Shlok Mishra *shlokm@cs.umd.edu* . *+1301-586-2663* . *USA*

Education

University of Maryland, College Park — College Park, MD, USA
PhD in Computer Science — *Aug 2018 – present*
Advisor : Dr. David Jacobs
Cumulative GPA: 3.85

Graduate Research Assistant: Self-Supervised Learning for Representation Learning and Generative Modelling in Computer Vision

Research Interest: Self-Supervised Learning, Generative modelling, Deep Learning

Relevant Courses: Deep Learning, Computational Linguistics, Advanced Numerical Optimization, Algorithms in Machine Learning:Guarantees and Analyses

Birla Institute of Technology, Mesra — Ranchi, Jharkhand, India
Bachelor of Engineering (BE), Computer Science — *Jun 2012 – Jun 2016*

Publications

Published

[1] Shlok Mishra*, Songwei Ge*, Chun-Liang Li, Simon Kornblith, David Jacobs. "Hyperbolic Contrastive Learning for Visual Representations beyond Objects" *Computer Vision and Pattern Recognition (CVPR) 2023*

[2] Songwei Ge, Shlok Mishra, Chun-Liang Li, Haohan Wang, David Jacobs
"Robust Contrastive Learning Using Negative Samples with Diminished Semantics" *Advances in Neural Information Processing Systems 34*

[3] Shlok Mishra, Anshul Shah, Ankan Bansal, Abhyuday Jagannath, Abhishek Sharma, David Jacobs, Dilip Krishnan
"Object-Cropping for Self-Supervised learning" *Transaction on Machine Learning Research 2022, CoLLAs 2023*

[4] Tianhong Li, Huiwen Chang, Shlok Mishra, Han Zhang, Dina Katabi, Dilip Krishnan. "MAGE: MAsked Generative Encoder to Unify Representation Learning and Image Synthesis." *Computer Vision and Pattern Recognition (CVPR) 2023*

[5] Anshul Shah, Aniket Roy*, Ketul Shah*, Shlok Mishra, David Jacobs, Anoop Cherian, Rama Chellappa. "HaLP: Hallucinating Latent Positives for Skeleton-based Self-Supervised Learning of Actions." *Computer Vision and Pattern Recognition (CVPR) 2023*

[6] Shlok Mishra, Kuntal Sengupta, Max Horowitz-Gelb, Vincent Chu, Sofien Bouaziz, David Jacobs
"Improved Presentation Attack Detection Using Image Decomposition" *International Joint Conference on Biometrics (IJCB 2022) ORAL*

[7] Shlok Mishra, Anshul Shah, Ankan Bansal, Jonghyun Choi, Abhinav Shrivastava, Abhishek Sharma, David Jacobs
"Learning Visual Representations for Transfer Learning by Suppressing Texture" *British Machine Vision Conference (BMVC) 2022*

[8] Anshul Shah, Shlok Mishra, Ankan Bansal, Jun-Cheng Chen, Rama Chellappa, Abhinav Shrivastava
"Pose and Joint-Aware Action Recognition' *Winter Conference on Applications of Computer Vision WACV 2022*

[9] Janit Anjaria, Hong Wei, Shlok Mishra and Hanan Samet
"TrajDistLearn: Learning To Compute Distance Between Trajectories" *Proceedings of the 14th ACM SIGSPATIAL*

[10] Shlok Kumar Mishra, Pranav kumar, and Sujan Kumar Saha, "A Support Vector Machine Based System for Technical Question Classification," in *Third International Conference, MIKE 2015*,

Submissions

[11] Shlok Mishra*, Joshua David Robinson*, Huiwen Chang, David Jacobs, Aaron Maschinot, Dilip Krishnan. (Under submission TMLR.
"CAN: A Simple Contrastive Masked Autoencoder Framework For Scaling To Uncurated Data."

[12] Shlok Mishra, Hossam Isack , Sergio Orts-Escolano, Luca Prasso, Rohit Pandey, Franziska Mueller, Abhimitra Meka, Jonathan Taylor, Dilip Krishnan , David Jacobs, Christian Haene. "Generating Annotated Datasets via Keypoints Conditioned StyleGAN. "

[13] Anshul Shah, Shlok Mishra, Anoop Cherian, Rama Chellapa. "Max-Margin Video Contrastive Learning "

Arxiv

[14] Shlok Kumar Mishra, Pranav Goel, Abhishek Sharma, Abhyuday Jagannath, David Jacobs, Hal Daume III
"Question Generation for Longer Sequences" https://arxiv.org/pdf/2004.05109.pdf

Professional Experience

Google Research — *May '23 - Present*
Research Intern — Seattle WA

- Mentor: Prof. Ira Kemelmacher-Shlizerman and Tyler Zhu.
- Working on TryOn Diffusion.
- Improving TryOn diffusion by adding more controls to the model and avoiding overfitting on the TryOn models.

