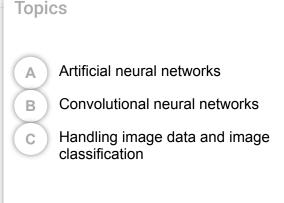
DSC550-T301 Data Mining (2235-1)

Week 11: Neural Networks

Week 11: Neural Networks

Introduction

Introduction
Readings
Supplemental Materials
11.1 Discussion/Participation
11.2 Exercise: Building a CNN Image Classifier



Readings



Read the following:

• Chapters 8, 20, and 21 of Machine Learning with Python Cookbook

Supplemental Materials

All of the materials below are from external sources. Authorship and ownership are indicated within the sources themselves.

11.1 Discussion/Participation

Here are optional topics for discussion via Teams this week. Remember, these topics aren't required, but if you are struggling to know what to post about, these can be used to initiate discussion!

- 1 What is a neural network?
- What is the difference between an artificial neural network (ANN) and a convolutional neural network (CNN)?
- 3 What does it mean that neural networks are modeled after the brain?
- What is an activation function?

11.2 Exercise: Building a CNN Image Classifier



In this exercise, you will build a convolutional neural network (CNN) to classify handwritten digits from the MNIST dataset. The steps to build a CNN classifier are outlined in section 20.15 of the *Machine Learning with Python Cookbook*, but keep in mind that your code may need to be modified depending on your version of Keras.

1 Load the MNIST data set.

Display the first five images in the training data set (see section 8.1 in the Machine Learning with Python Cookbook). Compare these to the first five training labels.

Build and train a Keras CNN classifier on the MNIST training set.

A Report the test accuracy of your model.

5 Display a confusion matrix on the test set classifications.

6 Summarize your results.

Submission Instructions

Click the title above to submit your assignment.

This exercise is due by Sunday 11:59 PM.

Submit your code, output, and answers at the link above. Comment all your code and answer any questions that are asked in the instructions. It is perfectly fine to answer a question by displaying output from your code, but make sure you are displaying the appropriate output to answer the question. I would recommend using and submitting a Jupyter Notebook, but this is not required.

View the rubric for this Assignment by clicking on the link below:

Exercise Rubric