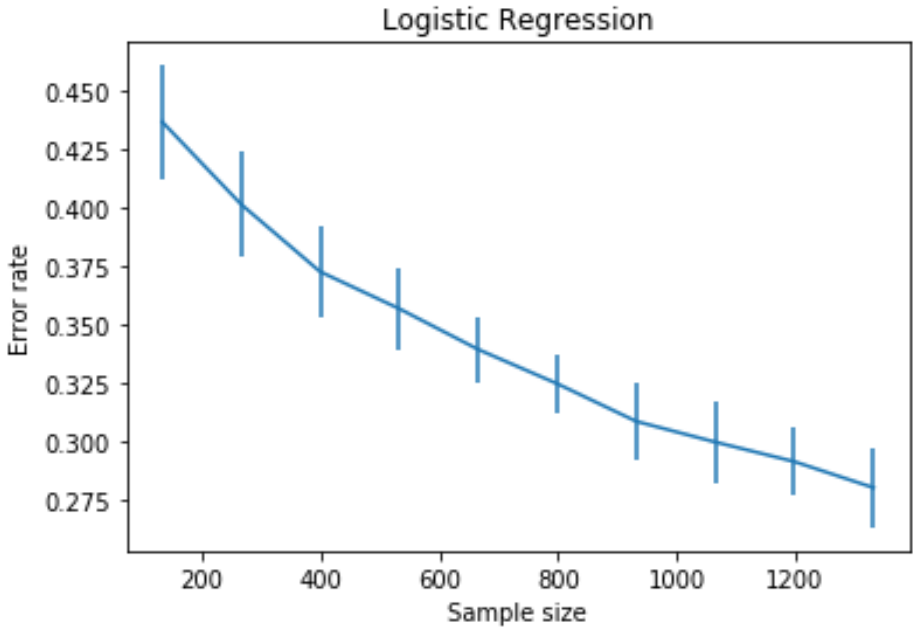
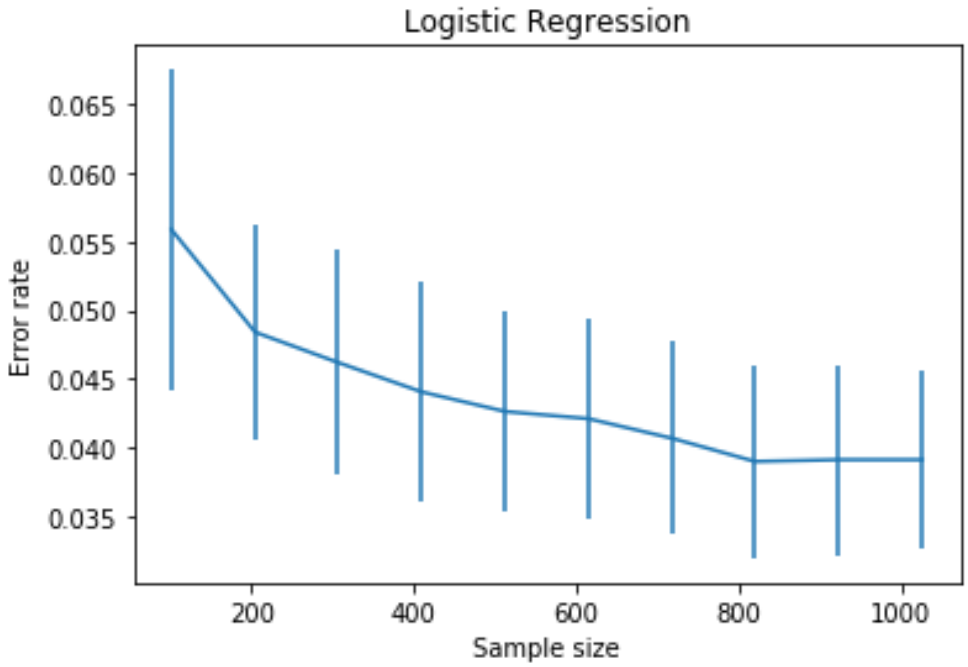
B555: Machine Learning

