



Dear Members of the Admissions Committee,

I am pleased to write this letter of recommendation for Kaiyue Zhao, who is applying for the master program in advanced computer science at Oxford. I have known Kaiyue for over two years in my capacity as his supervisor at Shanghai Jiao Tong University.

During this period, I have been consistently impressed by Kaiyue's exceptional capabilities and dedication. He has demonstrated strong analytical skills, a rigorous work ethic, and a sincere enthusiasm for research. We worked on two separate papers during the last two years. The first, Goal-Driven Reasoning in DatalogMTL with Magic Sets, which was accepted at the AAAI 2025 Conference, introduces a magic set rewriting algorithm for the temporal reasoning language DatalogMTL. In this project, Kaiyue explored multiple strategies for adapting the method, with particular attention to challenges involving temporal logic operators and recursion. He also successfully implemented the algorithm using the state-of-the-art temporal reasoner MeTeoR, demonstrating advanced programming and debugging skills. His contributions reflect a remarkable ability to quickly master new concepts and deliver robust implementations. The second paper, Incremental Maintenance of DatalogMTL, currently under second-round review at AAAI 2026, further introduces incremental update mechanisms into DatalogMTL. In this work, Kaiyue took charge of investigating the adaptation of the DRED algorithm from classic Datalog to DatalogMTL and implemented the core algorithm prototype. He maintained regular and constructive communication with me throughout the project, demonstrating admirable intellectual curiosity and a strong drive to explore the unknown. His involvement in both projects underlines not only his technical strengths but also his self-motivation and potential for future research.

Kaiyue has also shown remarkable resilience and adaptability in the face of challenges. A notable example can be found in our AAAI 2025 work, where he was responsible for designing the comprehensive empirical evaluation. Given that the performance improvement of the Magic Sets method varies significantly across different types of queries, designing a meaningful experiment was particularly complex. Kaiyue carefully designed a set of queries that covered various scenarios, including both entailed and non-entailed facts while ensuring all predicates were included. This thorough experimental setup formed a solid foundation for our paper's contributions. Moreover, in late July 2025, as the deadline of AAAI 2026 was fast approaching, we encountered significant performance issues where our algorithm performed poorly. Faced with this pressure,



Kaiyue systematically utilized tools like a line profiler to conduct an in-depth analysis of the codebase. Through his sharp analytical skills, he successfully pinpointed the key computational bottlenecks that were limiting the speed. He then proceeded to implement crucial complexity optimizations, which ultimately resolved the performance problems and allowed us to complete the experiments successfully. In both instances, he demonstrated a marked level of perseverance and problem-solving ability. These qualities, combined with his natural curiosity, make him an excellent candidate for advanced study and research.

Furthermore, Kaiyue possesses strong interpersonal skills, making him a supportive and valuable collaborator. He communicates his ideas with clarity and contributes effectively to group discussions. Beyond research, he further exhibited leadership and teamwork by guiding a student team to a top national ranking and award in a prestigious competition. This accomplishment, alongside his research contributions, attests to his social skills both as a leader and as a collaborator.

Overall, Kaiyue is the best undergraduate student I have supervised thus far in my career. I am confident that he will excel in Oxford's master program and make meaningful contributions to the academic community. His solid foundation in knowledge representation and reasoning, combined with his strong research aptitude, positions him well for success in advanced study. I wholeheartedly support his application.

Please feel free to contact me at +8619117253274 or pan.hu@sjtu.edu.cn if you require any further information regarding Kaiyue's application.

Sincerely,

Pan Hu

Associate Professor of Computer Science

Shanghai Jiao Tong University

Signature:

Pan Hu 古月