Ayush Chopra

Graduate Research Assistant
Massachusetts Institute of Technology

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Education

Massachusetts Institute of Technology, Cambridge, MA 2022 - 2025 (Expected)
Ph.D in Media Arts and Sciences (MIT Media Lab)
Advisor: Ramesh Raskar

University of Oxford, Oxford, UK Sept 2022 - Oct 2022
Visiting PhD Researcher
Host: Ani Calinescu (Dept of Computer Science and Institute for New Economic Thinking)

Massachusetts Institute of Technology, Cambridge, MA 2020 - 2022
S.M. in Media Arts and Sciences (MIT Media Lab)
Thesis: Decision Making for Populations; GPA: 5.0/5.0
Committee: Ramesh Raskar (Prof, MIT); Anil Kamath (Fellow/VP, Adobe); Jayashree Cramer (Prof, Harvard)

Delhi Technological University, Delhi, India 2014 - 2018
B.Tech in Computer Science and Engineering
CGPA: 9.23/10.0

Work Experience

MIT Media Lab
Graduate Research Assistant, Camera Culture September 2020 - Present

- Interdisciplinary research bridging agent-based models with artificial intelligence and machine learning. Outline of my research agenda and current progress is here.
- Master thesis research published at The BMJ, ECCV (x2), CVPR and ICML Workshop (**Best Paper Award**). Work featured in Reuters, Weather Channel etc.

Media and Data Science Research Lab, Adobe Inc
Senior Member of Technical Staff June 2019 - August 2020
Member of Technical Staff August 2018 - May 2019
Intern June 2017 - April 2018

- Research in machine learning with applications in computer vision and large-scale data mining.
- Worked closely with engineering, product, evangelism and marketing.
- Prototyped new concepts, published papers, delivered talks and shipped product.
- Delivered innovation talks at **Adobe Marketing Summit 2020** and **Adobe Tech Summit 2019**.
- Awarded the Adobe **Outstanding Young Engineer Award** (youngest recipient at Adobe)
- Work covered by various media outlets including Venture Beat, AdWeek, WWD.

Mythical Labs Inc.
Lead, Machine Learning March 2017 - March 2021

- Building RemoteHQ to help engineering and sales teams adapt to the new decentralized world.
- RemoteHQ voted #1 product on Product Hunt launch and raised a seed round.

Google Summer of Code
Mentor April 2018 - August 2018

- Supervised computer vision and data science projects for OpenFoodFacts (OFF).
- Shipped text detection and document parsing services for **100,000** users on the OFF mobile-app.

Patents

25 patents in *machine learning, computer vision and deep learning* filed across **4** countries.
Select Patent IDs: *US* 16/417,373; *US* 16/564,831; *US* 16/534,856; *US* 16/659,147; *US* 16/673,574; *US* 16/679,165; *US* 16/793,551; *US* 16/865,572; *US* 16/906,954; *GB* 2013277.5; *AU* 2020220153; *CN* 202010813038.6

Publications (selected)

Arnau Quera-bofarull, **Ayush Chopra**, Joseph Aylett-Bullock, Ani Calinescu, Ramesh Raskar, Mike Wooldridge.

"Don't Simulate Twice: One-shot sensitivity analyses via automatic differentiation", *Accepted at Adaptive Agents and Multi-agent Systems (AAMAS 2023).*(pdf, Full Paper)

Ayush Chopra, Surya Sahu, Abhishek Singh, Praneeth Vepakomma, Vivek Sharma, Ramesh Raskar. "Adaptive Split Learning", *Under review preprint.* (pdf)

Ayush Chopra*, Alex Rodriguez*, Jayakumar Subramanian, Balaji K, Aditya Prakash, Ramesh Raskar. "Differentiable Agent-based Epidemiology", Accepted at Adaptive Agents and Multi-agent Systems (AAMAS 2023) and ICML Workshop on AI for Agent-based Models (ICML-W 2022). (**Best Paper Award**, Long Oral, pdf)

Ayush Chopra, Abhinav Java, Abhishek Singh, Vivek Sharma, Ramesh Raskar. "Learning to Censor by Noisy Sampling", *Accepted at European Conference on Computer Vision **(ECCV 2022)***. (Poster, pdf)

Abhishek Singh, Ethan Garza, **Ayush Chopra**, Praneeth Vepakomma, Vivek Sharma, Ramesh Raskar. "Decouple-and-Sample: Protecting Sensitive Information in Task-agnostic Data Release. *Accepted at European Conference on Computer Vision **(ECCV 2022)***. (Poster, pdf)

Ayush Chopra, Esma Gel, Jayakumar Subramanian, Ramesh Raskar, Tom Kingsley et al. "DeepABM: Scalable and Efficient Agent-based Modeling via Invariant Message Passing". *Accepted at Winter Simulation Conference* **(WSC 2021)**. (Oral, pdf)

