Convolutional neural networks (CNNs) have been used in the field of computer vision for decades. However, their true value had not been discovered until the ImageNet competition in 2012, a success that brought about a revolution through the efficient use of graphics processing units (GPUs), rectified linear units, new dropout regularization, and effective data augmentation. Acknowledged as one of the top 10 breakthroughs of 2013, CNNs have once again become a popular learning machine, now not only within the computer vision community but across various applications ranging from natural language processing to hyperspectral image processing and to medical image analysis. The main power of a CNN lies in its deep architecture, which allows for extracting a set of discriminating features at multiple levels of abstraction.