Exercise report 2 for ML

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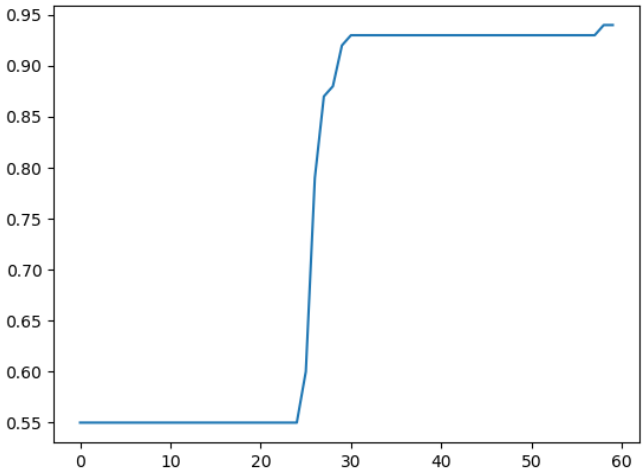
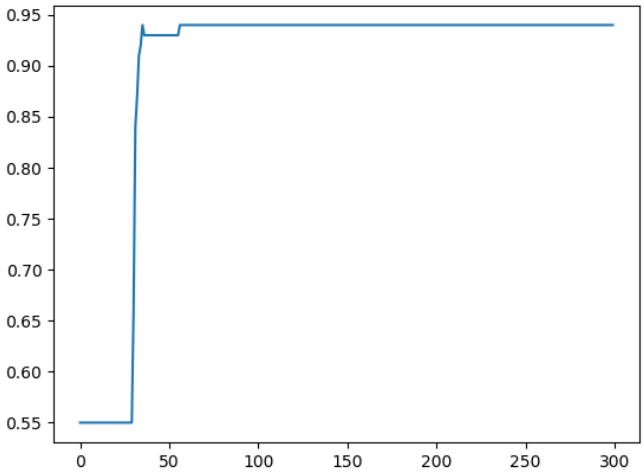
1 observation

The experiment is carried out in two scale(0 60, 0 400) to test the performance of the MLP with BP algorithm when different train and test datasets are applied.
When testset-1 is applied, the result appears below:

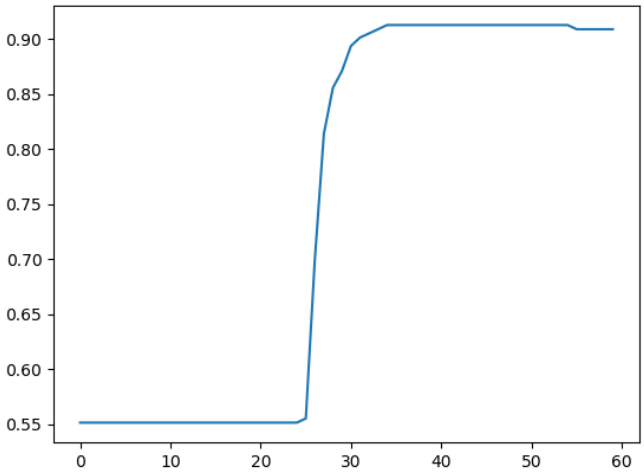


lr_train_1_test_1

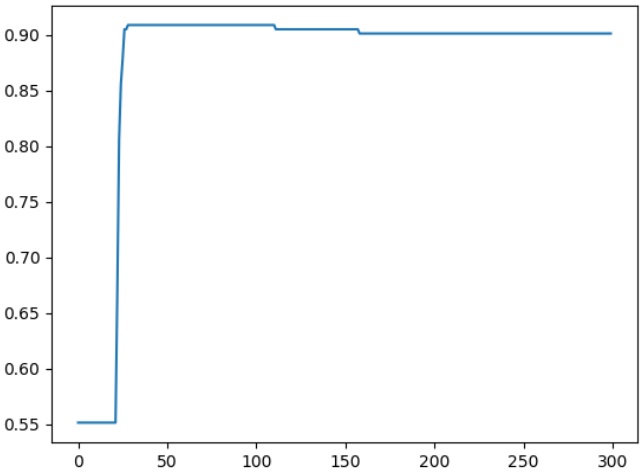


lr_train_1_test_1_e400

The learning curve appears a rapid rise after epochs=25 or 26. In the larger scale(epochs=300), the learning curve goes still at a level of ashfsfsalfsalflsdfjsa;dfsadlfjdsljfsaf%. This is the performance of the MLP with small trainset and small testset.

