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When I first started my undergraduate studies as a cognitive science major at the University of California, Irvine, it felt like I was learning the blueprints of an extraordinary machine without yet having the tools to assemble it. I was just as interested in building as I was in understanding concepts. My computer science minor gave me an outlet to turn constructs of intelligence into lines of code, and by the time I read *Artificial Intelligence: A Modern Approach* by Russell and Norvig, I knew that I wanted to create intelligent systems informed by how cognition actually works. USC's MSCS program with an AI specialization is the next logical step in this pursuit.

My academic path has been defined by the gradual merging of theory and implementation. I was amazed at the computational machinery behind modern AI and how naturally many of these methods aligned with the cognitive processes I had studied. I became convinced that while AI draws inspiration from human cognition, its power comes from the algorithms and systems that let those ideas scale. This became especially clear in my Cognitive Robotics course, where I implemented a Q-learning architecture with sensory-motor integration and a subsumption-style value system on a robot. Watching my robot switch between behaviors based on its learned policy was the first time I truly saw cognitive principles instantiated in a tangible product. More importantly, it made clear that my interest lies in the computational frameworks that generate intelligent behavior.

That interest drove my honors thesis in the Cognitive Anteater Robotics Laboratory under Dr. Jeffrey Krichmar. Funded by the Undergraduate Research Opportunities Program and Calit2's Interdisciplinary Research Teams program, I co-developed the computational model that enables the robot to store and retrieve event-based memory traces to guide foraging behavior. This work, which led to a co-authored paper, *Episodic-like Memory in a Simulation of Cuttlefish Behavior* (available on bioRxiv and is in preparation for journal submission), was a deep dive into applied AI. Beyond theoretical modeling and experimental simulations, I integrated our algorithm into the robot's control architecture using ROS2 and Nav2 to enable autonomous navigation. Watching the system move from code to behavior was both exhilarating and humbling. Edge cases in the robot's navigation highlighted the gap between biological plasticity and the rigidity of current reinforcement learning policies. I could apply existing architectures, but I couldn't fix their fundamental limitations. That's when I realized that I needed deeper grounding in optimization and learning theory to move from applying AI to advancing it.

My internship at Advanced Micro Devices (AMD) marked another turning point, this time from academic exploration to professional application. I built an LLM-powered automation agent chatbot that replaced a long chain of manual GUI-based workflows used by CAD engineers. The system could understand and parse natural language, execute the appropriate applications, extract and validate their outputs, and then chain those results into subsequent executables. To make this reliable, I integrated multiple internal APIs, a domain-specific knowledge base, and a prompt-engineered one-shot pipeline within a Python orchestration layer. I also implemented automated output validation and safety guards to ensure safe execution because the failure modes of LLMs often surfaced only at scale. The challenge wasn't getting the model to respond; it was engineering the system so it behaved deterministically across environments. That experience made clear to me that my short-term goal is to become an engineer who builds scalable AI systems.

My long-term goals, however, are rooted in experiences that began long before I learned to code. I grew up in Johor, Malaysia, in a multicultural setting that required constant toggling between Mandarin, English, and Malay contexts. I was taught to navigate these linguistic and cultural shifts with care, and interestingly this translated into a keen eye for solving engineering problems and quick mastery of technical skills. I also attended Foon Yew Secondary School, a Chinese institution that receives no government funding and depends entirely on tuition and community fundraising to function. I learned at a young age that nothing existed by default; I believed that systems—be it educational or computational—need proactive stewards who understand how to maintain and refine them.

This mindset carried with me when I moved to the U.S. alone for college. Seeking a sense of home, I joined Southern Wind Lion Dance and eventually became captain and coordinator of Orange County's largest lion dance team, leading more than seventy active members and planning performances across Southern California. The biggest takeaway I got from being entrusted with such a big responsibility is that aligned expectations and communication is the key to success in every team-centric environment. I saw these two themes resurface consistently in other leadership roles I took on in the Cognitive Science Association and ICS Student Council at UCI. Notably, it was my internship that concretely reinforced this perspective of mine.

I had the opportunity to join in on discussions about design tradeoffs with my manager. The way he confidently navigated complex decisions with technical fluency and empathy left a lasting impression on me. I recognized a familiar pattern: the same combination of pure skill and foresight I relied on in lion dance were the foundations of technical leadership as well. My manager's credibility came not from title, but from mastery—mastery of the constraints and the people building the system, as well as the people depending on the technology. Seeing those parallels clarified the trajectory I want for myself. My long-term career goal is to grow into a managerial position on an engineering team, where I can contribute both deep technical expertise and the collaborative instincts shaped by my background. To effectively lead in the field of artificial intelligence, I know I must first sharpen my technical foundation and broaden my understanding of intelligent systems design, and I plan to seek that education here at USC.

This AI-focused MSCS program has the balance of rigorous theoretical grounding and application-oriented coursework that lines up directly with the gaps I identified through my research and industry experience. Courses such as CSCI 561 (Foundations of Artificial Intelligence) and CSCI 567 (Machine Learning) would strengthen the formal understanding I found myself wishing for when navigating reinforcement learning limitations in my honors thesis, while CSCI 570 (Analysis of Algorithms) would refine the computational foundations required to design more reliable intelligent systems. At the same time, I'm also very interested in the courses offered in Group 3 Electives - Computer Vision and Robotics, as I have a cognitive robotics background and would like to experience robotics from a pure engineering perspective. With the program's project-driven culture, and Viterbi's ecosystem that fosters interdisciplinary collaboration, together with Southern California's expanding tech landscape, USC offers the applied learning environment I know I excel in.

The direction I'm pursuing now is shaped by one consistent ambition: to engineer intelligent systems inspired by cognition that operate reliably in complex, dynamic settings. From cognitive science to reinforcement learning research to large-language-model engineering in industry, each step has clarified both what I want to contribute to the field and what I still need to learn. At USC MSCS - AI, I can take my next steps with intent, and I hope to leave the

program not only as an engineer capable of architecting intelligent systems, but as someone prepared to guide teams through the technical and human challenges that come with building them. I am ready for graduate training that matches the scale of the problems I want to solve, and I believe USC is the place where I can develop the technical mastery and leadership foundation to do so.