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Multi-Layer Perceptions Exercise 1 Report

In this exercise, I used previous knowledge from the last exercise in which modifications were made to both the mlp\_classifier and the mlp\_regressor by modifying/adding smaller batch sizes, an adaptive learning\_rate, and momentum to the model. Although I made these changes, I did not modify the learning rate of .001 because it’s a good default number and the number of hidden layers would have a more drastic effect. Also, I tested with different number of hidden layers ranging from 100-400. The results are shown below.

**MLP Classifier**

Presets: Learning\_rate=’adaptive’ | learning\_rate\_init = .001

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Batch Size | Momentum | Hidden Layer Size | Total  Iterations | Time  Training | Time  Testing | Accuracy |
| Test 1 | 100 | .95 | 100 | 50 | **102.210032** | **0.054974** | **0.978143** |
| Test 2 | 100 | .95 | 200 | 30 | **175.739619** | **0.054974** | **0.982000** |
| Test 3 | 100 | .95 | 300 | 34 | **268.297941** | **0.070966** | **0.984857** |
| Test 4 | 100 | .95 | 400 | 37 | **384.568501** | **0.103951** | **0.983571** |

**MLP Regressor**

Presets: Learning\_rate=’adaptive’ | learning\_rate\_init = .001

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Batch Size | Momentum | Hidden Layer Size | Total  Iterations | Time  Training | Time  Testing | MSE |
| Test 1 | 100 | .95 | 100 | 13 | **147.796397** | **0.317493** | **0.038314** |
| Test 2 | 100 | .95 | 200 | 13 | **219.011689** | **0.594988** | **0.038906** |
| Test 3 | 100 | .95 | 300 | 13 | **263.495593** | **0.878580** | **0.038448** |

MSE was not going down going down by much so I didn’t test more than 3 times. Even though there are many more combinations of parameter modifications I was having trouble trying to find a structure to efficiently test parameter modifications.