

1 Theory

1.1 Convolution

1.2 Batch normalization

2 Methodology

2.1 Pixel classification

2.2 Image to image classification

Architectures such as [1] could be used for semantic segmentation, given a sliding windows approach across the image to be classified. However, this approach would prove to be time consuming, as each pixel would have to be classified independently, each pixel would only have a receptive field limited by the extent of the sliding window and the edges would be difficult to classify. Thus, network architectures such as [2] and [3] provide a translation invariant framework for image to image prediction.

The U-Net architecture was originally proposed by [3] in 2015.

References

- [1] Alex Krizhevsky, Ilya Sutskever, and Geoffrey E Hinton. "ImageNet Classification with Deep Convolutional Neural Networks". In: *Advances in Neural Information Processing Systems*. Ed. by F. Pereira et al. Vol. 25. Curran Associates, Inc., 2012. URL: <https://proceedings.neurips.cc/paper/2012/file/c399862d3b9d6b76c8436e924a68c45b-Paper.pdf>.
- [2] Jonathan Long, Evan Shelhamer, and Trevor Darrell. "Fully Convolutional Networks for Semantic Segmentation". In: (Nov. 2014). arXiv: [1411.4038](https://arxiv.org/abs/1411.4038) [cs.CV].
- [3] Olaf Ronneberger, Philipp Fischer, and Thomas Brox. "U-Net: Convolutional Networks for Biomedical Image Segmentation". In: (May 2015). arXiv: [1505.04597](https://arxiv.org/abs/1505.04597) [cs.CV].

Wrigglesworth
2011 the
persistence
of sea ice
anomalies
are very
high at
weekly - sub
monthly
timescales,
making it
difficult to
beat

Write about
how deep
neural net-
works fits
a model to
some output
according
to the in-
put. This
way, using
data which
is somewhat
correlated
to what is
expected as
output can
help increase
the model
skill