

Fall 2021: CSEE5590/490 – Special Topics

Python and Deep Learning Module-2 - ICP-9

Lesson Overview:

In this lesson, we are going to discuss Neural Network, Backpropagation, Activation Function, Linear Regression, Cost/Loss Functions, Gradient Descent (Optimization Algorithm) and Learning Rate.

Use Case Description:

Image Classification on the hand written digits data set

Source Code:

Provided in your assignment folder and assignment repo.

In class programming:

1. We had used 2 hidden layers and *relu* activation:
 - a. Change the number of hidden layers and the activation to tanh or sigmoid and report what happens.
2. Using the history object in the source code, plot the loss and accuracy for both training data and validation data on the same graph.
3. Run the same code without scaling the images, how the accuracy changes?
4. Convert the sequential model to a functional API model.
5. Plot one of the images in the test data, and then do inferencing to check what is the prediction of the model on that single image in the test data.

Bonus point (20%):

1. Change the loss method to (sparse categorical_crossentropy)
 - a. For this part you need to explain WHY you did encounter an error what did you do to overcome this.
2. Use a method (from NumPy) to print the correct class from the model prediction.

** Follow the IPC rubric guidelines.

Submission Guidelines:

1. Once finished present your work to TA during class time.
2. Once evaluated submit your source code and documentation to GitHub and represent the work in a ReadMe file properly (short summary for the ICP).

After class submission:

1. Complete your work and submit to your repo before the deadline.
2. Record a short video (1~3) minute, explaining the technical part and method used.
3. Add video link to ReadMe file.

Note: Cheating, plagiarism, disruptive behavior and other forms of unacceptable conduct are subject to strong sanctions in accordance with university policy. See detailed description of university policy at the following URL:

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