I chose to attend to the guest lecture on Automated Discovery of Machine Learning Optimizations because it is directly related to my internship experience. Zhihao Jia, PhD Candidate at Stanford University, is working in a huge challenge that hardware developers are facing, which is hardware design for Machine Learning software with a specific purpose. I have completed two summer internships at Intel Corporation and, even though I have not worked in developing or designing hardware, I have gained insight on the process for embedded hardware design.

As an intern I saw most of the time when hardware is design for software that provides only a specific and narrow purpose, hardware is optimized to reduce costs on manufacturing. However, this design process results in suboptimal circuits and, from what I have witnessed at Intel, it takes significant amount of time. The guest lecturer presented his research projects, which is applying Machine Learning strategies to efficiently design hardware without manually working on the circuit. Also, heuristics used for Machine Learning software are not always optimal for hardware. Consequently, the hardware designs are made faster and optimal because he can automate testing for suboptimal results.

One of the applications for his research is to develop a tool that will have hardware industry. Intel could possible use it do make chips for smart homes and smart cars, where a lot of data processing would be use for image and temperature understanding and adjustments. Another application could be for making parallel computing to analyze different processes of the GPU and making specific design “processors” to optimize run time on computers. This design process would be extremely fast with the guest lecturer’s research.

Machine Learning applications on hardware are really interesting because low-level embedded systems designed for specific application might do more processing with the machine learning libraries included. However, they way of classifying data would be faster and probably it will take less memory, but more processing power and, possibly, more RAM memory. The software can be highly optimized for the classification process, so the RAM memory would be the only issue, but making it design data to match software would be a really interesting project to work on in industry.

The presenter’s presentational skills were extraordinary. I was able to fully understand everything he talked about in his presentation. He explained all the theoretical concepts with basic mathematics and broke down every single concept, so that students who were not familiar with the topic were able to follow his presentation. Furthermore, he gave a significant amount of examples and explained thoroughly his research project. Additionally, I am highly interested in the details of his research because he talked about TensorFlow, open-source software library, which I learned about in my CSCI 585 –Database Systems class.

In my viewpoint, I think that this presentation was intellectually interesting for me because it was completely relatable to the classes I have taken for my Master’s program, Artificial Intelligence, and during my undergraduate degree, all the circuit design classes, including Electronic Circuits, Embedded Systems, and Internet of Things. As a young student in the Engineering field, I believe Machine Learning is the future for all technology. Unfortunately, software research develops faster than hardware and, for decades, hardware slows down software implementation and mass production. Thus, with the guest lecturer’s research project, even software developers and software technology is going to be able to enjoy its benefits.