CS 436
HW-3
Selin DINC

I have done this assignment completely on my own. I have not copied it, nor have I given my solution to anyone else. I understand that if I am involved in plagiarism or cheating I will have to sign an official form that I have cheated and that this form will be stored in my official university record. I also understand that I will receive a grade of 0 for the involved assignment for my first offense and that I will receive a grade of "F" for the course for any additional offense.

Selin DINC

Perceptrons and Neural Networks

Iterations without removing stop words

1. Accuracy after 10 iterations with 0.1 learning rate : % 72.80334728033473
2. Accuracy after 10 iterations with 0.5 learning rate : % 83.26359832635984
3. Accuracy after 100 iterations with 0.5 learning rate : % 82.63598326359832
4. Accuracy after 100 iterations with 1.0 learning rate : % 82.84518828451883
5. Accuracy after 100 iterations with 1.5 learning rate : % 83.05439330543933
6. Accuracy after 100 iterations with 2.0 learning rate : % 82.63598326359832
7. Accuracy after 100 iterations with 2.5 learning rate : % 82.42677824267783
8. Accuracy after 100 iterations with 3.0 learning rate : % 82.84518828451883
9. Accuracy after 1000 iterations with 0.001 learning rate : % 72.80334728033473
10. Accuracy after 1000 iterations with 0.01 learning rate : % 84.72803347280335
11. Accuracy after 1000 iterations with 0.1 learning rate : % 83.89121338912135
12. Accuracy after 1000 iterations with 0.3 learning rate : % 83.26359832635984
13. Accuracy after 1000 iterations with 0.5 learning rate : % 83.05439330543933
14. Accuracy after 1000 iterations with 1.0 learning rate : % 83.05439330543933
15. Accuracy after 1000 iterations with 1.5 learning rate : % 82.84518828451883
16. Accuracy after 1000 iterations with 2.0 learning rate : % 82.63598326359832
17. Accuracy after 1000 iterations with 2.5 learning rate : % 82.42677824267783
18. Accuracy after 3000 iterations with 0.01 learning rate : % 82.42677824267783
19. Accuracy after 3000 iterations with 1.5 learning rate : % 82.84518828451883
20. Accuracy after 10000 iterations with 0.01 learning rate : % 84.10041841004184

Iterations by removing stop words

1. Accuracy after 10 iterations with 0.1 learning rate : % 73.22175732217573
2. Accuracy after 10 iterations with 0.5 learning rate : % 90.1673640167364
3. Accuracy after 100 iterations with 0.5 learning rate : % 90.3765690376569
4. Accuracy after 100 iterations with 1.0 learning rate : % 91.0041841004184
5. Accuracy after 100 iterations with 1.5 learning rate : % 92.05020920502092
6. Accuracy after 100 iterations with 2.0 learning rate : % 91.84100418410041
7. Accuracy after 100 iterations with 2.5 learning rate : % 91.84100418410041
8. Accuracy after 100 iterations with 3.0 learning rate : % 91.42259414225941
9. Accuracy after 1000 iterations with 0.001 learning rate : % 73.22175732217573

10. Accuracy after 1000 iterations with 0.01 learning rate : % 89.7489539748954
11. Accuracy after 1000 iterations with 0.1 learning rate : % 90.3765690376569
12. Accuracy after 1000 iterations with 0.3 learning rate : % 90.3765690376569
13. Accuracy after 1000 iterations with 0.5 learning rate : % 90.3765690376569
14. Accuracy after 1000 iterations with 1.0 learning rate : % 91.0041841004184
15. Accuracy after 1000 iterations with 1.5 learning rate : % 92.05020920502092
16. Accuracy after 1000 iterations with 2.0 learning rate : % 91.84100418410041
17. Accuracy after 1000 iterations with 2.5 learning rate : % 91.84100418410041
18. Accuracy after 3000 iterations with 0.01 learning rate : % 90.3765690376569
19. Accuracy after 3000 iterations with 1.5 learning rate : % 92.05020920502092
20. Accuracy after 10000 iterations with 0.01 learning rate : % 90.3765690376569

