Statement of Purpose

A recent report shows that people upload about 60 million photos on Instagram every day. Compared to text, image has greater capacity in carrying information. However, when the information is presented in the format of image, information retrieval becomes difficult, which significantly reduces the efficiency in finding the contents of interest. As a big fan of photo processing and sharing, I am interested in image information mining from the perspective of an algorithm designer and developer. I want to become an engineer to develop image processing, recognition, and retrieving techniques and create intelligent tools, to help people to get the desired information easier and faster.

My undergraduate study in Telecommunications Engineering has provided a solid academic foundation for my career aspiration. My GPAs during the undergraduate years show a rising trend, from 86/100 (freshman year) to 90/100 (sophomore year) and then 93/100 (junior year). I am ranked the 1st among 109 students in my class. Due to my outstanding GPA, I have received the National Scholarship which is only rewarded to the most excellent 0.2% college students in China in 2014.

I also conducted several projects to apply my theoretical knowledge to practical systems. I designed a device composed of a GPRS module and an 8051 MCU to control remotely household appliances by sending text message via a mobile phone. In another project, I designed a 4 frequency-shift keying (FSK) modulator with chip rate of 19.53125 KHz by Quartus II and implemented it on FPGA. During the National College Student Innovative Entrepreneurial Competition in 2013, our team developed a terminal printer for an instant-messaging application. As the team leader, I not only coordinated the team members' work but also independently established the message-processing framework which called API (provided by the application platform) to transmit XML packets to our server. We stood out as the second prize winner among 60 candidate teams. By studying the materials from hardware to software, from down to up layers, and from Verilog to Java, such experiences greatly broaden my horizon and strengthen my desire to carry on advanced study in designing and programming advanced algorithms.

In 2014, I got a chance to conduct research on big data under the direction of Dr. Gao. I chose to use discriminant analysis method to solve the problem of recognizing and classifying huge amounts of images. Initially, I implemented the linear discriminant analysis (LDA) algorithm, but later found it overflowed when testing it with an ORL database of 400 facial expressions. Considering that LDA stretched each single picture to column vector, I found out that the high dimension of the vector was the reason causing overflow. Then I combined LDA with principal component analysis which could lower the dimension. However, the processing capacity of this approach was essentially limited. As I studied more algorithms about pattern recognition, I found it possible to split the whole

database into subsets, establish corresponding models for each small subset and then merge the models together. Finally I made it and the classification accuracy was higher than other algorithms.

Besides this project, I have been learning how to use OpenCV to process images. I implemented video capture and similarity measurement with class VideoCapture and PSNR algorithm; I employed background subtraction, smoothing filtering, and binary processing to detect moving objects. I believe my experience in C++ will help me to learn rapidly in processing image with OpenCV.

From these projects, I got to know details about image processing and discriminating and found myself greatly interested in it. With image discriminating techniques, Facebook developed DeepFace, and the face verification performance is close to human-level. Thanks to optical character recognition (OCR), Google Street View has a recognition rate higher than 90% for thousands of millions of house numbers. I am not satisfied with just the entertainment applications offered by image processing Apps. Therefore, I want to pursue a graduate degree, deepen my study in this area, and to apply image processing techniques to machine vision and artificial intelligence in the future.

The M.Eng program in Electrical Engineering at Cornell University impresses me very much. Having deliberately studied your website, I am attracted by this professional program which enables one to apply theoretical knowledge to a real-world problem, with the guidance from finest faculty, and in collaboration with talented students. I believe at Cornell I am able to improve my leadership skills in a competitive and collaborative environment, which is necessary for my whole career. Besides, I found that your flexible curriculum a good balance between theory and practice, and I'm interested in some of the ECE core courses such as Computer Vision and Machine Learning. The ground breaking research is another reason that Cornell attracts me. Specifically, the ongoing research of Object-Driven Image Group Annotation and Computational Models of Kinship Verification at the Advanced Multimedia Processing (AMP) Lab well tally with my background and interest. Moreover, from the Alumni Notes, I learned that Cornell brand is very strong across geographies and the alumni network is a tremendous resource, an advantage vastly preferable to many similar programs offered by other universities.

I believe studying at Cornell will be an important stage for my future development and sincerely hope that you will give me admission. In return, I will contribute to your development with my academic and research endeavors. Meanwhile, I would like to bring to your community my enthusiasm towards volunteer activities. When I served as chairman of the Student Union, I led a team of 100 members. We once held a Charity Gala before thousands of audience, raising up to 5000 dollars for poverty-stricken students in Shaanxi Province. If accepted, I hope to share my volunteer spirit with my prospective classmates.