Personal Statement

My name is Xucheng Zhuang, and I am currently an undergraduate student majoring in Software Engineering at the College of Software Engineering, Sichuan University. Since entering this field, I have gradually developed a strong determination to pursue advanced research in artificial intelligence, particularly in large language models, multimodal models, and agent systems. Compared with purely application-oriented development, I am more motivated by the opportunity to understand the underlying mechanisms of intelligent systems, identify meaningful research problems, and contribute to work of both theoretical and practical value.

During my undergraduate years, both academic study and practical experience have strengthened my interest in research. I have maintained a strong habit of self-directed learning, systematically studying deep learning, computer vision, natural language processing, Transformers, and large language models. I have deepened my understanding through note-taking, experiment reproduction, and project-based practice. At the same time, I have worked to develop solid engineering skills, hoping to connect theoretical reading with real system building. This combination of research-driven learning and engineering practice has made me increasingly certain that academic research is the path I wish to pursue.

My research interests are currently centered on large language models, especially model reasoning, memory mechanisms, multimodal understanding and generation, and LLM-based agent systems. I believe that as foundation models continue to advance, key research questions will concern not only model capability itself, but also how to enable stronger planning, long-term memory, tool use, and cross-modal coordination in complex environments. Compared with work limited to a single modality or short-turn interaction, I am more interested in intelligent systems for realistic and complicated tasks. I hope to study how large models can evolve from simply generating responses to genuinely understanding tasks, planning solutions, executing actions, and adapting through feedback.

My undergraduate research experience has mainly developed through two AI-related projects. The first is a project on jailbreak attacks against large language models, in which I served as the project leader. This work focuses on the security risks and adversarial vulnerabilities of LLMs. I conducted a systematic literature review on jailbreak attacks and

defense strategies, evaluated mainstream models under different prompt-based attack settings, and further explored a reinforcement-learning-based prompt optimization framework to improve the efficiency and transferability of adversarial prompts. Through this project, I gained not only a deeper understanding of LLM safety but also firsthand experience with the full research process, including problem formulation, literature review, experimental design, result analysis, and iterative refinement. The project has so far led to a survey manuscript and one invention patent. Although I have not yet published at a top conference, this experience has clarified my research goals and strengthened my determination to work toward high-level academic output.

The second project concerns scenario-controlled image generation for animal recognition, in which I worked as a core team member. This project explores controllable image generation and its contribution to downstream recognition tasks by generating synthetic data under scenario constraints and evaluating its effectiveness. Through this work, I was exposed to generative modeling, multimodal information modeling, and data construction and evaluation. More importantly, I came to realize that generative models are not only useful for content generation itself, but can also serve as an important bridge connecting data, tasks, and model capability. This experience further strengthened my interest in multimodal research and in the interaction between generative models and perception tasks.

Beyond formal research projects, I have continued to build relevant skills through engineering projects and long-term self-study. For example, I completed a GAN-based cartoon avatar generation project and worked on image safety classification tasks involving model training and system implementation. In natural language processing, I also explored Chinese sentiment analysis in practice. At the same time, I have built a structured learning framework around large language models, covering model architectures, training and alignment, inference optimization, retrieval-augmented generation, agents, and deployment. Although these projects are not all academic research in the strict sense, they have helped me connect theoretical understanding with engineering implementation and develop a problem-driven research mindset.

In addition to research and technical training, I have also sought to strengthen my broader academic abilities. I have received the National Scholarship and the title of Outstanding Student at Sichuan University, and I was awarded Meritorious Winner in the MCM/ICM. I

also participated in the SOC Summer Workshop at the National University of Singapore. These experiences broadened my academic horizon and improved my abilities in English reading, problem modeling, cross-cultural learning, and teamwork. I believe that research requires not only persistence and independent thinking, but also openness, stable execution, and the ability to collaborate effectively with others.

Looking ahead, I hope to continue conducting in-depth research on large models during my graduate studies, with a gradual focus on multimodal intelligence and agent-related problems. In the short term, I aim to strengthen my foundations in machine learning, deep learning, probability, statistics, and optimization, while improving my abilities in problem abstraction, experimental design, and academic writing. In the longer term, I hope to focus on three directions: enhancing reasoning, planning, and long-term memory in large models for complex tasks; exploring more effective cross-modal modeling for multimodal understanding and generation in open environments; and studying how agent systems can integrate external tools, environmental feedback, and task states to support more reliable autonomous decision-making and execution. I also hope to engage in high-level paper writing as early as possible and hold myself to the standards of top conferences and journals in the field.

Overall, my undergraduate study, research, and practical experience have convinced me that long-term academic research is the path I truly wish to pursue. I hope to receive systematic training on a stronger platform, continue exploring large language models, multimodal models, and agent systems in depth, and steadily improve my research ability and academic expression. With sustained effort, I hope to grow into a researcher capable of making meaningful contributions to this rapidly evolving field.