Veeru **Talreja**

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Summary

Ph.D. candidate at West Virginia University with research interest in developing deep learning algorithms, mainly focused on image processing and computer vision. Have an in-depth knowledge of python-based machine learning and deep learning frameworks such as Scikit-Learn, Tensorflow, Keras, and Pytorch. As a Ph.D student working on different projects has given me an ability to develop successful deep learning based discriminative and generative models for computer vision applications.

Highlights

- 3+ years experience of implementing algorithms using deep learning frameworks Pytorch, TensorFlow, Keras, and Caffe.
- 5+ years experience of working with Python, specifically in the field of machine learning.
- 3+ years experience in Web development using Asp.Net, C#.
- Knowledge and experience with AWS services such as Sagemaker, S3, ECS, Lambda.
- Excellent oral, written and communication skills
- Internship experience at Mitsubishi Research Lab (MERL) and Signify Research in Cambridge, MA.
- Reviewer for IEEE Transactions on Multimedia, IEEE Transactions on Biometrics, Behavior, and Identity Science, IEEE GLOBECOM 2019, 2020
- Best poster awards at the Center for Identification Technology Research (CITeR) Spring 2019 and Fall 2019 meetings.
- Best student paper award at International Joint Conference on Biometrics (IJCB 2020).

Work Experience

Research Assistant
Morgantown,WV

West Virginia University — *June 2015 - PRESENT*

- Cloud-based biometric service: Design methods to perform biometric recognition in a smartphone environment using cloud-based services.
- Multimodal biometric security: Achieved high matching and security performance by integrating deep hashing with error-correcting codes (ECC) for multimodal biometric security.
- Facial image retrieval using soft biometrics query: Adopt deep cross-modal hashing and neural ECC decoding for a virtual facial line-up system using soft biometrics query (i.e.,facial attributes).
- Cross-resolution face recognition: Develop an attribute-guided coupled generative adversarial network (GAN) architecture for cross-resolution face recognition.

Deep Learning Intern
Cambridge,MA

Signify — *June, 2020 - Dec. 2020*

- Optimized deep learning models for object detection and semantic segmentation in the field of agriculture AI and improved the performance by 3%
- Develop and implement machine learning pipeline for stress and disease detection in plants

Research Intern
Cambridge,MA

Mitsubishi Electric Research Lab (MERL) — *Jan. 2020 - May 2020*

- Integration of recurrent neural network and belief propagation for developing error correcting decoder for wireless communication applications.
- Developed an end-to-end deep learning model for phase noise-robust optical communications with significant performance gain up to 2 dB

Software Developer
Hyderabad, India

Dolphin Talreja InfraPro Private Limited — *Jan. 2014 - May 2015*

- Developed a web tool that will help the company in account management, cost management, and labor management.
- Assisted in preparing an estimate for a new project for prospective clients.

Geospatial Database Software Developer
Morgantown, WV

West Virginia University Research Corporation — *Jan. 2011 - Dec.. 2013*

- Developed a Website portal to host multiple applications for West Virginia Division of Natural Resources using Asp.Net (C#), HTML, JS and Ajax.
- Created a user management system for the portal including login control, and maintain the user credentials and roles in a SQL Server database.
- Developed a 10-page data entry web form for one of the applications and link it to the SQL database.
- Maintained the applications and as an administrator provided access to the user based on individual privileges and roles.

Graduate Assistant - Software Developer
Morgantown, WV

West Virginia University — *Dec. 2009 - Aug. 2010*

- Researched and constructed an automated marking system for marking and identifying lumber using RFID.
- Developed a Java and a .Net code for reading the data from serial port to a database using the scanner.

Software Intern
Canonsburg, PA

Ansys Inc. — *May 2009 - Dec. 2009*

- Development and maintenance of ANSYS Mechanical Software using C++.
- Contributed to writing strongly typed interfaces and objects for the engineering simulation data model.
- Used Microsoft component object model (COM) components for developing interfaces from the requirements by adding new methods.
- Implemented the new methods and ran regression tests to verify the correctness of these methods.
- Developed Unit Tests in C++ and C# to ensure software requirements are met.

Graduate Teaching Assistant & Mentor *Morgantown, WV*

West Virginia University *Aug. 2007 - May. 2009*

- Taught fundamentals of JAVA programming and conducted related programming labs.
- Mentored and guided undergraduate students in the concepts of C, C++, Advanced Mathematics, Physics, Chemistry, and Statistics.

