**SOP**

*Applicants for our graduate programs are selected using a holistic evaluation system. This essay will assist both the admissions committee and fellowship review committees to evaluate your preparation for the proposed field of study. In your statement of purpose, please describe your* ***aptitude and motivation*** *for graduate study in your area of specialization.*

*A sample of topics that you might address in your statement is below:*

***Academic plans*** *and* ***research interests***

***Relevant experience***

***Future career goals***

***Why UCI would be a good intellectual fit for you***

*We recommend that you complete the essay in another program (i.e. Word, Google docs, etc) and copy it in the text box below. (1200 word maximum.)*

In my undergraduate study, I developed my interests in many areas. Among those, I focused on application and contract layer of Blockchain Systems the longest time. During my research in Inplus Lab, my colleagues and I proposed a two-layer Stackelberg Game data trading mechanism in Blockchain-based Internet of Vehicles (IoV) and verified it in some numerical experiments in Jupyter Notebook beforehand. After months of hard work, we completed a paper named *Blockchain-Based Digital Goods Trading Mechanism in Internet of Vehicles: A Stackelberg Game Approach* and submitted it to the International Conference on Service Oriented Computing (ICSOC). However, our work did not win the satisfaction of the ICSOC committee. They offered me suggestions for further improvement. With their advice, we evaluated the robustness and efficiency of my algorithms by implementing several smart contracts on Rinkeby, a test net of Ethereum. With specific scenarios to support this protocol system, I confidently submitted this paper to the IEEE Cloud this time. During this process, I realized that there was a big gap between idea origination and implementation. To ensure the stability and efficiency of operations in the system, we need to take more factors into consideration, such as security and cost of execution and storage, *i.e.*, gas cost. Currently I am working with the Blockchain Technology and Application group on the Decentralized Data Storage and Sharing on Blockchain (BCShare) project. BCShare employs InterPlanetary File System and certificateless cryptography to address the control on user data from the giant companies. This project helps to promote decentralization to the social applications and enables users to manage their social linked data. The research in Inplus Lab not only helps to improve my mastery of Blockchain technology, but also to further my understanding of Trustworthy Systems, Cryptography, and Distributed Systems. I think my research experience shares great similarity with the research interests of Professor Qi Alfred Chen (in Computer Security in IoT) and Michael Dillencourt (in Distributed Systems). I look forward to exploring these areas under their instruction.

In addition, I am also interested in researching Reinforce Learning. In the summer of 2018, I started my first internship in the Institute of Automation, Chinese Academy of Science (CASIA). Out of my interests in Game AI, I participated in StarCraft team to build StarCraft Ⅱ Learning Environmentwith Tensorflow. Initially, I trained the soldiers with Advantage-Actor-Critic and Deep Deterministic Policy Gradient (DDPG) algorithms, but neither brought any satisfactory outcome, *i.e.*, about 2,100 and 2,600 wins in every 10,000 battles respectively. After communicating with my advisor and colleagues, I tried to enhance my DDPG-based work by allowing the soldiers to cooperate. By referring to *Multi-Agent Actor-Critic for Mixed Cooperative-Competitive Environments*, I applied the novel Multi-Agents Deep Deterministic Policy Gradient (MADDPG) algorithm to this scenario and took more factors into consideration in the rewards. Derived from DDPG, the MADDPG critic not only inputs its own state and action, but also includes others’ information to make a global optimization. Due to this revision, the average winning rate of soldiers was improved from 26% to 43% with only 120 training epochs. From this internship, I picked up more knowledge in reinforcement learning, including traditional algorithms, training methods, evaluating criteria, and etc. Furthermore, I learned more about the business cases where reinforce learning methods are being applied to achieve artificial intelligence, which inspires me to integrate them in other studies in the future. I think this experience matches well with the research of Professor Rina Dechter, Padhraic Smyth, Erik Sudderth in Artificial Intelligence. I am willing to explore this area under their supervision.

After this internship, I was attracted to Computer Networks, which aroused my interests to explore other application scenarios as I realized how powerful and scalable this technology could be. After many rounds of interviews, I was offered the chance to intern at Microsoft to work on the Predictable Remote Direct Memory Access (RDMA) for AI Training project. We were aimed at guaranteeing bandwidth for Data Manipulation Language training tasks in RDMA networks. In this project, I managed to implement the central logic controller and the adaptive data backup mechanism, *i.e.*, adaptively specifying the traffic classes of VM-pairs to guarantee the bandwidth of users. Unlike the previous internship, corporate assignments place more emphasis on cooperation and integrity of projects, so it is necessary for the team to work closely together to ensure smooth progress. It’s a great teamwork experience, which taught me to respect others’ roles in the team and to be a responsible person both at work and in life.