Accuracy generally rises then falls after a certain amount of training.(overtraining/overfitting)

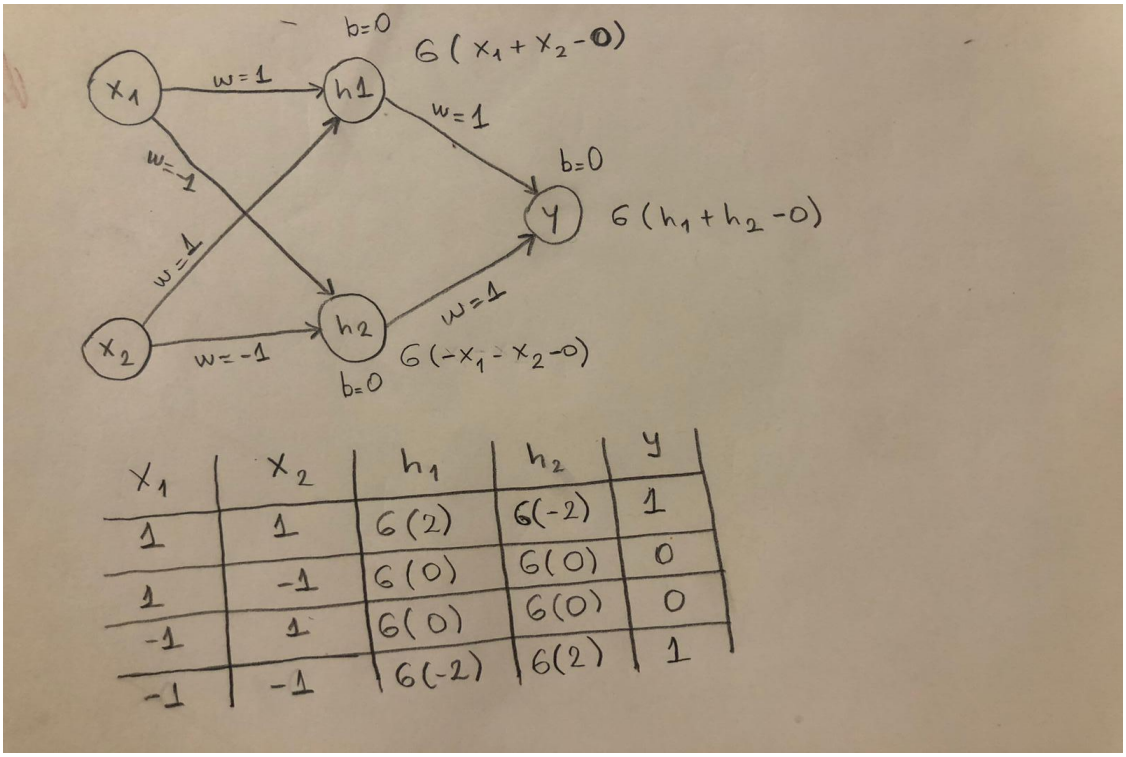
Naive Bayes for Text Classification

Accuracy on test data **with** stop words: % 96.44351464435147

Accuracy on test data **without** stop words: % 96.86192468619247

In my case accuracy of Naïve Bayes is higher than the Perceptron algorithm. Accuracy of Perceptron algorithm reaches % 92.05020920502092 at max. Naïve Bayes max accuracy is : % 96.86192468619247. In both cases removing stop words increases the accuracy. The reason that Naïve Bayes is more accurate than Perceptron may be that Perceptron overfits after a certain amount of iterations.

Question 2



x_1	x_2	h_1	h_2	y
1	1	g(2)	g(-2)	1
1	-1	g(0)	g(0)	0
-1	1	g(0)	g(0)	0
-1	-1	g(-2)	g(2)	1