Publications

Conferences

- V. Talreja, M. C. Valenti, N. M. Nasrabadi, **"Multibiometric secure system based on deep learning"**, IEEE Global Conference on Signal and Information Processing (GlobalSIP) 2017.
- V. Talreja, T. Ferrett, M. C. Valenti, A. Ross, **"Biometrics-as-a-service: A framework to promote innovative biometric recognition in the cloud"**, IEEE International Conference on Consumer Electronics (ICCE) 2018.
- V. Talreja*, F. Taherkhani*, M. C. Valenti, N. M. Nasrabadi, **"Using Deep Cross Modal Hashing and Error Correcting Codes for Improving the Efficiency of Attribute Guided Facial Image Retrieval"**, IEEE GlobalSIP 2018. *Co-first authors
- F. Taherkhani, V. Talreja, H. Kazemi, N. M. Nasrabadi, **"Facial Attribute Guided Deep Cross-Modal Hashing for Face Image Retrieval"**, IEEE International Conference of the Biometrics Special Interest Group (BIOSIG) 2018.
- V. Talreja, S. Soleymani, M. C. Valenti, N. M. Nasrabadi, **"Learning to Authenticate with Deep Multibiometric Hashing and Neural Network Decoding"**, IEEE International Conference on Communication (ICC) 2019.
- V. Talreja, M. C. Valenti, N. M. Nasrabadi, **"Zero-Shot Deep Hashing and Neural Network Based Error Correction for Face Template Protection"**, IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS) 2019.
- V. Talreja*, F. Taherkhani*, M. C. Valenti, N. M. Nasrabadi, **"Attribute-Guided Coupled GAN for Cross-Resolution Face Recognition"**, IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS) 2019. *Co-first authors
- F. Taherkhani*, V. Talreja*, J. Dawson, M. C. Valenti, N. M. Nasrabadi, **"PF-cpGAN: Profile to Frontal Coupled GAN for Face Recognition in the Wild"**, IEEE International Joint Conference on Biometrics (IJCB 2020). *Co-first authors
- V. Talreja, T. Koike-Akino, Y. Wang, D.S. Millar, K. Kojima, K. Parsons, **"End-to-End Deep Learning for Phase Noise-Robust Multi-Dimensional Geometric Shaping"**, Accepted in European Conference on Optical Communications (ECOC 2020).

Journals

- V. Talreja, M. C. Valenti, N. M. Nasrabadi, **"Deep Hashing for Secure Multimodal Biometrics"**, IEEE Transactions on Information Forensics and Security (TIFS), vol. 16, pp. 1306-1321, 2021.
- F. Taherkhani*, V. Talreja*, M. C. Valenti, N. M. Nasrabadi, **"Error-Corrected Margin-Based Deep Cross-Modal Hashing for Facial Image Retrieval"**, IEEE Transactions on Biometrics, Behavior, and Identity Science, vol. 2, no. 3, pp. 279-293, July 2020. *Co-first authors

Book Chapter

- V. Talreja, T. Ferrett, M. C. Valenti, and A. Ross, **"A Framework for Secure Selfie-Based Biometric Authentication in the Cloud"**, Selfie Biometrics.

Projects

- **Profile to frontal face recognition in the wild** Implemented a generative adversarial network (GAN) model for profile to frontal face recognition in the wild by projecting the profile faces and frontal faces into a common latent space for verification or retrieval [Sept. 2019-Dec. 2019]
- **Cross-resolution face recognition** Designed and implemented an embedding model for cross-resolution face recognition based on novel attribute-guided deep coupled learning framework using generative adversarial network (GAN). [Jan. 2019-Aug. 2019]
- **Deep virtual facial line-up using soft biometrics** Implemented a fast image retrieval system using deep cross-modal hashing and error correcting codes for quickly searching over a large gallery of faces based solely on a soft-biometric query (facial attributes). [April 2018-Dec. 2019]
- **Deep hashing for secure multimodal biometrics** Used the concepts of error-correcting codes and deep hashing to develop a multimodal biometric security framework for generating a secure multimodal template from each user's multiple biometrics. [March 2016-Dec., 2019]
- **Cloud-based biometric service model for iris and ocular recognition using a smartphone** Implemented a framework for Biometrics-as-a-Service (BaaS) that performs iris/ocular matching operations in the cloud, while using images captured with smartphones. [June-Nov. 2015]

Education

West Virginia University *Morgantown, West Virginia*

Ph.D. in Electrical Engineering (GPA:4.0/4.0) *June, 2015 - May, 2021*

- Advisor: Matthew C. Valenti
- Co-Advisor: Nasser M. Nasrabadi

West Virginia University *Morgantown, West Virginia*

M.S. in Electrical Engineering (GPA:4.0/4.0) *August, 2007 - August, 2010*

- Advisor: Natalia Schmid