Deep Learning

Deep Learning model for the Boston housing price regression dataset

Academic year 2020/2021

Instructions

The objective of this exercise is to build a deep learning model for the Boston housing price regression dataset. This is a dataset comes packaged with Keras and you can use it by using the following code:

```
from keras.datasets import boston_housing

(x_train, y_train), (x_test, y_test) = boston_housing.load_data()
```

After importing the dataset, you have to build a deep learning model for solving the regression problem at hand. The objective of this exercise is to summarize what we covered until now in the course.

Thus, you are required to perform the following tasks:

- Build a deep learning model in the simplest way we have seen, that is by training your model on the training set and by testing it on unseen data. Analyze the performance you obtained. Consider a simple architecture consisting of two hidden layers. Make different experiments by changing the number of neurons in the hidden layers. Perform 100 iterations (i.e., epoch) during the training phase.
- Take into account the model(s) built in the previous task. By using the same architectures and the same parameters, experiment the use of L1 and L2 regularization for limiting the amount of overfitting. Subsequently, use a dropout layer after each hidden layer. Compare the results obtained against the ones reported in the first task. What could you say about regularization and dropout?
- Use k-fold cross-validation. This is particularly important taking into account that the dataset under analysis presents a limited number of observations. Repeat the previous tasks.