

PERSONAL STATEMENT

I am currently pursuing a Ph.D. in Computer Science at the University of Massachusetts Amherst, where my research lies at the intersection of Differential Privacy (DP), data visualization, and human-computer interaction (HCI). Specifically, I am interested in designing and building visual data exploration platforms and how data visualization and HCI can be utilized to increase the fairness and trust of the DP algorithms. I am also interested in the broader field of learning and interaction, where multiple autonomous, rational, and intelligent agents interact with humans or each other to pursue some goals in a shared environment.

In my current research, I primarily focus on ensuring fairness in DP algorithms across diverse demographic groups. The fairness problem arises because the noise may disproportionately affect minority populations, leading to biased or suboptimal outcomes. I am exploring how we can optimize privacy parameters to ensure that DP applications uniformly maintain decision accuracy across all demographic groups without compromising privacy. Prior to that, I conducted interviews with DP practitioners to identify real-world challenges in deploying privacy-preserving systems. This work led to a publication in the IEEE Transactions on Visualization and Computer Graphics (TVCG) [↗](#).

Throughout my graduate studies, I have developed strong skills in ML, NLP, and privacy-preserving technologies. My work has involved evaluating and enhancing large language models (LLMs) using strategies like in-context learning [↗](#), fine-tuning and advanced retrieval techniques to improve model adaptability and personalization [↗](#). I have also assessed the privacy risks associated with machine learning models and implemented defense mechanisms to protect sensitive data [↗](#). These experiences have equipped me with proficiency in Python, C++, and libraries related to machine learning and differential privacy.

During my undergraduate studies at the University of Dhaka, I focused on applying optimization algorithms to solve Continuous Distributed Constraint Optimization Problems (C-DCOPs) in large-scale multi-agent systems. I applied local search and particle swarm optimization techniques to address these complex challenges. This work resulted in publications, including a paper in the Engineering Applications of Artificial Intelligence journal [↗](#) and another presented at the 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS) [↗](#).

I am seeking internship opportunities this summer that broadly focus on research and data science. My work on large language models, differential privacy, and multi-agent systems aligns well with positions in AI, ML, Privacy, and data science internships. I have experience evaluating and enhancing large language models, designing algorithms for privacy-preserving data analysis, and applying optimization techniques in multi-agent systems. Collaborating with interdisciplinary teams has sharpened my ability to work effectively in diverse environments. I am passionate about leveraging AI to accelerate scientific discovery and eager to contribute my skills to innovative projects in the industry.