MSBD 6000B Deep Learning Project 1

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1. Data pre-processing

   By comparing Scale() function, MinMaxscale() function and Normalize() function respect to SVM model, the Scale() function has the highest accuracy. Therefore, for data pre-processing, I use the Scale() function of sklearn for standardization.

2. Experiment deployment

   In this project, I am using SVM, Logistic Regression and KNN to do training and cross validation. For SVM model, I use the SVC package of sklearn in python. For each of the classifier, I did 10-fold cross validation. The performance metric is accuracy.

3. Classifiers and experiment results

   For all parameters, like SVM C and gamma, Logistic Regression C and KNN k-neighbors, optimizers are selected by cross validation and grid search. I only give the best results for each parameter selection.

3.1 SVM

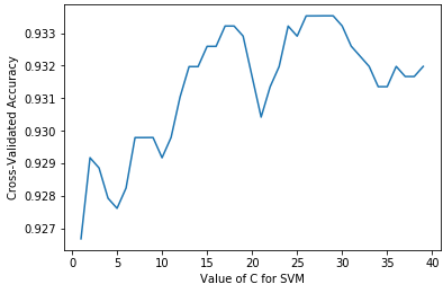
To find the best parameters in SVM, I use grid search and cross validation to find the best values of gamma and C. For SVC package in SVM, I am using rbf kernel, 28 for C value respect to the picture below and 0.01 for gamma value.

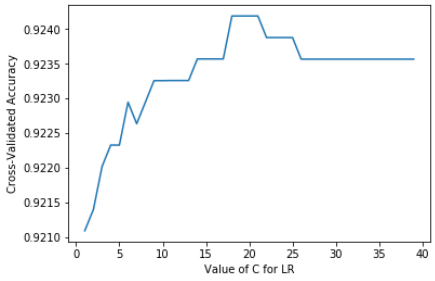
3.2 Logistic Regression

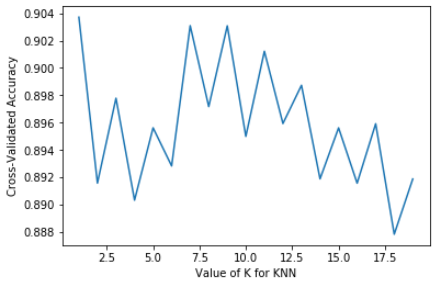
For LR, I use cross validation. The best C value from the picture below is 18.

3.3 KNN

For KNN, I use cross validation. The best k value from the picture below is 7.







3.4 Performance

10-fold accuracy	SVM	Logistic Regression	Knn
mean	0.9335	0.9242	0.903
std	0.0187	0.0148	0.0139

4. Conclusion

In terms of accuracy and stability, SVM model is the best. Therefore, I choose SVM for prediction.