# Complex Images

In tutorial 1.4, we explored a convolution neural network to classify different apparel in the Fashion MNIST Dataset. These neural networks classified extracted features as opposed dense neural networks that classify raw pixels. This leads to better results.

But these images were very simple -- 28x28 monochrome images containing a single subject, and it was centered. Can convolutions help with understanding the contents of more complex images?

The short answer is 'yes', and we'll explore CNNs on images that are more real-world. To get a sense of what's possible here's a great paper -- https://arxiv.org/pdf/1311.2901v3.pdf -- where the authors explore how a Convolutional Neural Network can 'see' features. So, in the left diagram here, we see the results of a filter when applied to what are obviously dogs, as well as curved items like clocks. The images on the right are actually *reconstructions* of images using these filters -- where these images were generated by the neural network by going backwards through filters!
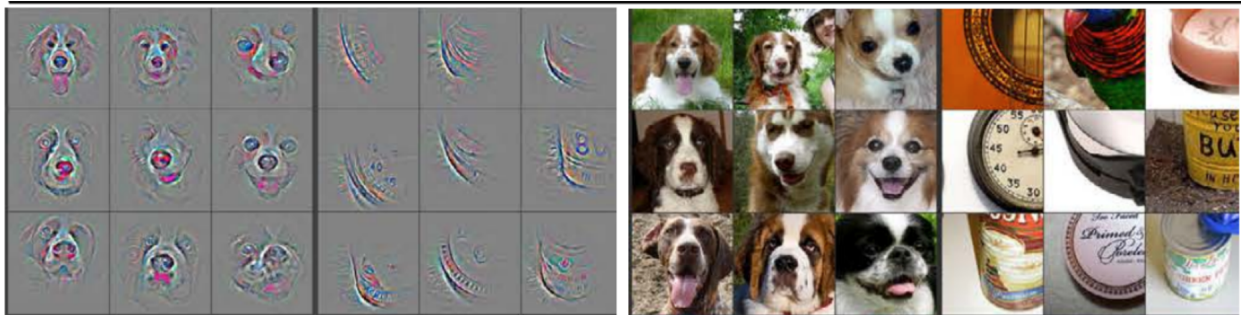
For some code on how to create visualizations of your filters check out -- https://keras.io/examples/vision/visualizing_what_convnets_learn/