

Aditi Golder
(Applicant for Ph.D. Program at the Columbia University
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Statement of Purpose

My fervor for research deepened during a seminar on "How to become a Researcher," where I volunteered, unaware of the profound impact it would have on my academic journey. Listening to erudite scholars during this seminar served as a catalyst, rekindling a dormant spark of inspiration within me. My path continued to unfold as I enrolled in the "Artificial Intelligence" course, a pivotal juncture that drew me closer to the enthralling realm of cutting-edge technology and its multifaceted applications. During this coursework, I did a project blending machine learning algorithms to solve a real-life problem, and I recognized the profound significance of research and its transformative potential in shaping the future. The dream of becoming a researcher has been a constant beacon, with my academic achievements, research collaborations, and hands-on experience driving me toward a Ph.D. in Computer Science, specifically in the challenging area of machine learning applications.

During my baccalaureate years, I acquired diverse concepts about system design and analysis, data structure, computer algorithms, software security, network security, data mining, and distinct programming languages. My fascination with healthcare research ignited at this phase. In my final semester, I devised ensemble machine-learning approaches to analyze complex medical data, predicting heart disease and mortality from heart failure, and the results demonstrated the accuracy of predictions, with Artificial Neural Networks achieving a remarkable 91.52% accuracy in predicting cardiac illnesses and a bagging ensemble delivering 90% accuracy in heart failure prediction. As a neophyte, many challenges came in doing this research, such as medical domain knowledge, methodology of performing ensemble machine learning models, and data scarcity. To overcome these, I sought knowledge from cardiologists, read different articles on cardiac diseases, and performed several tuning fits for the hyperparameter of the models, which helped me to carry out my work. Subsequently, I embarked on a thesis exploring the career intentions of female students in programming, where I unveiled the Exception Confirmation Model and Entrepreneurship Event Theory, demonstrating the influence of seven factors on the continuity intentions of female students pursuing programming careers. My undergraduate years instilled in me the discipline of long hours in the laboratory, a habit I have carried forward.

I continued to expand my knowledge and expertise and joined Jahangirnagar University, one of Bangladesh's premier institutions for graduate studies, renowned for its rigorous selection process. I proudly achieved the 3rd rank out of approximately 1,200 students on the admission test. Throughout my graduate studies, I maintained a delicate equilibrium between comprehensive study and profound understanding of the subject matter, an approach that yielded rich dividends, evidenced by my GPA of 3.63 and my 3rd rank among nearly 128 students in my batch. Expanding my research horizons, I collaborated to conduct a comprehensive survey on Hate Speech Detection, addressing the scarcity of quality data in the Bengali language. Additionally, I worked on Emotion Detection from Bengali texts. In this research, I proposed two novel models, the CRNN (Convolutional Recurrent Neural Network) hybrid model, and the AdaBoost-Bidirectional Encoder Representations from Transformers (BERT) ensemble model, both outperforming existing models in terms of accuracy, precision, and recall. An empirical study involving six baseline models and five feature engineering techniques further underscored the significance of my research. Currently, I am working on interpretable machine-learning models, trying to use them in the healthcare sector.

In my view, a student's merit extends beyond academic excellence and encompasses the

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practical application of knowledge. As an undergraduate, I was recognized as a top-up IT Trainee by the ICT division of the Government of Bangladesh. I actively contributed to the Bangla Translate-a-thon organized by GDG Bangla, volunteered for the Google Translate Community, and served as a Google Local Guide. Furthermore, I managed diverse social awareness programs, participated in the university's robotic and cultural clubs, and competed in different programming contests. These activities immensely assist me in growing my leadership ability and confidence in survival in any competitive situation and enrich my rational thinking.

To choose my area of specialization at the Columbia University, I am drawn to programs that foster multidisciplinary thinking. In this regard, the research areas offered by the department, like Computational Biology, Security, NLP, Artificial Intelligence, and especially Machine Learning, seamlessly align with my academic aspirations. My research experience and publications position me as a candidate with the requisite technical foundation and genuine research enthusiasm to contribute to interdisciplinary projects in these areas, blending analytical and experimental skills. Whenever I examine the contributions of the world's finest scholars, I yearn to join this illustrious academic community that disseminates automated machine-learning models and global security concerns. I feel that the intellectual mentoring faculty of the Computer Science department at the Columbia University will help me transition between my current aims and my future academic aspirations. I admire the contribution of researchers, which deeply inspired me to join this university

Columbia University offers students a life-changing education through its dynamic curriculum, cultural diversity, extensive research opportunities, and excellent faculty. Consequently, a Ph.D. in Computer Science will assist me in becoming a creative and independent researcher. According to Global and US rankings, Columbia is one of the nation's leading research institutions and one of the top universities in the world for entrepreneurs. Furthermore, the university's track record of stellar graduation outcomes, particularly regarding employment rates and graduate or professional school attendance, has further solidified my resolve to choose the university for my Ph.D. education. These statistics reflect the institution's remarkable success and underscore the exceptional competence and preparedness instilled in its students. Such an educational environment is precisely what I seek, as I believe it will enable me to merge academic knowledge with practical problem-solving skills, thereby making a tangible impact on real-world challenges. I hope you will find me a worthy and commendable candidate for the Ph.D. program at your esteemed university. In closing, I sincerely thank the esteemed committee and faculty members for their invaluable time and kind consideration.

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