

# Personal Statement

Applicant: Hao-En Lu      Birth: 07/June/2000

Applying: Art and Science Department

## Motivation

In these days and age, aside from attaining knowledge, there needs to be more emphasis on innovation and problem-solving skills – sometimes it is required for us to think outside of the box to have a new angle to address a problem. Computer Science has become a leading field of science, which applications lead to innovative tools to resolve numerous problems beyond human capability; therefore, I hope to apply my computer science knowledge to build an unconventional Artificial Intelligence (AI) system for society to enhance the accessibility of AI for many people, especially for Taiwanese citizens and government. I like to think and resolve problems in unconventional ways, which is why I think I am a suitable candidate for Computer Science studies. I love to face constant challenges and puzzles so that I can dig deep into my knowledge and ability to find the best solutions. I feel no better sense of accomplishment than after solving something significant and useful for human society.

## Academic background and work experience

I have already studied a wide range of computer science subjects and mathematical theory, including calculus, advanced programming, statistics, operating systems, operation research, network applications, database management, computer game design, ethics of AI, 3D metaverse design, cloud-based decentralized system applications, software management, etc. These courses required students to understand the basics of computer programming and the know-how to apply various programming languages to create a project, along with basic computer science knowledge and mathematical theory, and I keep studying on Coursera after graduation to improve my machine learning skills and mathematical ability.

Although in my freshman and sophomore years of college, besides the mathematics and programming courses that are indispensable for my bachelor program, I was deeply fascinated by Western music style and street dancing, so I took some relevant courses in college, for example, I took the course called European Musical Culture and Popular Music Industry in my freshman year, took the Pop Music Culture in my sophomore, and have attended the dance club from my first year to my third year of college. Due to not fully focusing on the obligation courses and distracting by extra-curriculum activities, I did not have a great score in my first two years. But after the final performance of the dance club, I knew that my interest is gradually converting to technology and science, so I reschedule my time to put full effort into science-related

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courses and my obligation courses. Consequently, I got better grades and started to develop an interest in artificial intelligence and machine learning.

In my senior project, I researched the field of Natural Language Processing, which is using machine learning to understand natural language speaking such as English, and utilize the result to achieve human-computer interaction. I studied numerous Natural Language Processing APIs including Google Cloud, Amazon Web Service, IBM Watson, etc. Then I compared the results from each API with an algorithm that lines up the sentences, picks out the highest common words in each sentence, and combines them into a new sentence. With the help of my teammates, we implemented a robot on a website that can understand English puzzles and generate answers to those puzzles with oral interaction. This project enlightened me to further expertise in machine learning, study more about machine learning and its functionality, dive into the research of Natural Language Processing to improve current AI systems with their ability to communicate with a human, and be enthusiastic about knowing more about logic in the mathematic world as well.

After finishing the machine learning course in my senior year, I also came across Deep Learning, Game AI, and Reinforcement learning while educating myself on Kaggle. The emphasis on other implementations of machine learning sparked more interest in me to be proficient in AI, especially because I felt promising about its revolutionary characteristics, and I also witnessed the potential of creating abundant benefits with it. This is why, when I was studying in my fourth year at university, I continued with a course titled 'Mind and Brain', attended the seminar in neurobiology and cognitive science, and took a course regarding 3D metaverse application, which opened me to the field of human-computer interaction and gave me the will to further improve the current architecture of AI with more sophisticate and brain-alike structure. Besides, studying neurobiology and psychology made me aware of the many psychological illnesses people suffer, and I see the potential of putting AI into psychological practice to alleviate relevant disorders.

After I graduated from college, I continued my passion to learn more about machine learning on Coursera and participated in some machine learning courses such as Machine Learning Specialization and TensorFlow Developer Professional Certificate provided by DeepLearning.AI, and in the meantime, I also took some interesting courses such as Fintech specialization, Computational Neuroscience, and IoT embedded systems. All these courses broaden my horizon of where machine learning

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can be implemented and strengthen my fundamental knowledge of mathematics and computer science. Hoping that participating in the BU Computer Science master's program can help me expand my career and interest in machine learning to a wider area.

## Study Objectives

My objective in studying a master's program is to strengthen my knowledge of computer science, have a solid foundation in building software applications, and be able to apply my knowledge to create machine learning models to help with the research team for many tasks such as data analysis, data visualization, or image classification. Meanwhile, I also hope to combine computer technology and neuroscience research to create a more advanced machine-learning architecture to improve the ability and efficacy of AI. At the moment, society is developing towards the trend of enhancing machine input, such as the applications of text-to-image AI, DALLE as an instance, the rising popularity of virtual assistants such as SIRI and ALEXA, and the development of automated vehicles like TEXLA, etc., all represent the shift in the direction of automation and AI-oriented applications. However, AI has not yet been fully implemented in several areas such as psychological health care or environmental protection. Therefore, I also hope to develop machine learning models and products to help increase the accessibility of AI in those fields and generate benefits for the workers. My goal is to be able to provide more value in assisting large companies in the development of various AI products to increase the accuracy and efficiency of those products and create more useful tools for other important areas of human society.

## Future goals

After I graduate, I hope to join a tech company or pursue a Ph.D. degree in the United States and devote myself to AI product or architecture development or research, so I can help a company build AI applications and further enhance my knowledge in this expertise. Also, I plan on continuing to take more online machine-learning courses, performing further research to elevate my skills and knowledge during this period, and observing persisting issues in society that can potentially be resolved by introducing AI to those areas.

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I plan to apply for job opportunities in larger tech companies in the long term. I plan on utilizing the skills that I've gained from my short-term goals and putting them into practice in a larger environment. This way I can further harness what I have learned and make improvements to my skills and even broaden my horizon while understanding more about the market needs, looking at what problem society may have, and developing more advanced products to provide solutions for the customers. My final goal is to be able to take what I have learned in the US back to Taiwan by establishing a tech company in Taiwan that is specializing in developing machine learning models for many areas and enhancing Taiwan's technological prowess. Taiwan still has many unresolved problems such as environmental protection, financial issues, and energy crisis that need to be settled as soon as possible. Introducing Artificial Intelligence to Taiwan can greatly help the government and citizens with those issues and create a more friendly environment for Taiwanese citizens to live in.

Attending the Master's program in Computer Science at Boston University can significantly provide me with the opportunity to achieve my goals. By developing a solid foundation of knowledge in the computer science field, obtaining software development skills, and digging deeper into professional theses, I can create my project to break new ground in many areas. Boston University also provides many outstanding courses regarding machine learning specialization, allowing me to keep sharpening my skills in AI development. BU also has a diversity of research fields, providing a great resource for me to combine knowledge from different areas to generate answers and find potential problems in other fields that can be resolved by utilizing machine learning. BU is also located in a great place that offers opportunities for students to work or intern in a major tech company or collaborates with a world-class academic research team, so I can keep devoting myself to AI model development, enhancing my knowledge and skill set, as well as improving society with the applications of Artificial Intelligence. Boston University is a marvelous place to achieve my life goals and create projects that can potentially benefit society. And I also hope that I can also generate benefits by utilizing my skills and passion for Boston University by helping students at BU to have convenient machine learning or software tools for their academic study.