Google Research — *Aug '21 - May23*
Research Intern — Cambridge MA

- Mentor: Dr Dilip Krishnan.
- Working on Self-Supervised learning for uncurated data.
- We built two SSL methods which combine Generative and Discriminative features and improve both image generation and image recognition.
- **Product Impact:** The embeddings from CAN is being explored for products involving segmentation, object detection and adversarial perturbations. Two groups in Google Lens team are looking at the embeddings with promising initial results where we reduced the error rate by 13%.

Google Augmented Reality *May '21 - Aug '21*
Research Intern Mountain View California

- Mentor: Dr. Christian Haene, Dr. Hossam Isack
- Working on using GAN's for domain adaptation.
- We used inference via optimization to control the output of geneartor.
- We also proposed a new architecture to control of Style-GAN using additional keypoint information.

Google Research *May '20 - Jan '21*
Research Intern Mountain View California

- Mentor: Dr. Kuntal Sengupta, Dr. Vincent Chu and Dr. Sofien Bouaziz
- Working on face anti-spoof detection by using Intrinsic properties of image.
- We showed that albedo is a better signal to detect spoofs as compared to depth information.
- The internship work got accepted as ORAL to one of the top-tier conferences in Vision and Bio-metrics.

Product Impact: A part of the idea from the internship work was used in the Pixel7 Face Unlock and was deployed in production.

Flipkart Internet Pvt.Ltd. Bangalore, India
Software Development Engineer *Dec '16 - Aug '18*

- Used various machine learning and deep learning models for predicting zipcodes from user address with the help of LSTM, BILSTM, SVM, multinomial logistic regression, ridge regression, LDA and LSI.
- Vehicle Routing Problem: Implemented with help of java spring boot framework and optaplanner an end to end system for Route Planner. Also with the help of Google optimization research tools added new features of slotted delivery and load balancing.
- Dynamic Clustering: Used various clustering algorithms such as K-means, DBScan for dynamic geo-clustering of customer demand and boosting wishmaster productivity.

Ongoing Projects

DreamTryOn: Controlling TryOn diffusion using text *May '23 - Present*

- **Shlok Mishra**, Tyler Zhu, Chris Lee, Varsha Ramakrishnan, Ira Kemelmacher-Shlizerman
- We are working on adding text as a feature to Tryon diffusion. This enables users to control the TryOn output by changing the Apparel's colour, length, and size, along with the background and other modes, using additional text inputs.

Masked Autoencoders for Multi-Object datasets *March '23 - Present*

- **Shlok Mishra**, Anshul Shah, Songwei Ge, David Jacobs
- We are currently developing a masked autoencoder tailored for scenarios involving multi-object datasets. Our approach involves incorporating object-aware cropping and utilizing hyperbolic geometry to enhance feature encoding within the masked autoencoder framework, particularly when dealing with complex real-world multi-object datasets.

TryOn with ControlNet *March '23 - Present*

- Koutila PNVR, **Shlok Mishra**, David Jacobs
- We are working on adding ControlNet-based controls for the Virtual-TryOn. This involves changing pose, background, style etc tailored for TryOn.

Selected Achievements

- Selected for Doctoral Consortium in International Conference on Computer Vision (ICCV) 2023.
- Selected for Doctoral Consortium in British Machine Vision Conference (BMVC) 2023.
- Travel grant award from University of Maryland for attending ICCV.
- Invited to give talk in PIRC(PhD internal Research Conference) Google.

Service

Serving as reviewer for major computer vision conferences CVPR[20,21,22,23], Neurips([20,21,22,23], ICLR([21,22,23,24], AAAI([21,22,23], ECCV[20,22], ICCV([21,23], ICML([21,22,23], WACV[21,22,23], BMVC[22,23]), NLP conferences (ACL([2020,2021,2022], EMNLP([2020,2021,2022]) and journals (CVIU, TMLR, IJCV, TIP, IEEE-TCSV, IEEE-IFS etc).

Teaching and Mentoring Experience

- Teaching Assistant for CMSC828L Deep Learning Spring 2021 by David Jacobs.
- Teaching Assistant for CMSC 420, Data Structures Fall 2018 by Hanan Samet.
- Teaching Assistant for CMSC 420, Computer Vision Spring 2019 by Cornelia Fermüller.
- Mentored high school students in Summer 2019 and helped in implementing LeafSnap project.

Skills

Computer Vision, Machine Learning, Natural language Processing, Deep Learning, Matlab, Java, Pytorch, Tensorflow, JAX, Python.