Santiago Romero, **Ayush Chopra**, Alex Ryu, Ramesh Raskar, Tom Kingsley et al. "Public health impact of delaying second dose of BNT162b2 or mRNA-1273 covid-19 vaccine: simulation agent based modeling study". *Accepted at British Medical Journal* **(BMJ 2021)**. (Journal, pdf)

Ayush Chopra, Rishabh Jain, Mayur Hemani, Balaji Krishnamurthy."ZFlow:Gated Appearance Flow-based Virtual Try-on". *Accepted at International Conference on Computer Vision* **(ICCV 2021)**.(Poster, pdf)

Abhishek Singh, **Ayush Chopra**, Vivek Sharma, Ramesh Raskar. "DISCO: Dynamic and Invariant Sensitive Channel Obfuscation of Deep Neural Networks". *Accepted at IEEE Computer Vision and Pattern Recognition* **(CVPR 2021)**. (Poster, pdf)

Siddharth Gairola, **Ayush Chopra***, Mayur Hemani*, Balaji Krishnamurthy. "SimPropNet: Improved Similarity Propagation for Few-shot Image Segmentation." *Accepted at International Joint Conference on Artificial Intelligence* **(IJCAI 2020)**. (Poster, pdf)

Ayush Chopra*, Surgan Jandial*, Mausoom Sarkar, Balaji Krishnamurthy, Vineet Balasubramanian. "Retrospective Loss: Looking Back to Improve Training of Deep Neural Networks." *Accepted at Knowledge Discovery and Data Mining* **(KDD 2020)**. (Oral, pdf)

Anubha Kabra, **Ayush Chopra**, Nikaash Puri, Pinkesh Badjatiya, Balaji Krishnamurthy. "MixBoost: Synthetic Oversampling using Boosted Mixup for Handling Extreme Imbalance." *Accepted at 20th International Conference on Data Mining* **(ICDM 2020)**. (Poster, pdf)

Surgan Jandial*, **Ayush Chopra***, Kumar Ayush*, Mayur Hemani, Balaji Krishnamurthy. "SieveNet: A Unified Framework for Robust Image-Based Virtual Try-on." *Accepted at IEEE Winter Conference on Applications of Computer Vision* **(WACV 2020)**. (Oral, pdf, demo)

Anirudh Singhal*, **Ayush Chopra***, Kumar Ayush*, Utkarsh Patel, Balaji Krishnamurthy. "Towards a Unified Framework for Visual Compatibility Prediction." *Accepted at IEEE Winter Conference on Applications of Computer Vision* **(WACV 2020)**. (Oral, pdf)

Ayush Chopra*, Abhishek Sinha*, Hiresh Gupta*, Mausoom Sarkar, Balaji Krishnamurthy. "Powering Robust Fashion Retrieval With Information Rich Feature Embeddings." *Accepted at IEEE Computer Vision and Pattern Recognition Workshops* **(CVPR-W 2019)**. (Oral, **Best Paper Award**, pdf, media, slides, poster)

Kushagra Mahajan*, Tarasha Khurana*, **Ayush Chopra***, Isha Gupta, Chetan Arora. "Pose Aware Fine-Grained Visual Classification." *Accepted at International Conference on Image Processing* **(ICIP 2018)**. (Poster, pdf)

Awards

Best Paper Award - ICML 2022 Workshop
Won the best paper award at AI for Agent-based Models workshop at ICML 2022.

Adobe Data Science Research Award 2021 - MIT Media Lab
Awarded for Master thesis research at the MIT Media Lab. Resulting work published at top-tier journals and covered by international media (Reuters, Weather Channel) outlets.

Outstanding Young Engineer Award - Adobe
Youngest recipient of the award at Adobe, in my first full year of employment. One of three annual winners worldwide.

Best Paper Award - CVPR 2019 Workshop
Won the best paper award at (FFSS-USAD) held at CVPR 2019 [Details].

#1 Product of the Day - Product Hunt
RemoteHQ voted the best product on launch day (24 October 2019). [Details]

Talks

GradABM: Scalable, Differentiable Agent-based Modeling [Slides] October 2022
Institute for New Economic Thinking, University of Oxford, Oxford, UK

Adobe Summit Sneak: Project Clothes Swap [Video] March 2020
Adobe Marketing Summit, Vegas, Nevada

Powering Robust Fashion Retrieval With Information Rich Feature Embeddings [Slides] July 2019
Workshop on Fashion and Subjective Search (FFSS), CVPR, Long Beach, CA

Panoptic Shopping: The Future of Visual Search [Slides] February 2019
Adobe Tech Summit, San Francisco, CA

A Practitioner's Introduction to Machine Learning [Code, Slides] October 2017 - July 2018
Coding Blocks, India

Positions of Responsibility

Reviewer & **Program Committee: CVPR, ICCV, ICLR, IJCAI, WACV, TPAMI**
Reviewer and organizer for top-tier conferences in Machine Learning, Computer Vision and AI.

Interviewer & **Manager: Adobe**
Interviewed and supervised over ***30*** candidates for full-time and intern positions across product and research teams