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Statement | Computer Science

"May God continue with you and guide, lead, and give you sound wisdom and knowledge," Ngaitlangalbinus Lyngdoh wrote. It wasn't just any message; it was a heartfelt blessing from one among the multitudes of daily wage workers and laborers in Meghalaya, India, who had found a beacon of empowerment in an online resource—a social audit website I created. To give some context, the Government of Meghalaya announced CRAWL and BOCW cash transfers as compensation for loss of income during the COVID-19 lockdown for the unorganized sector and construction workers. However, an investigation revealed discrepancies in the payments distributed under these schemes. In response, our research group at IIT Delhi and BITS Pilani, led by me, in collaboration with TUR, created a website that allowed beneficiaries to register grievances. I designed it in three languages - Garo, Khasi, and English - and featured an elastic search functionality to locate names in the database. The results indicated that a significant portion did not receive any amount or only partial payments. Specifically, among street hawkers and vendors, 56% did not receive any amount, while 36% of domestic workers reported not receiving any. This project truly redefined my perception of technology's potential to drive change. It became increasingly clear that my path was one of innovation with a conscience, a philosophy I intend to carry throughout my graduate studies.

Through my graduate study, I aim to delve deeply into HCI and AI research, particularly their applications for societal good. My goal is to innovate in technology in socially responsible ways and contribute positively to society. I am deeply interested in research related to responsible machine learning, prioritizing algorithmic fairness, interpretability, and personalization, alongside developing participatory systems that balance technical precision with ethical considerations. My ultimate ambition is to become a professor focusing on HCI and AI, dedicating myself to impactful research to ensure fair access to resources for underprivileged classes. Having actively participated in various research programs at the **Indian Space Research Organization, University of Washington, Arizona State University, Hiroshima University, and IIT Delhi** during my undergraduate studies in Computer Engineering at BITS Pilani, I have developed the necessary skills to excel in my graduate studies. I am particularly keen on contributing to the Human-Computer Interaction and ML research at NYU, focusing on creating intelligent, interactive solutions and models to solve everyday problems faced by individuals with various abilities.

How did I get here? During my thesis at the **University of Washington's ICTD Lab** in Spring 2023 under Prof. Richard Anderson, I built on my growing interests in HCI and AI. Here, I developed the Ekichabi Dashboard. This dashboard was designed to represent metrics for the eKichabi application, a USSD application tailored for retrieving contact information of agriculture-related enterprises in Tanzania. Using various clustering techniques, I discerned three distinct user behaviors: a cluster with minimal app interaction, another with balanced engagement and diverse searches, and a third showcasing maximal activity yet selective searching. I also identified parameters such as most common modality, modality of failures, user behavior, etc. To address any shortcomings in the existing application and contribute to its ongoing enhancement. In another such project at BITS Pilani, I developed a 5-fold XLMRoberta model for a voice information retrieval system, integrating digital assistants to address India's agricultural digital literacy gap. Our survey confirmed the model's effectiveness and the importance of localized solutions.

Apart from HCI, my deep interest in ML and AI stems from some of my previous research experiences. In the Summer and Fall of 2022, I joined Prof. Tianfang Xu at **Arizona State University's SURI (Summer Research Initiative) program**. Here, I targeted to predict the streamflow of Logan River Watershed for climate change variability. Validated against historical data, my attention-based Conv-LSTM model achieved an NSE of 0.90, better than the previous result of 0.84. This experience at the SURI program gave me a valuable glimpse into the demanding yet rewarding life of a Ph.D. student and significantly broadened my understanding of time series based AI models. Subsequently, my participation in the **ILDP Start + Program at Hiroshima Universit**y significantly enhanced my understanding of AI applications in sustainability. During this program, our team achieved recognition by winning the Best Presentation Award for our research showcase. Later, at Hiroshima University I got a chance to participate in the HU Entrepreneurship program through the **Sakura Science Fellowship**.

My past experiences have also taught me valuable lessons about navigating and overcoming diverse challenges. During my internship at the **Indian Space Research Organization**, I was given an exciting task to refine the 30-meter Digital Elevation Model (DEM) – a 3D representation of terrain elevations to a 10 m super-resolution DEM using Lidar-based Photon elevation data and ML. Previously, such a task was approached only through statistical models. The challenge was to delve into a project devoid of any prior research. This meant I had to devise entirely new approaches to solve this problem. Among all the methods, I created a 2D matrix of LIDAR points representing the actual area. For each point in this 2D matrix, we used variables such as Latitude and Longitude and the corresponding DEM height to estimate the LIDAR data. This project taught me the art of discovering novel solutions to complex challenges. Another significant personal challenge I encountered was managing to maintain my academic focus while grappling with the emotional turmoil of losing three family members during the COVID-19 pandemic.

All these experiences, including my professional work experiences at Groupon, BNY Mellon and Providence Global Center have prepared me for my Master's program at NYU, where I aim to refine my technical expertise and pursue cutting-edge research. NYU's commitment to research in HCI and AI, supported by world-class faculty and facilities, particularly excites me. The opportunity to collaborate with interdisciplinary institutes within NYU's vibrant tech ecosystem presents an ideal setting for my aspirations. NYU's culturally diverse campus is the perfect crucible for honing my skills and contributing to significant technological advancements with a meaningful societal impact.