Homework Set 5, CPSC 6430/4430

LastName, FirstName

Due 04/17/2024, 11:59PM EST

Naive Bayes Implementation and Application

Please refer to Jupyter Notebook.

Naive Bayes

The table below provides a training dataset containing sixteen observations. Now please determine by Naive Bayes whether the new coming data is Male (M) or Female (F) given 'Basketball, 6 feet (height), 150lbs, 4 inches hair, 10 inches footsize and Drinking'.

Sports	Height (feet)	Weight (lbs)	Hair (inches)	Footsize (inches)	Drinking	Class
Basketball	6	145	6	11	No	F
Tennis	5.6	150	8	11	Yes	M
Basketball	6.4	170	3	13	Yes	M
Basketball	6.2	150	7	12	No	M
Basketball	6	140	6	11	Yes	F
Tennis	6.4	130	7	11	No	F
Soccer	5.8	140	4	12	Yes	M
Soccer	6.2	130	7	11	No	F
Soccer	6	150	4	10	Yes	M

Perceptron Implementation and Application

Please refer to Jupyter Notebook.

Stepsize for Perceptron

In vanilla perceptron we set $\mathbf{w}^{t+1} = \mathbf{w}^t + y_i \mathbf{x}_i$ whenever we make a mistake. Now we change the stepsize from 1 to some $\eta > 0$, and accordingly $\mathbf{w}^{t+1} = \mathbf{w}^t + \eta y_i \mathbf{x}_i$. Prove that the modified perceptron will perform the same number of iterations as the vanilla Perceptron. In the Perceptron jupyter notebook, you may change Perceptron(eta=10) to 'eta=1', 'eta=100' or 'eta=0.1' and observe the plot which will validate the conclusion claimed here.