

Personal Statement

Yulin Zhou(Kyra)

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My interest in Computer Science first began with the Technovation Girls - a competition that encourages girls to solve daily problems through technology. Utilising the MIT App Inventor, my team created an application to help users adopt animals online. Whilst implementing the software development cycle, I became inspired by the complexities of programming, particularly dragging and constructing logical puzzles behind the user interface. Being ranked amongst the top 5 in China in TG gave me the confidence to pursue my studies in Computer Science further.

The interaction between mathematics and computer science fascinates me, especially after attending three mathematical modelling competitions and have been awarded Honourable Mention in all of them. In one, I led my team to simulate a fake news-spreading mechanism by the SIR model as it was similar to the disease-spreading system. However, when categorising users into three groups (susceptible, infected or recovered), over-abstraction leads to an unreliable result. Hence, we went through a sensitivity study by calibrating the differential equations. I enjoy the process of incorporating mathematical concepts into modelling which both developed my understanding of mathematical theory and drove me further into computer programming.

I encountered algorithms and data structures through the book "Competitive Programming 3" by Steven and Felix Halim. While reading it, I was most impressed by Dynamic Programming paradigm. In a 0-1 knapsack question, I used it to partition the problem into sub-structures and solve via a transition formula. This idea later became integral to my logical thinking. The optimisation of Union-Find Disjoint Sets such as union by rank and path compression attracted me as well, both of them helped me comprehend the set theory behind it better. Earning a gold medal in the USA Computing Olympiad increased my ambition to work on the development of more efficient algorithms which may assist society by solving currently intractable problems.

After an internship at a computer vision company, I was inspired to start a handwritten digit recognition research. As a classification problem, I built a digit recognition software by the K nearest neighbour algorithm. While researching alternative algorithms, I was amazed by the Convolutional Neural

Networks, its idea of simulating human neural networks and its potential to reach a higher accuracy is satisfying. While absorbing knowledge about Artificial Intelligence, I keep improving my analytical thinking skills and being more curious about the future of AI.

As well as learning Python and C++, I am also intrigued by Haskell because of its elegance and efficiency when solving problems such as calculating large factorials using mapping and the laziness property. As a functional programming language, Haskell gives me insight into another way of thinking rather than thinking procedurally. Programming skills also help me build computer programs to understand physics concepts. I modelled the superposition and entanglement of Qubits after taking courses on BRILLIANT and reading the book “Quantum Computing for everyone ” by Chris Bernhardt, I realised Quantum Computing provides a new way to discover the universe - its uses in Cryptanalysis will only be the tip of the iceberg.

As the Student Ambassador of Technovation Girls, I have encouraged 152 girls to enter the Technovation Girls 2019 session by mentoring them through tutorials. Outside the school life, I am a boxer and a long-distance runner, I have participated in two half-marathon competitions to raise money for charities. This summer, I have also submitted my research paper to a workshop in Alaska, USA and presented my work in a pitch. This experience widened my horizon and increased my interest in exploring more about computer science in university.

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