2019/01/28 group meeting memo by jing jin
1.   Lifelong learning with dynamically expandable networks- present by Yong zhao

Dr. Hu:
the method will dynamically expand sth new without forget the old one.

Yong zhao:
Using the minst as example to illustrate the problem. The task 1 would be train the model to predict 0, the task 2 would expand the model to train it to predict 2.. The task 10 would be expand the model to train it to predict 9.

The problems provide three methods
1. Retraining (like transfer learning)
2. Regularization: sub-optimal (to remember the older information)
3. Expandation: time(each time adding some new neurons)

Challenge:
1. Scalability
2. When and how to expand
3. Catastrophic forgetting (happen when the task now is very different from the previous one)

Methods detail:

1. Selective retraining: only update the last hidden-layer. Use regularization to make the weight of the less important feature zero. When retrain the model, fix the less important features and train others. This would make the model more adaptive to the new tasks by just modify the neurons that are important to current task.
2. Dynamic network expansion(group sparsity regularization) : each step adding some useful filters and each of the feature map is a group.
3. split/duplication network. Before this paper many people use penalty factor in regularization to balance the old model and the new task. If the penalty factor is larger, then we make the training process difficult to change the weight. In this paper, if the feature is very important in current task(suppose the task 2), then reset them to the task 1 weight. At the second training using a different penalty factor and retrain them. Thus the neurons represent the common features are trained once and the neurons represent the very different features are trained twice.

2.   weakly supervised cell segmentation - present by Yuxin Cui

Yuxin present a paper that tell about deconvolution the feature map and to predict which part of the input would actually influence the output pixel.