Programming Project 3

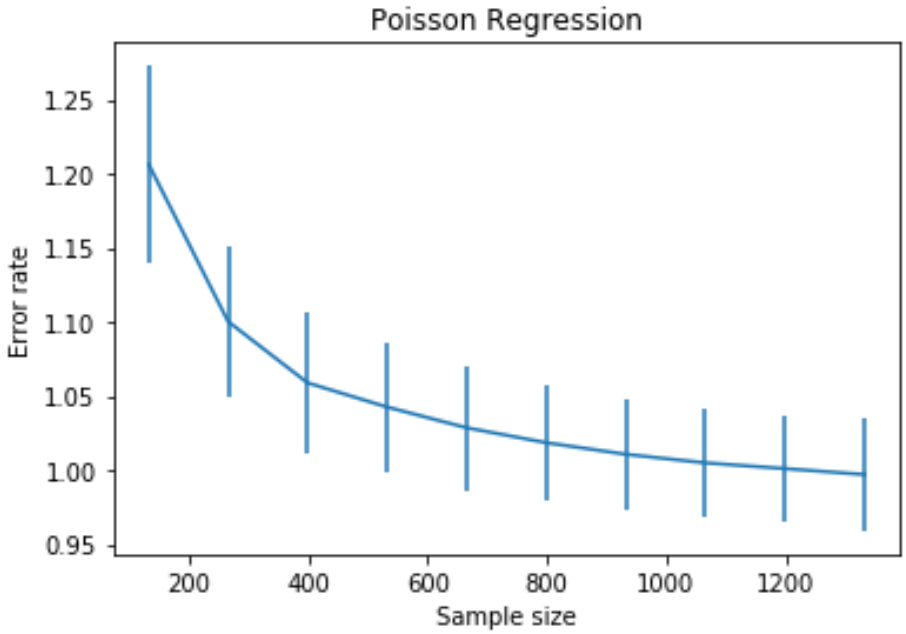
Dataset A:



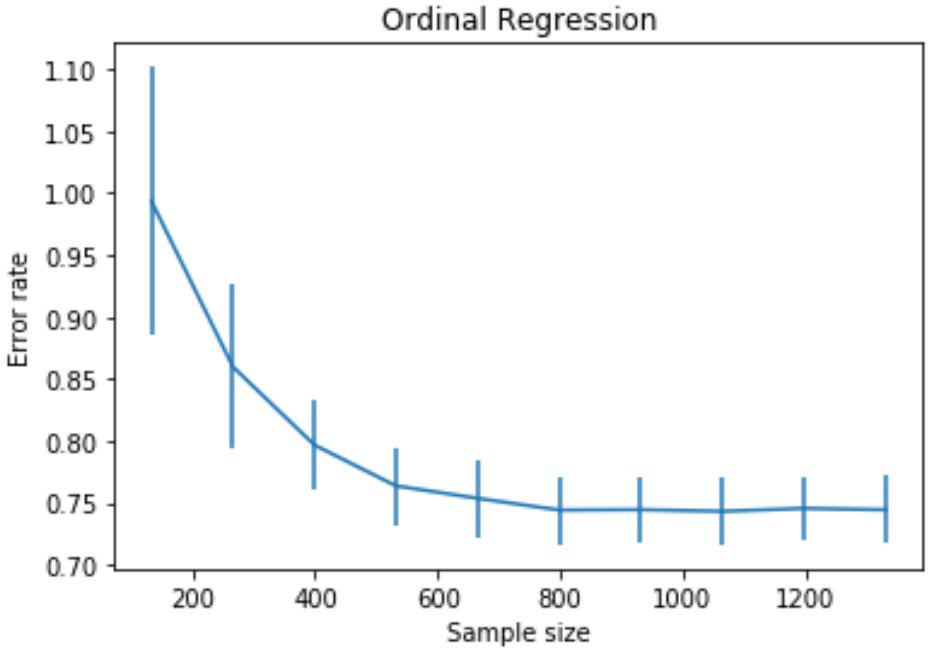
Dataset usps:



Dataset AP:



Dataset AO:



