Sobhan Soleymani

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Ph.D. in Electrical Engineering with more than six years of research experience in machine learning, computer vision, deep learning, signal and image processing, and their applications in biometrics. Selected Publications: TBIOM, NeurIPS, 3×CVPR, ECCV, 5×WACV, ICPR. Programming languages and libraries: Python, Matlab, Tensorflow, PyTorch, OpenCV, Scikit-learn.

Education

May'21 Ph.D. in Electrical Engineering, West Virginia University, Morgantown, WV, USA
Dissertation: Deep Models for Improving the Performance and Reliability of Person Recognition
Advisor: Dr. Nasser M. Nasrabadi

Mar.'09 M.Sc. in Electrical & Electronics Engineering, École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland
Thesis: Tomographic Field Reconstruction Using a Mobile Sensor Network
Advisors: Dr. Martin Vetterli and Dr. Yue M. Lu

July'07 B.Sc. in Electrical Engineering, Communications, University of Tehran, Tehran, Iran
Thesis: Modeling Optical Coherence Tomography Using Fourier Optics

Work Experience

Sept.'21–Present Postdoctoral Fellow, West Virginia University, Morgantown, WV, USA

- Generation and detection of morphed face images.
- Off-angle, view-invariant, and low-resolution face recognition.

Expertise

Person identification: Knowledge on face, iris, fingerprint, speech, and geometrical and generative face manipulation using Tensorflow and PyTorch.

- Designed several multimodal architectures for multimodal biometric recognition.
- Optimized a mutual information maximization problem on disentangled representations for differential morph detection.
- Utilized landmark- and StyleGAN-based models for face morph generation.
- Designed a prosodic-enhanced networks for cross-device text-independent speaker verification.

Adversarial Learning: Knowledge on crafting adversarial examples, iterative data generation, and studying loss landscape in the vicinity of natural and adversarial samples.

- Designed an adversarial attack capable of modifying frequency representations of input image.
- Exploited joint robustness to adversarial perturbations by analysing the interaction between members of an ensemble.
- Altered geometric structure of the face to craft adversarial examples.
- Crafted adversarial iris samples through designing a surrogate network and defending against them using an ensemble of autoencoders to learn the distribution of wavelet sub-bands.

Semi/un/self-supervised learning: Knowledge of data augmentation, pseudo-labeling, optimal transport, mixing augmentation, and knowledge distillation.

- Alleviated over-fitting by improving the performance of the mixing augmentation through supervision of a teacher model and identifying salient regions.
- Self-supervised training of the model by cluster assumption on the unlabeled data and generated pseudo label using Wasserstein metric.
- Proposed a semi-supervised method to adopts a hierarchical Optimal Transport and find a mapping from empirical unlabeled measures to corresponding labeled measures.

Domain transfer: Knowledge of generative adversarial networks, image-to-image translation, variational autoencoders, and mutual information maximization.

- Designed an unsupervised image-to-image translation using domain-specific variational information bound.
- Designed sketch-to-photo synthesis frameworks enhanced by facial attaributes.

Publications

[submitted] Adversarially-Trained Equivariant Single-View 3D Reconstruction, **Soleymani**, Dabouei, Taherkhani, Dawson, Nasrabadi.

[submitted] Attribute Guided Sparse Tensor-Based Model for Person Re-Identification, Taherkhani, Dabouei **Soleymani**, Dawson, Nasrabadi.

[submitted] Tasks Structure Regularization in Multi-Task Learning for Improving Facial Attribute Prediction, Taherkhani, Dabouei **Soleymani**, Dawson, Nasrabadi.

[submitted] Benchmarking Human Face Similarity Using Identical Twins, McCauley, **Soleymani**, Nasrabadi, Dawson.

[submitted] Real-time Texture-adaptive Redundant DWT Watermarking Using Short-SURF Descriptors, **Soleymani**, Noore, Nasrabadi.

2021 [33] Quality-Aware Multimodal Biometric Recognition, **Soleymani**, Dabouei, Iranmanesh, Dawson, Nasrabadi, *IEEE Transactions on Biometrics, Behavior, and Identity Science,* 2021.

