer Vision, Natural Language Processing, Design and Theory of Algorithms, Theory of Prob. and Stats. - I & II, Parallel Computing, Advanced Computer Graphics

Selected Projects

Fingerprint Presentation Attack Detection, PRIP Lab, MSU (Mar'17 – Present) [video]

- Utilized fingerprint domain knowledge and deep learning methods to design a robust fingerprint PA detector
- Improved generalization and interpretability of CNN models by investigating material characteristics and 3D t-SNE
- Developed an android application for real-time fingerprint spoof detection on a commodity smartphone (< 100ms)

Learning Latent Fingerprint Value Determination, PRIP Lab, MSU (Aug'15 – December'16) [media]

- Developed a crowdsourcing tool, Fingerprint*Mash*, to collect latent value responses from fingerprint experts
- Utilized matrix completion and multidimensional scaling to identify the underlying bases of value determination
- Learned an objective and automatic latent value predictor in terms of latent features that can rank a given set of latent fingerprints saving crucial time of fingerprint experts

KnowYourInk: Automated Tattoo Detection and Recognition, NEC Labs America (June'18 – Aug'18) [video]

- R-CNN based tattoo detection trained using Resnet-50 architecture on 20,000+ annotated tattoo images in the wild
- Feature extraction performed using inception-resnet-v2 architecture matched using cosine distance