

Ryan Filgas
Machine Learning
Research Paper Summary #3

ImageNet Classification with Deep Convolutional Neural Networks By Krizhevsky et al. presents a method of machine learning that makes use of a deep CNN to achieve error rates better than the state of the art on the ImageNet data. Their efforts focused on optimizing the use of GPUs to increase efficiency, and made use of optimized 2d convolutional algorithms. Importantly the network consists of five convolutional and three fully connected layers, removing any of which causes inferior performance.

Using the ReLU activation function it's possible for researchers to dramatically decrease training time – that is the model converges much faster than other functions tested. Researchers also made use of response normalization (brightness) to reduce error rates in addition to data augmentation consisting of image translations, reflections, and color intensity. Additionally a dropout method was applied, that drops all responses equal to .5 and reduces overfitting. The experiments were done fully supervised as well. Researchers were also able to use two GPUs to efficiently process data which communicated in specific layers; overall this increased speed. Ultimately researchers would like to apply what they've learned to video sequences as additional information can be gleaned by temporal factors to increase the accuracy of their models.