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# Mehrab Tanjim

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## SUMMARY

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**Research & Industry Experience:** 5+ years of experience on building state-of-the-art ML algorithms with scalable and data-driven techniques.

**Programming Languages:** Python (Proficient), Java, Scala, Swift, Dart, Bash Script.

**Libraries/Services:** PyTorch/TensorFlow (Proficient), Spark, AWS, GCP, BigQuery, Hadoop, Keras, Scikit-learn.

## EDUCATION

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**PhD in CS – University of California, San Diego (UCSD)** *Sep. 2018 – Present*

- Research Focus and Interests: Debiasing Generative Networks, Recommender Systems, Multi-Modal Learning, Federated Learning, Scalable Machine Learning Algorithm

**MS in CS – University of California, San Diego (UCSD)** *Sep. 2018 – March 2021*

- Coursework: Neural Networks/Pattern Recognition, Deep Learning for Sequences, Deep Unsupervised Learning, Computer Vision, Convex Optimization

**BS in CS – Bangladesh University of Engineering and Technology (BUET)** *Apr. 2012 – Feb. 2017*

- Coursework: Database, Operating System, Computer Networks, Software Development, Artificial Intelligence, Simulation and Modelling, Machine Learning, Pattern Recognition

## EXPERIENCE

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**The Home Depot** *Atlanta, GA, USA*  
*Data Science Intern* *Sep 2022 – Present*

- **Subsequent Purchase Prediction:** Improved the current model for subsequent purchase prediction by 1.5% by using an autoregressive model and sampled embedding loss which can further be used to generate synthetic datapoints, denoise training data and recommend new items using metadata embedding.

**Adobe, Inc.** *San Jose, CA, USA*  
*Research Scientist Intern* *June 2022 – Sep. 2022*

- **Scalable Video Fingerprinting:** Built a scalable, end-to-end pipeline using FAISS library that can trace a manipulated video in less than a second from a trusted database with millions of corpuses.

**Adobe, Inc.** *San Jose, CA, USA*  
*Computer Vision, Imaging & Video Intern* *June 2021 – Sep. 2021*

- **Debiasing Image-to-Image Translation:** Pretrained StyleGAN2 based networks show various biases in different image-to-image translation tasks (such as super-resolution, sketch-to-image, etc.). Mitigated this bias issue using contrastive learning and uniform sampling of minority attributes.

**Adobe, Inc.** *San Jose, CA, USA*  
*Data Science Intern* *June 2020 – Sep. 2020*

- **Bias Detection and Mitigation:** Identified the bias issue in the image results for search queries, proposed a way to audit. In addition, proposed an attribute-controlled style-based generator to create new content to mitigate such biases and enrich user experience [accepted in WACV'22].

**Etsy, Inc.** *New York, NY, USA*  
*Data Science Intern* *June 2019 – Sep. 2019*

- **Intent Detection for Recommendation:** Captured users' hidden intents (i.e. explore, purchase) from their interactions by designing a hierarchical Transformer model. It first discovers the intent and then pays attention to it for next item prediction (improved recommendations by 5%) [Pdf].

## University of California, San Diego

Graduate Student Researcher

San Diego, CA, USA

Sep. 2018 – Present

- **Dynamic Convolution:** Built an adaptive convolution network which changes its kernel dynamically depending on the current input (~10% better recommendations, accepted in **CIKM 2020**) [Pdf] [Code].
- **Visual Commonsense Reasoning:** Enforced reasoning for ans. prediction on **VCR** by building a differentiable module which jointly trains ans. and rationale prediction (performed better in leaderboard) [Pdf] [Code].
- **CNN for Sequences:** Improved the scalability of sequential recommender methods by modelling a scalable depth-wise separable 1D convolution neural network (requires ~30% less memory) [Pdf].
- **Rationale Generation:** Tasked state-of-the-art Visual Question Answering model (ViLBERT) with rationale generation (using GPT-2) to interpret/justify answer prediction. It improves accuracy by 1.5% as well [Pdf].

Graduate Teaching Assistant

Fall'19,'20, Winter'20,'22, Spring'20,'21

- **Neural Networks/Pattern Recognition:** Designed and assessed assignments on DNN, CNN (Image Segmentations), and RNN/LSTM (Image Captioning). Responsible for mentoring deep learning projects.

## BUET

Research Assistant

Dhaka, Bangladesh

Oct. 2017 – Aug. 2018

- **Scalable Machine Learning:** Improved the scalability of PCA for large datasets (up to 83× better performance) using sketching technique [Pdf] [Code].
- **Distributed Algorithm Design/Federated Learning:** Extended both Spark and Hadoop for creating geo-distributed clusters in AWS and designed geo-distributed algorithms for higher dimension data [Code].

## SELECTED PUBLICATIONS

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- **Md Mehrab Tanjim**, K.K. Singh, K. Kafle, R. Sinha, G.W. Cottrell, “Debiasing Image-to-Image Translation Models”, in the proceedings of *British Machine Vision Conference (BMVC)*, 2022.
- **Md Mehrab Tanjim**, K.K. Singh, K. Kafle, R. Sinha, G.W. Cottrell, “Discovering and Mitigating Biases in CLIP-based Text-to-Image Generation”, in the workshop of *Responsible Computer Vision at ECCV*, 2022 [Pdf].
- **Md Mehrab Tanjim**, R. Sinha, K.K. Singh, S. Mahadevan, D. Arbour, M. Sinha, G.W. Cottrell, “Generating and Controlling Diversity in Image Search”, in the proceedings of *Winter Conference on Applications of Computer Vision (WACV)*, 2022 [Pdf].
- T.M. Tariq Adnan, **Md Mehrab Tanjim** and Muhammad Abdullah Adnan, “Fast, Scalable and Geo-Distributed PCA for Big Data Analytics”, *Elsevier Journal on Information Systems*, 2021 [Pdf] [Code].
- **Md Mehrab Tanjim**, C. Su, E. Benjamin, D. Hu, L. Hong and J. McAuley, “Attentive Sequential Models of Latent Intent for Next Item Recommendation”, in the proceedings of the *Web Conference (WWW)*, 2020 [Pdf].
- **Md Mehrab Tanjim**, Hammad A. Ayyubi, Garrison W. Cottrell, “DynamicRec: A Dynamic Convolutional Network for Next Item Recommendation”, in the proceedings of the *Conference on Information and Knowledge Management (CIKM)*, 2020 [Pdf] [Code].
- **Md Mehrab Tanjim** and Muhammad Abdullah Adnan, “sSketch: A Scalable Sketching Technique for PCA in the Cloud”, in the proceedings of *Web Search and Data Mining (WSDM)*, 2018 [Pdf] [Code].

## REFERENCE

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- **Dr. Garrison W. Cottrell**  
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Email: gary@eng.ucsd.edu  
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Homepage: <https://cseweb.ucsd.edu/~gary>