

# 1 Theory

## 1.1 Convolution

## 1.2 Batch normalization

# 2 Methodology

## 2.1 Pixel classification

## 2.2 Image to image classification

Architectures such as [Krizhevsky2012] 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 [Long2014] and [Ronneberger2015] provide a translation invariant framework for image to image prediction.

The U-Net architecture was originally proposed by [Ronneberger2015] in 2015.

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