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How can Autoencoder help Image Segmentation?

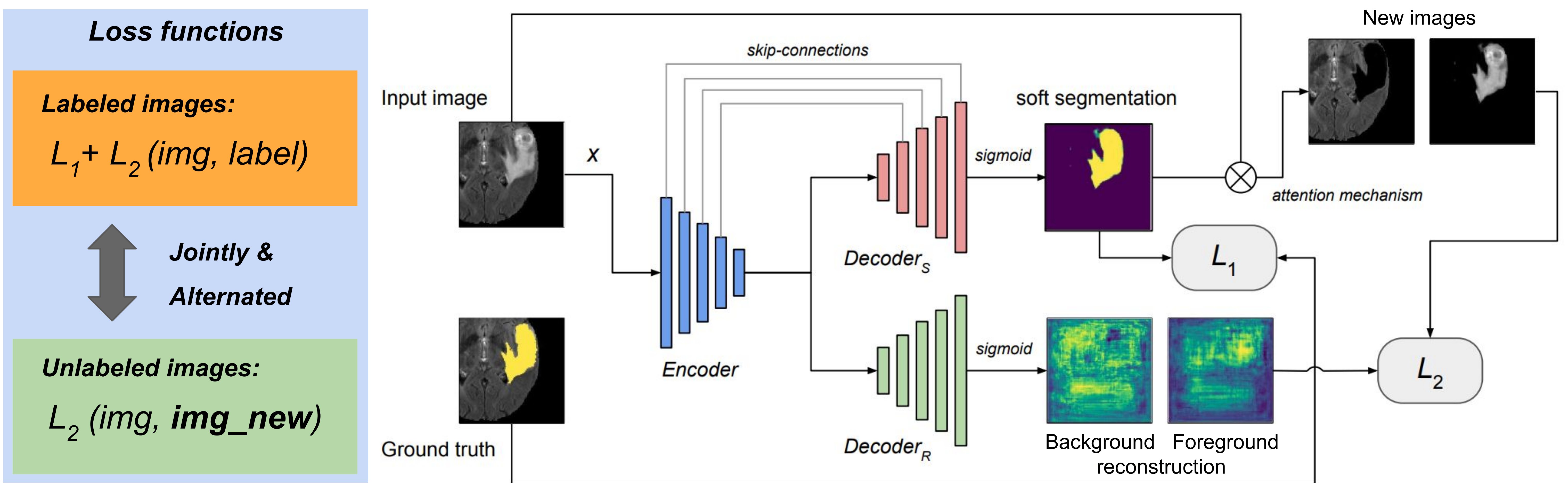
Motivation

1. Lots of medical images obtained everyday, but obtaining **annotations** is **expensive** and **time consuming**.
2. [1] has shown an auxiliary autoencoder can improve **classification**. [2] uses **reconstruction features** to help segmentation. Can we encourage the autoencoder to learn **features more relevant for segmentation**?

