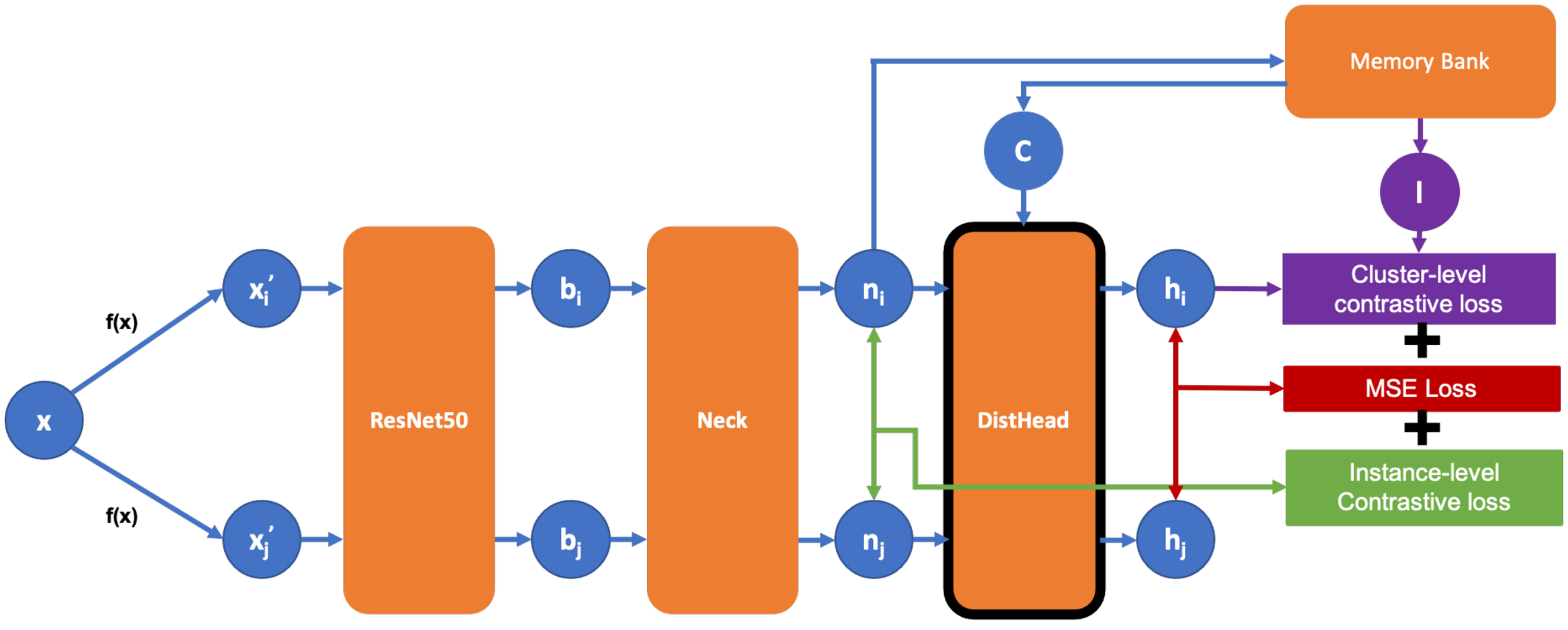
NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Computer Science and Engineering
College of Engineering

ContrastiveODC

Explore inter-image invariance for representation learning

Student: Li Shenggui Supervisor: Prof. Loy Chen Change



Project Objectives:

Contrastive learning shows promising results in representation learning. However, it mainly explores the intra-image invariance and neglects inter-image invariance. To utilize inter-image invariance for representation learning, one approach is to introduce clustering into contrastive learning. With clustering algorithms such as K-means, it is possible to group similar image representation into clusters. Therefore, contrastive learning can be conducted at both the instance level and the cluster level. The cluster-level contrastive loss maximizes agreement between representations within the same cluster and enlarges the different between different clusters. This can facilitate the model to learn better representation.

By carefully designing the loss function and the model architecture, our model uses both intra-image and inter-image invariance for representation learning. It also tackles the stale weights problem and avoids trivial solutions which exist in the clustering model. As a result, our model can outperform the baseline by a large margin.

Evaluation Results on ImageNet