Artificial Neural Networks

Advanced Machine Learning

April 12, 2018

Today you are going to continue to work with artificial neural networks, namely, you will build a Convolutional Neural Network (CNN) for MNIST image classification using `tensorflow` library. Your task is to build a multi-class classifier.

1. Use `tensorflow.examples.tutorials.mnist` to import MNIST data, make a one-hot encoding
2. Build a CNN of following structure: input layer → convolutional layer → maxpool layer → dense layer → output layer (softmax)
3. Use `tf.nn.conv2d` for convolutional layer, `tf.nn.max_pool` for maxpool layer, and `tf.nn.softmax` for output layer.
4. Initialize variables (filters) randomly using normal distribution
5. Make a kernel of size 5x5 pixels for convolutional layer, and 2x2 for maxpool layer
6. Use cross-entropy as a loss function and keep measuring accuracy you are getting on training set (`tensorflow.examples.tutorials.mnist` has already separated test and training sets for you)
7. Train your model using mini-batch gradient descent
8. Print the final accuracy measure on test set and compare it with the one you got using simple neural network from the last class