**Seminar Review**

**Topic**

The seminar title is “Efficient DNN Training Through Model and Output Consistency”. The presenter first pointed out the problem that state-of-the-art models become more and more data-hungry due to their growing capacity. However, data annotation is a costly process that requires a significant amount of work. Therefore, it is important to efficiently utilize the data. He proposes one possible solution.

**Main Contributions**

The presenter tries to approach this problem from two perspectives: enhancing the efficiency of the optimization process in training DNNs and modeling good representations to improve data utilization efficiency for different applications.

During his presentation, he mainly shows how to apply this method on Federated Learning. Consistent process and consistent decision lead to better decisions. He also mentions memory efficient online meta learning and deep companion learning. By introducing these theories and comparing the result of his method with results of traditional methods, he proves the effectiveness.

**Results**

Compared with former methods, his method can train models with fewer training rounds. Besides, the communication cost of each training round is decreased. Since his final model owns similar accuracy but costs much less, he realizes the tradeoff between accuracy and cost. Therefore, he found an efficient DNN training method.

**My Opinions**

Personally speaking, what he showed did not match what he described perfectly. During the presentation, he spent half of time introducing federated learning. It is admitted that federated learning is one possible solution to the thirst of huge data in model training. However, the security of federated learning is the key problem that prevents its application. Considering that federated learning still stays theoretical, it may be too early to start this kind of research. If we take weights of each client, one of the most important factors during federated learning, into consideration, the result of his method may be different.

**My Future Work**

I’d like to test the efficiency of his method with the consideration of weights of clients. The tradeoff may be a little different. If his method is still available, I will try to make improvements to find a better strategy or make this method applicable to more sceneries. If not, I may try to design more efficient and robust optimization algorithms for federated learning.