Solution

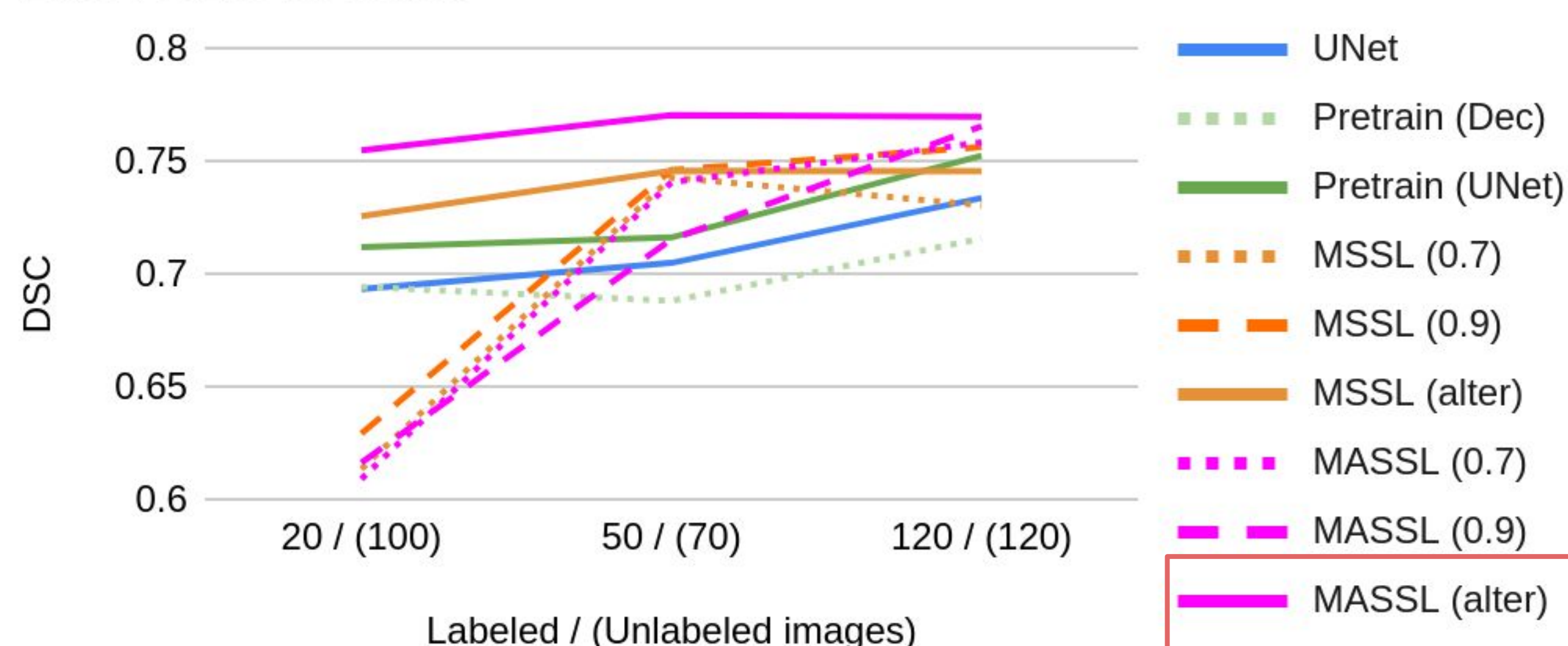
Let Autoencoder learn both **Segmentation** and **Reconstruction** to help the main task!

