

SANDIPAN BANERJEE

CONTACT INFORMATION

EMAIL: sandipan9008@gmail.com | PHONE: +1 574 298 2081 | [Webpage](#)

RESEARCH INTERESTS

Computer Vision - Face/Expression Recognition and Synthesis. Counterfeit Drug Detection.
Deep Learning - Convolutional Neural Nets (CNN), Generative Adversarial Nets (GAN), Autoencoders, Siamese Nets, Long Short-Term Memory Nets (LSTM).
Biometrics - Face and Iris (Segmentation and Recognition).

WORK EXPERIENCE

- | | |
|-------------------|---|
| JUL 2019-PRESENT | Computer Vision Scientist at Affectiva <ul style="list-style-type: none">- Building GAN models to synthesize facial expressions, pose and directional lighting by leveraging human perceptual judgements.- Designing network models for eye gaze/glance prediction in driver videos that are robust to changes in camera angle.- Hallucinating artificial samples in facial attribute feature space to detect temporal events like drowsiness from driver videos.- Worked on designing static and temporal expression detection models. |
| MAY 2014-MAY 2019 | Graduate Research Assistant at University of Notre Dame
<i>Computer Vision Research Laboratory (CVRL)</i> <ul style="list-style-type: none">- Working on generation of natural looking synthetic face images (2D & 3D) to augment training data for deep neural networks and artificial face image frontalization.- Developed a multi-scale cascaded network of GANs for hallucinating context (forehead, hair, neck, clothes) and background pixels directly from a single face mask.- Developed the Notre Dame Synthetic Face Dataset, containing 2M face images of 12K synthetic identities, that can be used without copyright or privacy concerns.- Previously worked on the PAD Project, detecting counterfeit pharmaceutical drugs. |
| SUMMER 2016 | Research Intern at Xerox Palo Alto Research Center (PARC) <ul style="list-style-type: none">- Extended the regular key-points of the human face to mesh and map forehead and cheek regions using texture information.- Artificially aged female face images (CNN, GAN, blending) for predicting skin conditions. |
| AUG 2013-MAY 2014 | Graduate Teaching Assistant at University of Notre Dame <ul style="list-style-type: none">- Graded papers, held office hours and conducted tests for the <i>Computer Networks (CSE 30264)</i>, and <i>Ethical and Professional Issues (CSE 40175)</i> courses. |
| JUL 2012-APR 2013 | Associate Engineer at Unisys Global Services India <ul style="list-style-type: none">- Worked on plug-in development for Unisys' proprietary Clearpath mainframe servers. |

EDUCATION

- | | |
|-------------------|---|
| AUG 2013-MAY 2019 | PhD in COMPUTER SCIENCE, UNIVERSITY OF NOTRE DAME, USA
M.S. obtained in May 2017 (GPA: 3.6/4).
ADVISERS: Dr. Patrick Flynn & Dr. Kevin Bowyer.
DISSERTATION: Exploring the Effects of Frontalization & Data Synthesis on Face Recognition. [PDF] |
| AUG 2008-MAY 2012 | B.Tech in COMPUTER SCIENCE & ENGINEERING, NIT DURGAPUR, India
GPA: 7.89/10. |

PUBLICATIONS

S. Banerjee, A. Joshi, P. Mahajan, S. Bhattacharya, S. Kyal, and T. Mishra, *LEGAN: Disentangled Manipulation of Directional Lighting and Facial Expressions by Leveraging Human Perceptual Judgements*, under review.

S. Banerjee, W. Scheirer, K. Bowyer, and P. Flynn, *Fast Face Image Synthesis to Improve Face Recognition*, under major revision for IEEE Trans. on Information Forensics and Security (TIFS).

A. Joshi, S. Kyal, S. Banerjee, and T. Mishra, *In-The-Wild Drowsiness Detection from Facial Expressions*, in IEEE Intelligent Vehicles Symposium (IV), 2020, Workshop Paper.

D. Saavedra, S. Banerjee, and D. Mery, *Detection of Threat Objects in Baggage Inspection with X-ray Images using Deep Learning*, under review.

S. Banerjee, W. Scheirer, K. Bowyer, and P. Flynn, *On Hallucinating Context and Background Pixels from a Face Mask using Multi-scale GANs*, in IEEE Winter Conference on Applications of Computer Vision (WACV), 2020. [\[paper\]](#)

S. Banerjee, W. Scheirer, K. Bowyer, and P. Flynn, *Fast Face Image Synthesis with Minimal Training*, in IEEE Winter Conference on Applications of Computer Vision (WACV), 2019. [\[paper\]](#)

S. Banerjee*, J. Brogan*, J. Krizaj, A. Bharati, B. RichardWebster, V. Struc, P. Flynn, and W. Scheirer, *To Frontalize or Not To Frontalize: Do We Really Need Elaborate Pre-processing To Improve Face Recognition?*, in IEEE Winter Conference on Applications of Computer Vision (WACV), 2018. [\[paper\]](#)

D. Mery, and S. Banerjee, *Recognition of Faces and Facial Attributes using Accumulative Local Sparse Representations*, in IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2018. [\[paper\]](#)

S. Banerjee*, J. Bernhard*, W. Scheirer, K. Bowyer, and P. Flynn, *SREFI: Synthesis of Realistic Example Face Images*, in IAPR/IEEE International Joint Conference on Biometrics (IJCB), 2017. [\[paper\]](#)

D. Mery, E. Svec, M. Arias, V. Rizzo, J. Saavedra, and S. Banerjee, *Modern Computer Vision Techniques for X-ray Testing in Baggage Inspection*, in IEEE Trans. on Systems, Man, and Cybernetics: Systems (SMC), 47 (4), pp. 682 - 692, 2017. [\[paper\]](#)

W. Scheirer, et al., *Report on the BTAS 2016 Video Person Recognition Evaluation*, in IEEE International Conference on Biometrics Theory, Applications and Systems (BTAS), 2016. [\[paper\]](#)

S. Banerjee, J. Sweet, C. Sweet, and M. Lieberman, *Visual Recognition of Paper Analytical Device Images for Detection of Falsified Pharmaceuticals*, in IEEE Winter Conference on Applications of Computer Vision (WACV), 2016. [\[paper\]](#)

S. Banerjee, and D. Mery, *Iris Segmentation using Geodesic Active Contours and GrabCut*, PSIVT Workshop on 2D & 3D Geometric Properties from Incomplete Data, 2015. [\[paper\]](#)

* denotes equal contribution.

SKILL SET

PROGRAMMING LANGUAGES: Python, Matlab

APPLICATIONS: OpenCV, OpenGL, Keras, Tensorflow, Caffe, Dlib

PLATFORMS: Ubuntu, Windows, EC2

OTHER RELEVANT INFORMATION

CONFERENCE REVIEWER: WACV 2020/21, CVPR 2020, ACCV 2020, IJCB 2020, BTAS 2019, ICB 2019.

JOURNAL REVIEWER: TPAMI, TIP, TIFS, TBIOM.

POSTERS & TALKS: WACV 2019 Doctoral Consortium, Midwest Vision Workshop 2018, Amazon Graduate Research Symposium 2017, NSF Data Science Workshop 2016.

TEST SCORES: GRE (2011) - 334/340, AIEEE 2008 - top 0.7% among 1M students.

REFERENCES

Available upon request.