

Research Statement

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As a sophomore undergraduate majoring in Computer Science at the University of Washington, I am eager to deepen my understanding of the intricate relationship between programming languages and relational databases. My initial foray into research during the previous summer in the UW PLSE (Programming Languages and Software Engineering) Lab, under the mentorship of PhD student Remy Wang, exposed me to the challenges and opportunities in this dynamic field.

During my tenure in the PLSE Lab, I contributed to the development of SQLite scripts aimed at enhancing the efficiency of the importing and testing processes for datasets with over 400 million data points. I played a pivotal role in data preprocessing by meticulously parsing and cleaning raw data to address various complex formatting issues. In addition, I executed over 16,000 view scripts and complex queries on bulk data, ensuring scalability and robustness in the face of large-scale datasets.

While this initial experience served as a valuable introduction to research, I recognize the need to delve deeper into the realm of original contributions. In the transition to Professor Gilbert Bernstein's group, my research focus will pivot towards more exploratory and innovative endeavors. Specifically, in the upcoming winter, I plan to engage in projects centered on the fundamental ideas and implementation of automatic differentiation of programs and probabilistic inference over programs.

These projects will not only broaden my understanding of advanced concepts but will also provide a platform for me to contribute novel insights to the intersection of programming languages and relational databases. I am particularly intrigued by the potential applications of automatic differentiation in optimizing program performance and the implications of probabilistic inference for robust and adaptive database systems.

Through this research journey, I aspire to develop a nuanced perspective on the symbiotic relationship between programming languages and relational databases, exploring avenues for innovation and efficiency. By combining theoretical insights with practical implementations, I aim to make meaningful contributions to the field while honing my skills as a researcher and computer scientist.