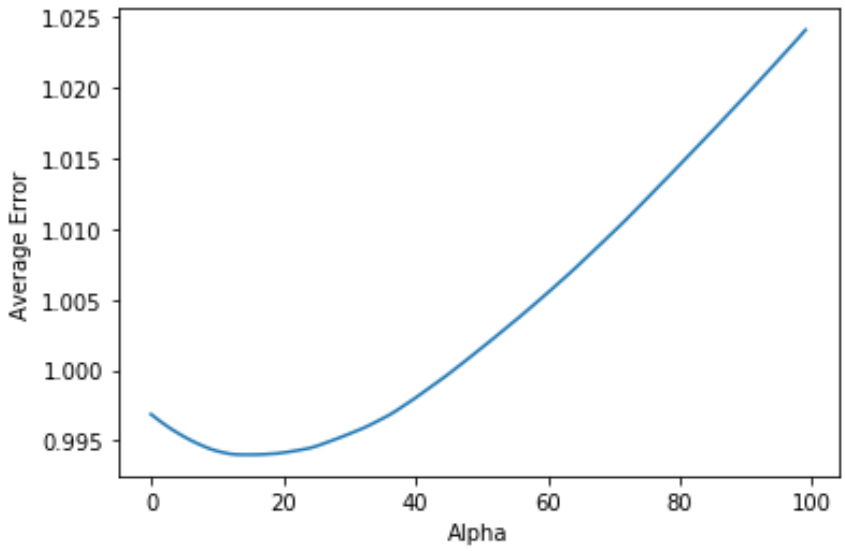
Dataset	Average Time	Average no. of iterations
A	0.06875	2.0
usps	0.3203125	5.5
AP	0.1734375	6.3
AO	0.2625	3.0

- The learning curves are as expected because with increasing sample size the error rate decreases because there is more training data available.
- The learning time for dataset A is quite low compared to usps as the number of iterations taken for convergence of w are less.
- The Poisson regression takes comparatively lower time for the number of iterations as compared to the other datasets. This maybe because it does not have to calculate the sigmoid.
- Ordinal takes the most time per iteration as compared to other models. This maybe because it has to calculate two sigmoids in order to get y_i .
- Poisson has the least time per iteration because it only calculates one exponent.

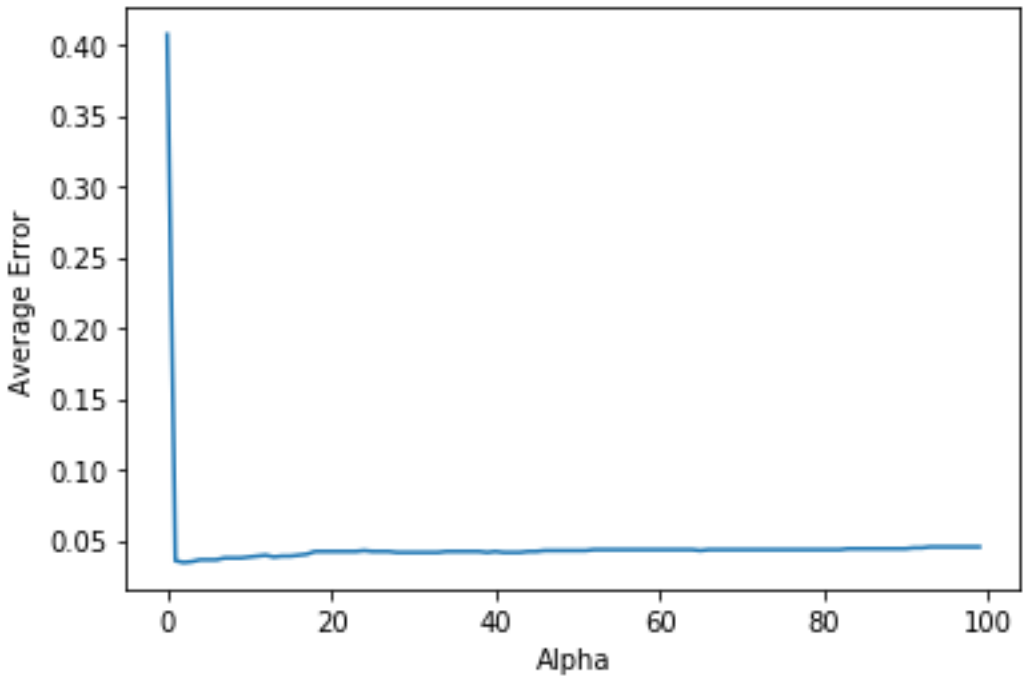
Bonus portion:

For model selection, I have used cross validation method to find the value of α with the least mean absolute error for a given dataset. Alpha values taken are from 0 to 100.

