**Motivation Letter**

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**Grades: 70.5/100**

**GPA: 3.78/4**

**Application MSc program: Electrical Engineering: Signal & System**

Currently I am a final year undergraduate in the University of Nottingham, China Ningbo Campus. My major is Electrical and Electronic Engineering (with Honors). Our campus of the University of Nottingham carries a complete British education, also English is the official language for working here.

My passion for career is to be an expert in electrical engineering. I want to engage in the designing process of automated systems, like robotics, advancing electronics and modern computing system. My undergraduate study equipped with fundamental knowledge and skills about them, but I think a more advancing degree is of vital significance to explore the further, and the deeper world in EEE field. So, I decide to apply for Delft's graduate program

**(Self-introduction: why I am interested in this EEE)**

During my undergraduate, in my year 2 project, I finished an Auto-navigate vehicle by myself. This project guided me in the deeper field of Micro-programmable Controller Unit (MCU). To finish this project, I started to study the external sensors and electronic devices using Arduino and Raspberry Pi. This integrated hands-on task strengthened my C++ skill, and the circuit analysis skills in the embedded system. Furthermore, to develop the auto-navigation function, I studied simple image processing by reading the official manual of OpenCV.

This teamwork-based project had also inspired me to join the "Robomaster Team" in our university, as a member of a software group working on Visual Computing tasks in an international robot competition held by DJI company.

In my year 3 application projects, my teammates and I accomplished an AC-DC forward converter implementation and its control strategy using our own designed PCB with specific chips and electronic components. Then we developed an STM32L based speed detection radar module, whose computing and receiver module is driven by a Verilog programmed FPGA to perform signal detection and analysis. This year, I interacted more with the electrical signal in circuits and aim to design a control strategy to amend and compensate the exceeded electrical excitations and signals, in the form of currents and voltages.

The projects in y2 and y3, enable me to know how a real electrical autonomous system is operated, and the way to put my courses materials into the real applications. At the same time, I was enabled to build hands-on computing projects and manipulate excitation signals in a certain system.

**(what I have done in past time, which guided me into signal & system area)**

In EEE field, signal and system is always the most significant elements to be analyzed and investigated. This is also the foundation for all my study.

Besides the projects, I have also learned several significant courses regarded to signal and system, including "Signal Transform" which taught me to analyze signal using Fourier Transform, Laplace Transform and Z-Transform, "Energy Conditioning and Control" which provided valid and complete control theory and concepts of evaluating and amending an electrical system performance. These courses all are marked above 75, which is an excellent grade in the British education grading system. Similarly, the overall marks of my projects have beyond 65, indicating I am heading of most of my classmates, both for UK campus and China campus.

I have also chosen the "Advanced Engineering Mathematics" and “signal & sensing system” in my final year study course list, to explore the processing of a digital signal using computer aided processing tools. However, to achieve higher goals and implement advanced projects requires a higher-level education and knowledge. At the same time, sharing and studying with those talented and motivated engineering students is always an exciting experience.

**(my courses and projects marks, and relations to signal & system)**

Delft University of Technology is one of the most famous and attractive institutions of science and technology in the world, which can provide me a wide range of advanced study options. On the other hand, TU Delft possesses the most talented and motivated staff, which would fire my thoughts and motivation in my later study period in order to peruse a higher capability and knowledge in Electrical Engineering. That would be a great preparation for my future PhD study or my career.

In terms of international life, Netherlands is a country with fabulous sightseeing and the most diverse culture in the world, and it is also one of the countries where western capitalism and industrialization have risen ~~firstly and finished initially~~. Studying and living in Netherlands can enlarge my sight of views then provide me with a different lifestyle and more opportunities in the future career path.

~~To summarize, the interests of "Signal & System" area and the high reputation of TU Delft and Netherlands are the reasons and motivations for me to apply this track of master's Program in Electrical Engineering~~.

**(why I choose this master program)**

In my summer vacation before the final year, I had chosen a research topic "Noise Cancellation" and join a research group led by Prof. Shunbai to deal with Audio Signals as a beginning step of my BSc thesis work. In this project, we are aiming to develop an embedded system which can achieve active noise cancellation.

I mainly focus on the processing of audio signals including "speaker classification" and "noise reduction". The audio signal is initially recorded and processed using Python on computer. After ~~initial~~ noise reduction and voice activation detection, the main information and speech parts are conserved. In the next stage, I will extract the speaker features in these audio signals as labels and datasets to implement and train a Machine Learning Model for ~~speaker~~ information classification, including who is speaking, when did he/she speak and what did he/she speak.

This project has been working for nearly 2 months. ~~From now on~~ At present, I have finished the pre-processing steps, and try to move to feature extraction stage, which is planned to be finished by the middle of my first semester in the final year study~~, roughly 2 months~~. Then by the beginning of my final semester, I shall prepare a suitable and well-tuned machine learning model in 3 months including a winter vacation. In order to achieve the embedded function, I must run this ~~machine learning~~ model on a cloud sever and interact with an FPGA board. The pre-processing steps will be finished on FPGA, then the device transmit the data to the cloud server then receives the returned labeled results. This interaction does require me to gain some knowledge and skills in Cloud Computing area. **(my BSc thesis work)**

At this stage, I want to pursue ~~a higher goal and~~ further research and study in the Multi-media signal system, Remote-sensing and Robotics. In modern days, multimedia is a key ~~signal~~ transceiver requires fast and accurate ~~delivery and~~ processing solution. For individuals who prefer high ~~voice~~ quality and accurate ~~acoustic signals~~ voices, the multi-media technology may provide a satisfied ~~intelligent~~ solution. On the other hand, combined with an intelligent system, a conventional media system can have better performance in accuracy and timing, which is a key issue to improve the industry's intelligentization.

The remote sensing area is now a ~~rising star both~~  hot spot in ~~the academic field and~~ industrial field that ~~Remote sensing can~~ help a lot in atmospheric and geoscience studies. At the same time, remote sensing can also lead to a traffic intelligentization, as both Intelligent Transportation System and Automatic Piloting and Delivering require high accuracy and fast localization and mapping. Applying my study strength and concentration on these two fields, has met my career expectation, ~~which is~~ to improve or achieve ~~intelligentization in~~ automatic driving of Intelligent Transportation System and industry intelligentization.

Besides signal processing in the intelligence system, robotics is another ~~hot spot~~ focus in the industry autonomous system. ~~From my undergraduate experiences, "Robomaster Competition" leads me into the world of robots, which consists of complex embedded software hardware and requires higher degrees of system control.~~ Robotics are programmed to achieve those dangerous challenge and improve the tedious work efficiency. I have gained an astonishing experience of manipulating and building a robot from “Robomaster Competition”. TU Delft is one of the most leading robotics institutions in Europe, it is my pleasure to find my interest and continue to study robotics in there.

After my graduation, my goal is to join large companies, like Philips or Tesla. I think in such a large company, I could use what I learn in Delft, and engage in the frontline of industry. ~~I am especially interested in engineering topics like robotics, sensor signal processing and multimedia technologies.~~ I am also interested in PhD studies. Comparing to the fundamental research, I prefer applicational research. There are also PDEng programs in the Netherlands. ~~That is also what I am considering about. So,~~ in which I could have opportunities to cooperate with large companies to design the real products. Starting my own company is also one of incoming options.

Therefore, it is my desire and career path to put my effort into signal & system track, which appealing me to apply for this master's program in Electrical Engineering. I believe Delft could provide a great preparation and education for my future career development

**(My further career expectation.)**