上海交通大學
SHANGHAI JIAO TONG UNIVERSITY

Dear Members of the Admissions Committee,

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

During this time, I have been consistently impressed by Shaoyu's exceptional abilities and dedication. He demonstrated outstanding analytical skills, a strong work ethic, and a genuine passion for research in general. We worked on two separate papers during the last two years. The first, Parallel Construction of Knowledge Graphs from Relational Databases, published at the PRICAI 2023 Conference, involves designing and implementing a parallel R2RML engine. Shaoyu led a team of three participants in the project developing the prototype system continuously for six months, and he was in charge of designing novel parallelisation schemes for the engine. The optimisations he devised, including the locking scheme, the scattering of global IDs, and the concurrent read pattern, yielded an overall more than five times performance uplift. His contribution to this work attests to his abilities for coding, debugging and quickly absorbing new knowledge. The second paper, Goal-Driven Reasoning in DatalogMTL with Magic Sets, currently under second-phase review at AAAI 2025, proposes a magic set rewriting algorithm for the temporal reasoning language DatalogMTL. Shaoyu was responsible for designing the algorithm and providing proof of its correctness. In this process, Shaoyu not only provided a proof for the original algorithm, but also a neat adaptation of the original magic set algorithm to support computing canonical representation for bounded DatalogMTL programs, and a detailed proof for the adaptation. His contributions in this second paper exhibited his excellent theoretical acumen and a strong interest in exploring the unknown. Shaoyu has also frequently been tasked with challenges such as understanding papers with complex technical details and providing proof or examples to explain their theories and proposals. He hardly fails such tasks.

Shaoyu has also shown remarkable resilience and adaptability in the face of challenges. In early July 2024, when the deadline for AAAI 2025 was already close, we realised that we needed to switch our baseline to the algorithm proposed by the paper Materialization-Based Reasoning in DatalogMTL with Bounded Intervals, which was published at AAAI 2023. However, our algorithm performed poorly when the given

query had a large interval endpoint. When we all wanted to settle for a compromise, Shaoyu proposed an adaptation to the algorithm in this AAAI 2023 paper, which was later proven to be both elegant and correct. This adaptation became one of the bright spots of our work. Moreover, from October 31st, 2023, to late April 2024, Shaoyu participated in a consulting project of mine where he was the senior student working on-site along with other junior students. Despite the hardship of the environment, where they sometimes had to work till very late, and pressure from peers who started much earlier in the project and had years of experience in the field, Shaoyu persevered and saw out the project. In these two cases, he demonstrated a marked level of optimism and perseverance. These qualities, combined with his natural curiosity, make him an excellent candidate for advanced study and research.

Furthermore, Shaoyu possesses strong interpersonal skills, making him a valuable collaborator. He effectively communicates complex ideas and works well in teams, contributing positively to group projects and discussions. In the past several years, he has led four groups of junior students sized from two to seven in five different projects in both research and industry themes and participated in another two where he was not the leader among students. All these projects had positive results, which attest to his social skills both as a leader and as a collaborator.

Overall, Shaoyu is the best master student I have supervised thus far in my career, and I am confident that Shaoyu will excel in Oxford's doctoral program and contribute to the academic community. He has the potential to make significant contributions to the field of knowledge representation and reasoning, and 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 Shaoyu’s application.

Sincerely,

Pan Hu

Assistant Professor of Computer Science

Shanghai Jiao Tong University

Signature:

Pan Hu 胡畔