HAMMAD A. AYYUBI

ha2578@columbia.edu

EDUCATION

Columbia University New York, NY
PhD in Computer Science, GPA: 3.97/4.0 *Sep. 2020 - Present*
Advisor: Prof. Shih-Fu Chang

University of California, San Diego San Diego, CA
Master of Science in Computer Science, GPA: 4.0/4.0 *Sep. 2018 - June 2020*
Advisor: Prof. Gary Cottrell, Prof. Manmohan Chandraker

Indian Institute of Technology, Banaras Hindu University Varanasi, India
Bachelor of Technology in Electrical Engineering, GPA: 8.7/10 *May 2012 - May 2016*

WORK EXPERIENCE

Google New York, NY
Student Researcher *June 2023 - Nov. 2023*
Mentor: Dr. Tianqi Liu

Microsoft Research Redmond, WA
Research Intern *June 2022 - Aug. 2022*
Mentor: Dr. Oriana Riva and Dr. Jianwei Yang

SRI International Princeton, NJ
Machine Learning Research Intern *June 2019 - Sep. 2019*
Mentor: Dr. Yi Yao and Dr. Ajay Divakaran

Soroco India Pvt. Ltd. Bangalore, India
Software Engineer - Deep Learning & Computer Vision *Feb 2018 – Aug 2018*

Citicorp Services India Pvt. Ltd. Pune, India
Software Developer *July 2016 – Jan. 2018*

PUBLICATIONS

1. **Hammad A. Ayyubi**, Rahul Lokesh, Alireza Zareian, Bo Wu, and Shih-Fu Chang. Learning from Children: Improving Image-Caption Pretraining via Curriculum. *ACL Findings*, 2023

2. **Hammad A. Ayyubi**, Tianqi Liu, Arsha Nagrani, Xudong Lin, Mingda Zhang, Anurag Arnab, Feng Han, Yukun Zhu, and Jialu Liu. Video Summarization: Towards Entity-Aware Captions. *In Submission CVPR*, 2024

3. **Hammad A. Ayyubi**, Christopher Thomas, Lovish Chum, Rahul Lokesh, Yulei Niu, Xudong Lin, Long Chen, Jaywon Koo, Sounak Ray, and Shih-Fu Chang. Beyond Grounding: Extracting Event Hierarchies from Multimodal Content. *In Submission AAAI*, 2024

4. Haoxuan You1, Rui Sun, Zhecan Wang, Long Chen, Gengyu Wang, **Hammad A. Ayyubi**, Kai-Wei Chang, and Shih-Fu Chang. Idealgpt: Iteratively Decomposing Vision and Language Reasoning via Large Language Models. *EMNLP Findings*, 2023

5. Long Chen, Yulei Niu, Brian Chen, Xudong Lin, Guangxing Han, Christopher Thomas, **Hammad Ayyubi**, Heng Ji, and Shih-Fu Chang. Weakly-supervised Temporal Article Grounding. *EMNLP*, 2022

6. Haoxuan You, Zhecan Wang, Alireza Zareian, Liunian Harold Li, **Hammad A. Ayyubi**, Kai-Wei Chang, and Shih-Fu Chang. Learning Knowledge-aware Multimodal Representation for Visual Commonsense Reasoning. 2022

7. **Hammad A. Ayyubi***, Md. Mehrab Tanjim*, Julian McAuley, and Garrison W. Cottrell. Generating rationale in Visual Question Answering. *arXiv:2004.02032 2019*, 2020

8. **Hammad A. Ayyubi**. Leveraging Human Reasoning to Understand and Improve Visual Question Answering. *MS Thesis, UC San Diego*, 2020

9. **Hammad A. Ayyubi**, Yi Yao, and Ajay Divakaran. Progressive growing of Neural Ordinary Differential Equations. *ICLR Workshop on Integration of Neural Networks and Differential Equations*, 2020

10. Md. Mehrab Tanjim, **Hammad A. Ayyubi**, and Garrison W. Cottrell. Dynamicrec: A Dynamic Convolutional Network for Next Item Recommendation. *Proceedings of the 29th ACM International Conference on Information and Knowledge Management*, 2020

ACADEMIC RSEARCH & PROJECTS

Action Reasoning via State Changes in Videos   June. 2022 - May 2023
Advisor: Dr. Oriana Riva and Dr. Jianwei Yang
- Proposed a new task to predict actions and state changing objects from start state and end state frames in videos. Also, proposed counterfactual probe tasks to test action reasoning.
- Proposed a transformer based slot attention model to detect state changing object and predict action.

Visual Commonsense Reasoning   Jan. - June 2019
Advisor: Prof. David Kriegman
- Task: Answer a question, given an image, and also provide a rationale.
- Proposed novel end to end joint learning of answer and rationale prediction by using softmax, gumbel-softmax and reinforcement learning approaches to tackle non-differentiability.
- Implemented in PyTorch; used Docker and Kubernetes cluster for running multi-GPU tasks.

Generative Adversarial Network (GANs) Inspection   Apr. - June 2019
- Inspected latent manifold learned by DCGAN and PgGAN through various interpolation, extrapolation and vector arithmetics techniques.
- Proved that semantic relations are learned in the manifold.

Optical Character Recognition using Deep Learning   Feb. - June 2018
Advisor: Dr. Mohsen Malmir
- Researched various CNN models - U-Net, DeepLab v3+ - to segment text from images and PDFs.
- Used novel multi-task learning approach to instance segment, recognize and detect words.
- Achieved a recall of 97.8% on train set and 95% recall on test set.

Knowledge Distillation for Semantic Segmentation   July - Aug. 2018
Advisor: Dr. Mohsen Malmir
- Compressed U-Net into a much smaller model without decline in accuracy.
- Reduced model parameters by 84%, improved speed by 20% and reduced memory usage by 21%.

SKILLS

	Expert	Intermediate	Familiar
Programming Languages	Python, Java, Matlab	C, C++, Bash, MySQL	Clojure
Libraries & Framework	PyTorch, Docker, Kubernetes, OpenCV, Numpy, Spring	Keras, Tensorflow, Hadoop	BOOST

AWARDS & HONORS

2019	Runner's Up Award	Computer Vision Poster Competition, SRI Princeton
2019	People's Choice Award	Computer Vision Poster Competition, SRI Princeton
2012	JN Tata Scholar	JN Tata Endowmnet for the higher education of Indians
2011	Top 0.1%ile	Computer Science, Central Board of Secondary Education

PROFESSIONAL SERVICES

2023	Reviewer	ACL
2022	Reviewer	EMNLP
2021	Reviewer	EMNLP
2021	Program Committee	Visually Grounded Interaction and Language (ViGIL), NAACL

RELEVANT COURSEWORK

Graduate	**Undergraduate**	**Online**
Computational aspects of Robotics	Algorithms & Data Structures	DeepLearning.ai
Computer Vision	Artificial Intelligence & Expert Systems	Machine Learning
Deep Learning for sequence data	Calculus	
AI - Probablistic Graphical Models	Linear Algebra	
Statistical Learning		
Statistical Natural Language Processing		

TEACHING ASSISTANT

2022	COMS-4995	Deep Learning for Computer Vision	Computer Science Dept., Columbia Uni.
2020	CSE-291D	Advanced NLP	Computer Science Dept., UC San Diego
2020	CSE-250B	Introduction to AI: A Statistical Approach	Computer Science Dept., UC San Diego
2019	CSE-250A	AI - Probablistic Graphical Models	Computer Science Dept., UC San Diego
2016	CS0 101	Computer Programming	Computer Science Dept., IIT BHU