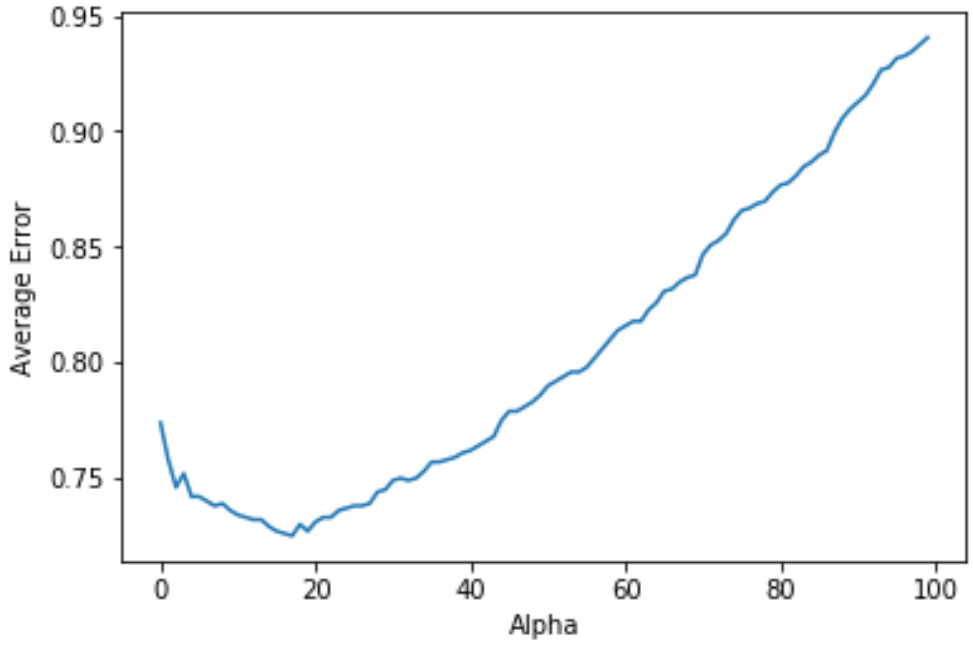
Dataset AP: Optimal solution for alpha is 15



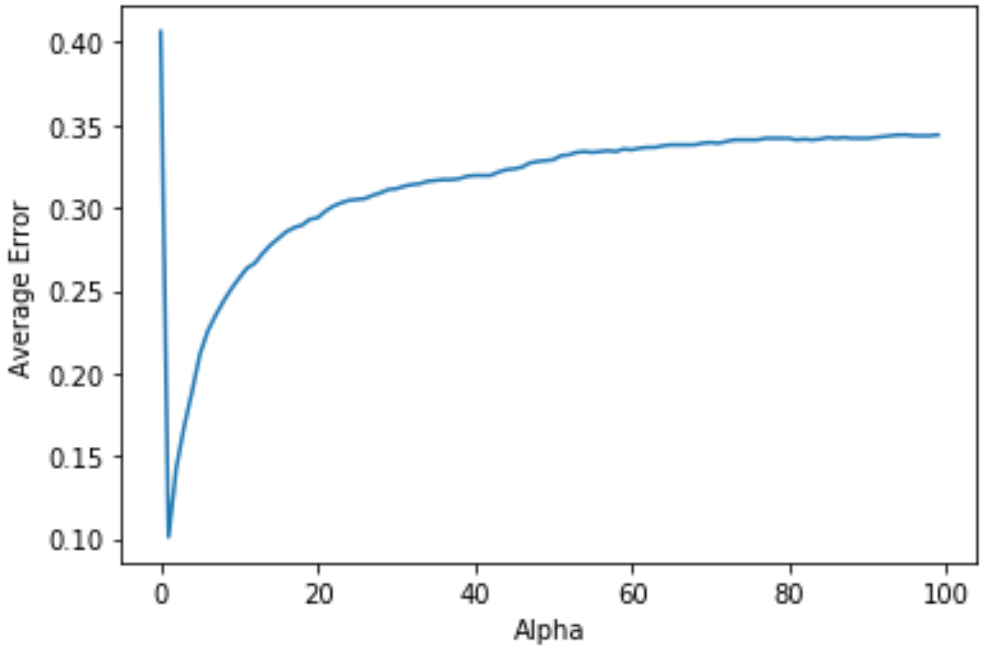
Dataset Usps: Optimal solution for alpha is 2



Dataset AO: Optimal solution for alpha is 15



Dataset A: Optimal solution for alpha is 1



Dataset irlstest: Optimal solution for alpha is 0