

# ACM Goa Professional Chapter presents

Talk by Ayush Chopra,  
MIT Media Lab

## Learning to Simulate Millions of Agents

4<sup>th</sup> August 2023

6 PM to 7PM (IST)

(Online) Meeting Link:  
<https://shorturl.at/bceMY>

Registration Link for ACM Goa Event Updates:  
<https://forms.gle/hai1vbuXSUMHMKa96>

### Abstract:

Humanity is facing grand challenges at unprecedented rates, nearly everywhere, and at all levels. Many of these challenges: pandemics, financial market instability and disinformation in social media, are emergent phenomena that result from complex interactions between a large number of strategic agents. Agent-based modeling (ABM) helps simulate such complex systems by modeling the actions and interactions of individual agents contained within. Their utility depends upon the ability to recreate populations with great detail, efficiently calibrate to real-world data and analyze sensitivity of results. However, ABMs are conventionally slow to execute, difficult to scale to large populations and tough to calibrate. My research aims to alleviate these challenges by fundamentally rethinking ABMs in this era of AI. First, we introduce algorithmic advancements that allow us to rapidly simulate and analyze interventions on million-scale real populations. Second, we present from case studies that evaluate prospective immunization policies and analyze impact of retrospective decisions of the COVID-19 pandemic. Finally, we introduce AgentTorch, a platform to simulate and analyze million-scale populations: inside the body, around us and beyond!



### About the Speaker

Ayush is a PhD student at the MIT Media Lab (Camera Culture Group) supervised by Prof Ramesh Raskar. His research lies at the intersection of agent-based modeling, distributed machine learning and privacy - with the goal of harnessing collective intelligence to guide population-level decision making. His research has resulted in papers in top-tier AI conferences and interdisciplinary journals (BMJ, AAMAS, KDD, CVPR, ECCV, ICCV, INFORMS, IJCAI etc) and best paper awards at CVPR and ICML workshops. His projects have resulted in 25 patents and have been featured by Reuters, Weather Channel, Venture Beat etc. Outside MIT, Ayush is affiliated with the Mayo Department of Epidemiology and has spent time at JP Morgan AI Research. Prior to MIT, Ayush was a researcher at Adobe where he focused on advancing in-browser computer vision and machine learning and also received the Adobe Outstanding Young Engineer Award 2020. Ayush co-organised the ICLR 2021 Workshop on Distributed and Private Machine Learning; and the ICLR 2023 Workshop on AI for Agent-based Models. Ayush received his SM from MIT in 2022 and BE from Delhi College of Engineering, India in 2018.



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