Aforementioned experiences clearly demonstrate my firm will, innovative thoughts and teamwork spirits, which make me well-qualified for your program. With a prestige faculty and a wide platform, UCI provides me with the opportunity to study in-depth specialization about this subject to achieve my dream. Besides, I believe the outstanding alumni of UCI could definitely benefit my future development. Thus, I would like to pursue my graduate studies in the Department of Computer Science, UCI. If admitted, I am inclined to work on the Game Theory due to my research experience in Inplus Lab. I am also interested in concentrating on Deep Reinforcement Learning because of my undergraduate studies and internship in CASIA.

In the short term, upon obtaining my master degree, I expect to complete my project plan with excellent performance to broaden my horizon and consolidate the knowledge I have gained. In the next 3 to 5 years, I aspire to become a reliable researcher by pursuing a doctor degree. In the long run, I hope to work as a professor to educate future students and to promote promising technologies to better our lives. The road ahead is destined to be a bumpy ride, but I am strong-willed enough to overcome whatever challenges lying ahead to accomplish my dream.

**Personal History Statement**

*This essay will assist both the admissions committee and fellowship review committees to evaluate your background and motivation for graduate study. In your personal history statement please describe how your* ***personal background informs your decision to pursue a graduate degree****. A sample of topics that you might address in your statement is below.*

*Any educational, familial, cultural, economic or social* ***experiences or opportunities*** *relevant to your academic journey*

***Challenges*** *and/or* ***obligations*** *you have had to address in order to achieve your educational goals and how you addressed them*

***Employment*** *while an undergraduate*

*How your perspectives or activities contribute to social or cultural diversity and/or make you sensitive to the experiences of underrepresented groups*

*The Personal History Statement is expected to focus on your* ***personal background*** *while the Statement of Purpose is expected to focus on your* ***academic/research background and interests****.*

My first encounter with computers took place when I was only a grade three pupil, as I had the opportunity to participate in the information competition and tried to program in Pascal under the guide of my computer teacher. As I grew up, I found the black boxes of Computer Science so common that they had been dramatically changing our lives. How could AlphaGo program defeat Lee Sedol? What is the use of Nakamoto's Bitcoin? How does computer store and process massive data and extract useful information? All of these aroused my interest to dive into this field, and I realized that I needed a broad CS base to further understand these fancy technologies. Besides, getting the best score in the College Entrance Examination in my high school, I found my gifts in mathematics. Driven by my passion for computers and talents in numbers, I chose Software Engineering as my undergraduate major in School of Data and Computer Science. Gradually, I found the subject of Computer Science to be my soul mates, and I realized I still need to accumulate my knowledge base and improve my technical mastery to give further play to my capability and creativity in this promising field. Thus, I decided to pursue M.S. in CS as my undergraduate program.

My undergraduate study was not a smooth ride. Despite a little lost in my fresh year, I overcame it with my strong will and eagerness to dreams. I was not proficient in programming when entering college. While my coursework mainly focused on the basics of programming and language syntax in my freshman and sophomore years. Although I was a little confused by coding in that period, I convinced myself that only by mastering basic skills can I learn higher-level of knowledge in depth. Spending all day in the library, I revised every line in my programming homework and imitated code examples online. In these programming exercises, I solved many rudimentary puzzles in different languages to hone my programming skills. Thanks to these programming basics I learned in these 100- and 200-level courses and self study, I made some remarkable achievements in my later study in college: I ranked the first in *Numerical Methods* (MATLAB), *Principles of Artificial Neural Networks* (Python), *Introduction to Data Mining* (Python), and etc. Proficient mastery of these courses also won me many precious opportunities in academic and industrial fields later on. The experiments of my papers and the assignments in my intern would not be accomplished without such training. This experience makes me more confident in myself to address challenges ahead.

Except for my academic performance, I also learned to be a respected leader and a responsible man in social activities. During my college life, I developed time management skills in my tenure as the vice president of the Table Tennis Association. To be more precise, I managed to balance well between course assignment and club activities, such as arranging the Intercollegiate Table Tennis Competition agenda. Besides, as a group leader of Guangdong Science Center Volunteer, I led a team to help visitors. Under my instruction, our group had clear definitions of responsibilities, rewards and punishments, so that the ability of each member could be fully utilized. I think these experiences make me a trustworthy leader and a good cooperator both at work and in life.

The aforementioned experiences clearly demonstrate my firm will, leadership, and team spirit. I look forward to keeping these qualities under education in UCI!