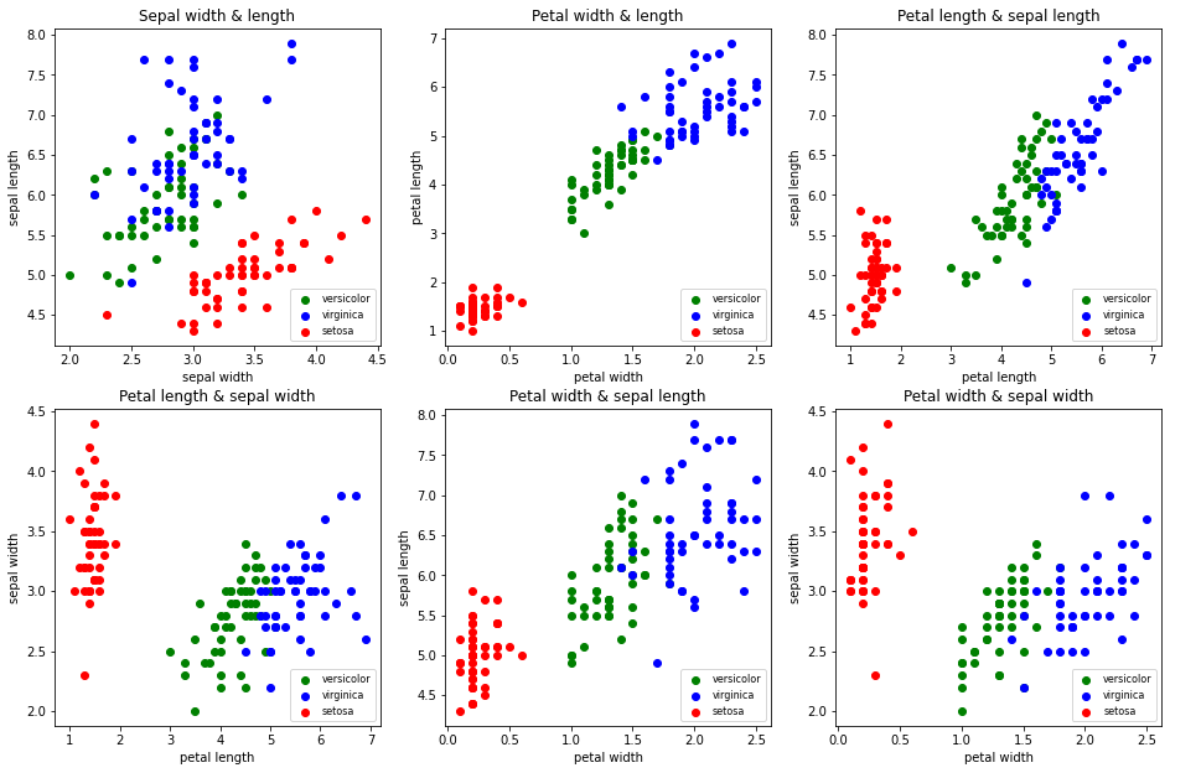
COMP5400M: BIC Coursework 2

Student ID: 201373470

1. Plots shows as below.



1. I do believe that setosa vs. non-setosa can be learnt by a perceptron. Based on the plots above, there are 6 plots of different 2 inputs’ combations. And we can see that all of these plots are linear separable between setosa and non-setosa flowers. Especially for the plot that use petal width and length as its inputs. There is a huge gap between setosa and the others, which means we can use one single decision line to separate it easily. In conclusion, the formular of the perceptron is *y + 2.8 \* x – 3.5 = 0.* The weight of petal length is 1, petal width is 2.8, both of sepal width and length are 0, and the bias is -3.5. The decision line on the plot shows as below.



1. No, it’s not gonna converge without learning rate. When using the gradient descent algorithm for optimization, the weight update rule will multiply the gradient term by a coefficient. This coefficient is the learning rate. Without it, there will be no update to the weight and also no optimization for the model. By the end of training, the loss remain unchanged and the output numpy has no changes as well. So the output can’t be correct.