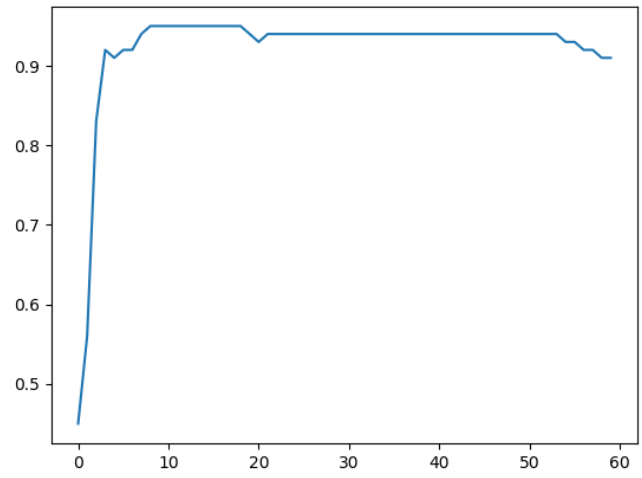


lr_train_1_test_2

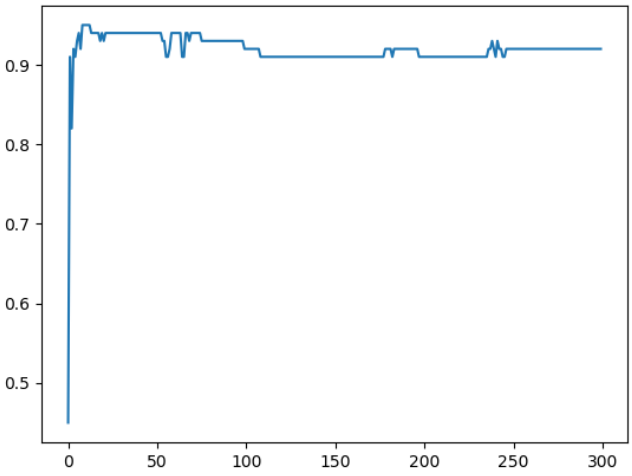


lr_train_1_test_2_e300

The learning curve appears a smoother growth at epochs=25 or 26. In the larger scale(epochs=300), the learning curve goes slightly lower when epochs increases. The accuracy maintains at aslkjflasfssdoadofasd%. This is the performance of the MLP with small trainset and large testset.

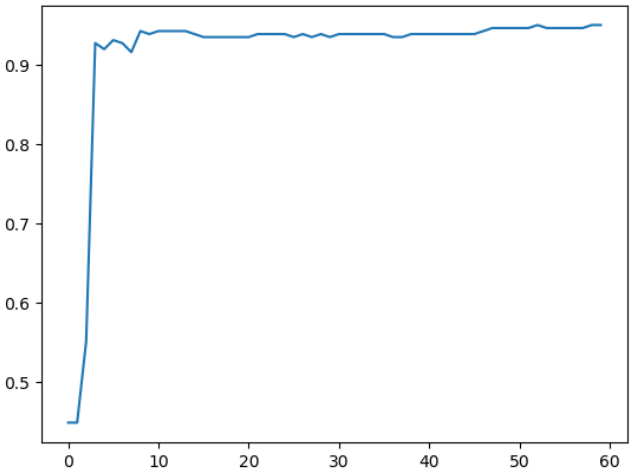


lr_train_2_test_1

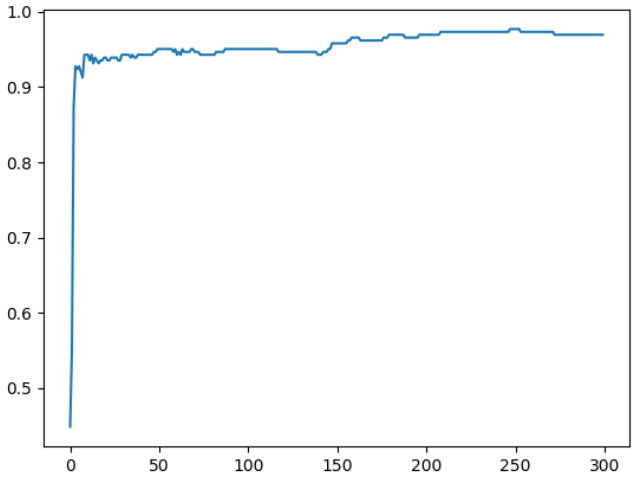


lr_train_2_test_1_e300

The learning curve appears a coarse fluctuation after its rapid growth at the beginning. In the larger scale(epochs=300), the learning curve fluctuates and maintains at around 90%. This is the performance of the MLP with large trainset and small testset.



lr_train_2_test_2



lr_train_2_test_2_e300

The leaning curve rises rapidly at epochs=1, and fluctuates above 90%. In the larger scale(epochs=300), the learning curve fluctuates and maintains at asjfldfjaslfsdlfasof%. This is the performance of the MLP with large trainset and large testset.

2 conclusion

The performance of the MLP shows below:

accuracy of each training after epochs=300

	small testset(testset-1)	large testset(testset-2)
small trainset(trainset-1)	0.9400	0.9049
large trainset(trainset-2)	0.9200	0.9658

The table implies the MLP performs better when sufficient size of trainset is provided, and when the result weight vector is applied to sufficient size of testset(the case of trainset-2&testset-2);
When either trainset or testset is insufficient while the other is sufficient, the result is overfitting(the case of trainset-1&testset-2) or unfitting(the case of trainset-2&testset-1);
When both trainset and testset is insufficient, chances are that the result vector satisfies the

testset well(the case of trainset-1&testset-1). But it's possible for this case to achieve the least accuracy when the samples are not quite similar.
So, when training MLP, trained and applied in sufficient size is the possible best condition.