[32] SuperMix: Supervising the Mixing Data Augmentation, Dabouei, **Soleymani**, Taherkhani, Nasrabadi, *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

[31] Self-Supervised Wasserstein Pseudo-Labeling for Semi-Supervised Image Classification, Taherkhani, Dabouei, **Soleymani**, Dawson, Nasrabadi, *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

[30] Mutual Information Maximization on Disentangled Representations for Differential Morph Detection, **Soleymani**, Dabouei, Taherkhani, Dawson, Nasrabadi, *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2021.

[29] Adversarially Perturbed Wavelet-based Morphed Face Generation, O'Haire, **Soleymani**, Aghdaie, Chaudhary, Nasrabadi. *IEEE International Conference on Automatic Face and Gesture Recognition (FG)*, 2021.

[28] Identical Twins as a Facial Similarity Benchmark for Human Facial Recognition, McCauley, **Soleymani**, Williams, Dando, Nasrabadi, Dawson. *IEEE 20th International Conference of the Biometrics Special Interest Group (BIOSIG)*, 2021.

[27] Attention Aware Wavelet-based Detection of Morphed Face Images, Aghdaie, Chaudhary, **Soleymani**, Dawson, Nasrabadi. *IEEE Int. Joint Conference on Biometrics (IJCB)*, 2021.

[26] Morph Detection Enhanced by Structured Group Sparsity, Aghdaie, Chaudhary, **Soleymani**, Nasrabadi. *IEEE Winter Conference on Applications of Computer Vision (WACVW)*, 2022.

[25] Differential Morph Face Detection using Discriminative Wavelet Sub-bands, Chaudhary, Aghdaei, **Soleymani**, Dawson, Nasrabadi, *IEEE Computer Vision and Pattern Recognition Workshop (CVPRW),* 2021.

[24] Detection of Morphed Face Images Using Discriminative Wavelet Sub-bands, Aghdaei, Chaudhary, **Soleymani**, Dawson, Nasrabadi, *IEEE International Workshop on Biometrics and Forensics (IWBF),* 2021.

2020 [23] Exploiting Joint Robustness to Adversarial Perturbations, Dabouei, **Soleymani**, Taherkhani, Dawson, Nasrabadi, *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.

[22] Transporting Labels via Hierarchical Optimal Transport for Semi-Supervised Learning, Taherkhani, Dabouei, **Soleymani**, Dawson, Nasrabadi, *European Conference on Computer Vision (ECCV)*, 2020.

[21] Differential Morphed Face Detection Using Deep Siamese Networks, **Soleymani**, Chaudhary, Dabouei, Dawson, Nasrabadi, *MultiMedia FORensics in the WILD (MMForWILD)*, 2020.

[20] SmoothFool: An Efficient Framework for Computing Smooth Adversarial Perturbations, Dabouei, **Soleymani**, Taherkhani, Dawson, Nasrabadi, *IEEE Winter Conference on Applications of Computer Vision (WACV), 2020*.

[19] Boosting Deep Face Recognition via Disentangling Appearance and Geometry, Dabouei, Taherkhani, **Soleymani**, Dawson, Nasrabadi, *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.

[18] Robust Facial Landmark Detection via Aggregation on Geometrically Manipulated Faces, Iranmanesh, Dabouei, **Soleymani**, Nasrabadi, *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.

2019 [17] Defending Against Adversarial Iris Examples Using Wavelet Decomposition, **Soleymani**, Dabouei, Dawson, Nasrabadi, *IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, 2019.

[16] Adversarial Examples to Fool Iris Recognition Systems, **Soleymani**, Dabouei, Dawson, Nasrabadi, *IAPR International Conference on Biometrics (ICB)*, 2019.

[15] Fast Geometrically-perturbed Adversarial Faces, Dabouei, **Soleymani**, Dawson, Nasrabadi, *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2019.

[14] Learning to Authenticate with Deep Multibiometric Hashing and Neural Network Decoding, Talreja, **Soleymani**, Valenti, Nasrabadi, *IEEE International Conference on Communications (ICC)*, 2019.

