Understanding Neural Networks and its challenges

Machine learning has become ubiquitous in our society, with many real-world applications in search, image understanding, speech, medicine, or self-driving cars. The key component behind ML are the deep neural networks (DNNs) which are composed of giant matrices of hundreds of millions of weight parameters in total. While DNNs obtain excellent and even super-human performance on many tasks, they are (1) easily fooled, especially in a way puzzling to humans; (2) hard to understand. In this talk, I will explain how DNNs are formed from the bread and butter of linear algebra and matrices in the context of computer vision. We will then discuss some of their unreasonable failures and existing methods for understanding DNN decisions and inner-workings. I hope the challenges presented would raise discussions and collaborations to improve DNNs or how we better understand them.