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CAT125R - Assignment #1 Statement of Purpose Final Draft
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Prompt: How did you become interested in this field? What experiences have contributed toward your preparation for further study in this field? Also, what are you future goal in this field?

5G is the next great leap of humankind. The remarkable speed and unlimited bandwidth of 5G can become the cradle of many revolutionary artificial intelligence products. Imagine a scene where a fully automated traffic system eliminates traffic jams and car accidents completely and a fully automated delivery system allows a drone to deliver anything you want to your balcony under thirty minutes. These are my visions for 5G network that combines with artificial intelligence software in the next 20 years, and it is also my goal for graduate school as well as my whole career. I believe my individual exploration and research experience in this field has prepared me for UCSD Engineering graduate program that allows me to contribute to the 5G and artificial intelligence revolution in the future.

My interests in artificial intelligence can trace all the way back to primary school. As I was in our school's robot football team, I have always been mesmerized by their ability to mimic human beings and how they transfer biological features, like sight and touch, into digital numbers and make decisions according to that. I have been exploring this process ever since. During college, I have taken many classes that cover different aspects of AI, including machine learning, deep learning, computer vision, etc. As an engineer, I like to manifest the knowledge I learned into useful products. I have done many little projects of my own outside of classroom.

Recently, I lead a team of 4 developers and built a cross-platform mobile app that allows real-time flower recognition. As the team manager, I not only coordinate tasks for my teammates but also devised the whole pipeline of this app.

The ability to spot problems and adapt challenges are also crucial for engineers. In my second year at college, I joined the Advanced Robotics and Controls Lab at UCSD to start doing research in applying machine learning in robotic motion planning. I started with reading papers in the field, and I quickly noticed the drawback of the traditional sensor-based motion planning. The robot arm will have delay whenever it has reached a decision point for the data from sensors get processed. If we built a deep learning algorithm that can map the whole geographical features and obstacle of surrounding to a series of motion for the robot arm beforehand, there will be no delays in those decision points. I started using Robotic Toolbox in MATLAB to simulate robot arm working environment with obstacles and using Python to build a learning algorithm for it. I have tried different approach and models during the process. Each of them has different problems, like too much learning time as dimensions get high, the prediction result is not precise enough, etc. Finally, I used the Gaussian mixture model and convolutional neural network to built a viable model for collision detection. The failures in this experience made me aware of how much failures could happen in the research process. However, I also learned that these failures are also necessary steps toward success. This experience prepares me to be a better researcher in graduate school.

Experience in the industry also give me more insight in the AI industry. This summer, I interned in Cambricon, a pioneer company specializing in intelligent chips. In the age of 5G, traditional CPU, GPU, and their command structure are no longer suitable for the deploy of AI

networks. Cambricon break the convention architecture of chips and design a completely new framework of chips. I was amazed by their vision in AI, but what surprised me more is their dedication in academic research. As I worked in the algorithm group, I have constantly read cutting-edge paper in the industry and shared with the group. As I accumulate more knowledge, I even get the chance to realize two of the deep learning algorithm and add them into the company's library. From this experience, I noticed that keep track and accumulate the most up-to-date knowledge is the basis of innovation. This experience not only prepared me for extensive academic research but also strengthened my dedication for graduate school.

Studying in the graduate program at UCSD Engineering School will provide me the resource and network that allows me to further pursue my track on artificial intelligence. I believe my experience has prepared me for future challenges in graduate school.