[13] Deep Contactless Fingerprint Unwarping, Dabouei, **Soleymani**, Dawson, Nasrabadi, *IAPR International Conference on Biometrics (ICB)*, 2019.

2018 [12] Unsupervised image-to-image translation using domain-specific variational information bound, Kazemi, **Soleymani**, Taherkhani, Iranmanesh, Dawson, Nasrabadi, *Advances in Neural Information Processing Systems (NeurIPS)*, 2018.

[11] Multi-Level Feature Abstraction from Convolutional Neural Networks for Multimodal Biometric Identification, **Soleymani**, Dabouei, Kazemi, Dawson, Nasrabadi, *International Conference on Pattern Recognition (ICPR)*, 2018.

[10] Generalized bilinear deep convolutional neural networks for multimodal biometric identification, **Soleymani**, Torfi, Dawson, Nasrabadi, *IEEE International Conference on Image Processing (ICIP)*, 2018.

[9] Prosodic-Enhanced Siamese Convolutional Neural Networks for Cross-Device Text-Independent Speaker Verification, **Soleymani**, Dabouei, Iranmanesh, Kazemi, Dawson, Nasrabadi, *IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, 2018.

[8] ID Preserving GAN for Partial Latent Fingerprint Reconstruction, Dabouei, **Soleymani**, Kazemi, Dawson, Nasrabadi, *IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, 2018.

[7] Deep sketch-photo face recognition assisted by facial attributes, Iranmanesh, Kazemi, **Soleymani**, Dabouei, Nasrabadi, *IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS)*, 2018.

[6] Facial Attributes Guided Deep Sketch-to-Photo Synthesis, Kazemi, Iranmanesh, Dabouei, **Soleymani**, Nasrabadi *IEEE Winter Applications of Computer Vision Workshops (WACVW)*, 2018.

[5] Attribute-Centered Loss for Soft-Biometrics Guided Face Sketch-Photo Recognition, Kazemi, **Soleymani**, Dabouei, Iranmanesh, Nasrabadi, *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2018.

2017 [4] On the construction of polar codes for achieving the capacity of marginal channels, Torfi, **Soleymani**, Aram, Vakili, *IEEE Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, 2017.

[3] Polar coding for achieving the capacity of marginal channels in nonbinary-input setting, Torfi, **Soleymani**, Iranmanesh, Kazemi, Shirvani, Vakili, *IEEE Annual Conference on Information Sciences and Systems (CISS)*, 2017.

[2] Dynamically reconfigurable evolutionary multi-context robust cellular array design, **Soleymani**, Noore, *International Journal of Circuits and Architecture Design*, 2016.

[1] Efficient high-quality demosaicing using spatially adaptive weighting, Kenarsari-Anhari, Bakhtiary-Davijani, Nasiri-Avanaki, **Soleymani**, *International Symposium on Signal Processing and Its Applications*, 2007.

Internships

[2] Real-time Gaze Tracking Using Webcam Videos, Supervisors: Dr. Matteo Sorci, Dr. Jean-Philippe Thiran, *École Polytechnique Fédérale de Lausanne*, Lausanne, Switzerland, 2009.

[1] 3D Model Processing for Automated Image Annotation, Supervisors: Dr. Luciano Sbaiz, Dr. Pascal Fua, *École Polytechnique Fédérale de Lausanne*, Lausanne, Switzerland, 2008.

Awards

[4] Best Poster Award in IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2019.
[3] Best Poster Award in IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2018.
[2] Best Student Paper Award in IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS), 2018.
[1] Best Paper Award in IEEE Winter Applications of Computer Vision Workshops, 2018.

Service

[2] Reviewer: IEEE TNNLS, IEEE TBIOM, IEEE TIM, NeurIPS, ICLR, IEEE J. of Selected Topics in Signal Processing, IEEE Signal Processing Letters, IEEE Sensors Journal, IEEE Access, CVIU, WACV, ICIP, and IJCB.

[1] Graduate Teaching Assistant (WVU): Introduction to Electrical Engineering Laboratory, Electrical Circuits Laboratory, and Digital Electronics Laboratory.