Method

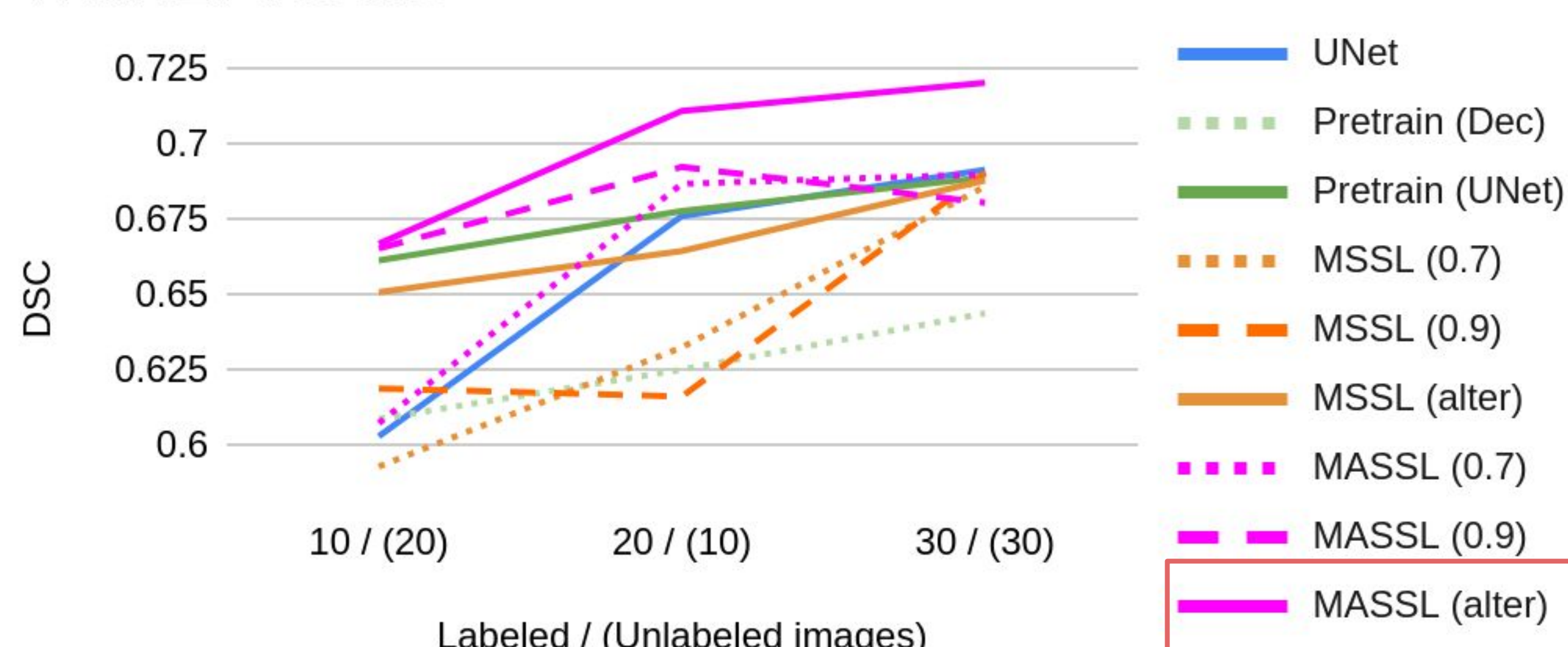


Results

BraTS18 results

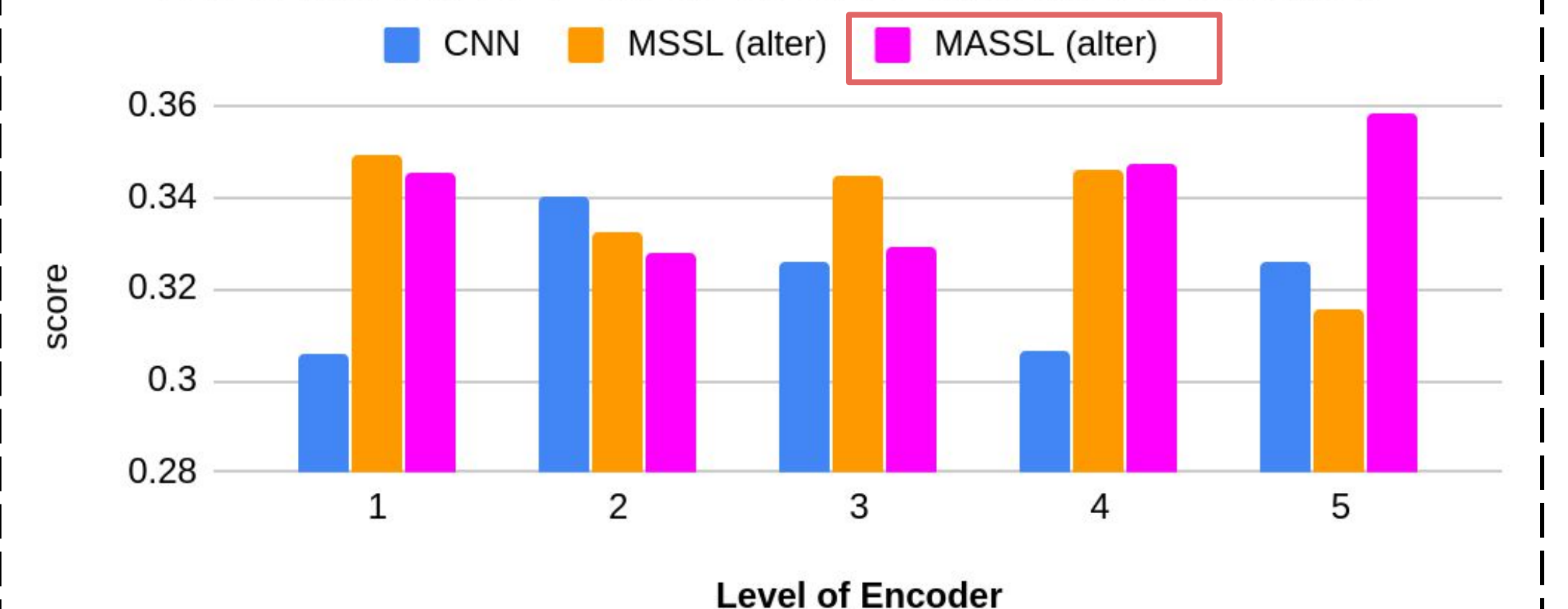


WMH17 results



Encoder Analysis

Discriminative Power of the Encoded Features



Conclusions

1. Autoencoder works better as an auxiliary task by doing both **segmentation** and **reconstruction**.
2. **MASSL** is a promising segmentation framework in both *semi-supervised* as well as *fully-supervised settings*.

References

1. Rasmus, A., et al.: Semi-supervised learning with ladder networks. In: NeurIPS. (2015)
2. Sedai, S., et al.: Semi-supervised segmentation of optic cup in retinal fundus images using variational autoencoder. In: MICCAI.(2017)