

Deep Learning: Theory and Practice

Linear and Logistic Models for Classification

22-02-2018

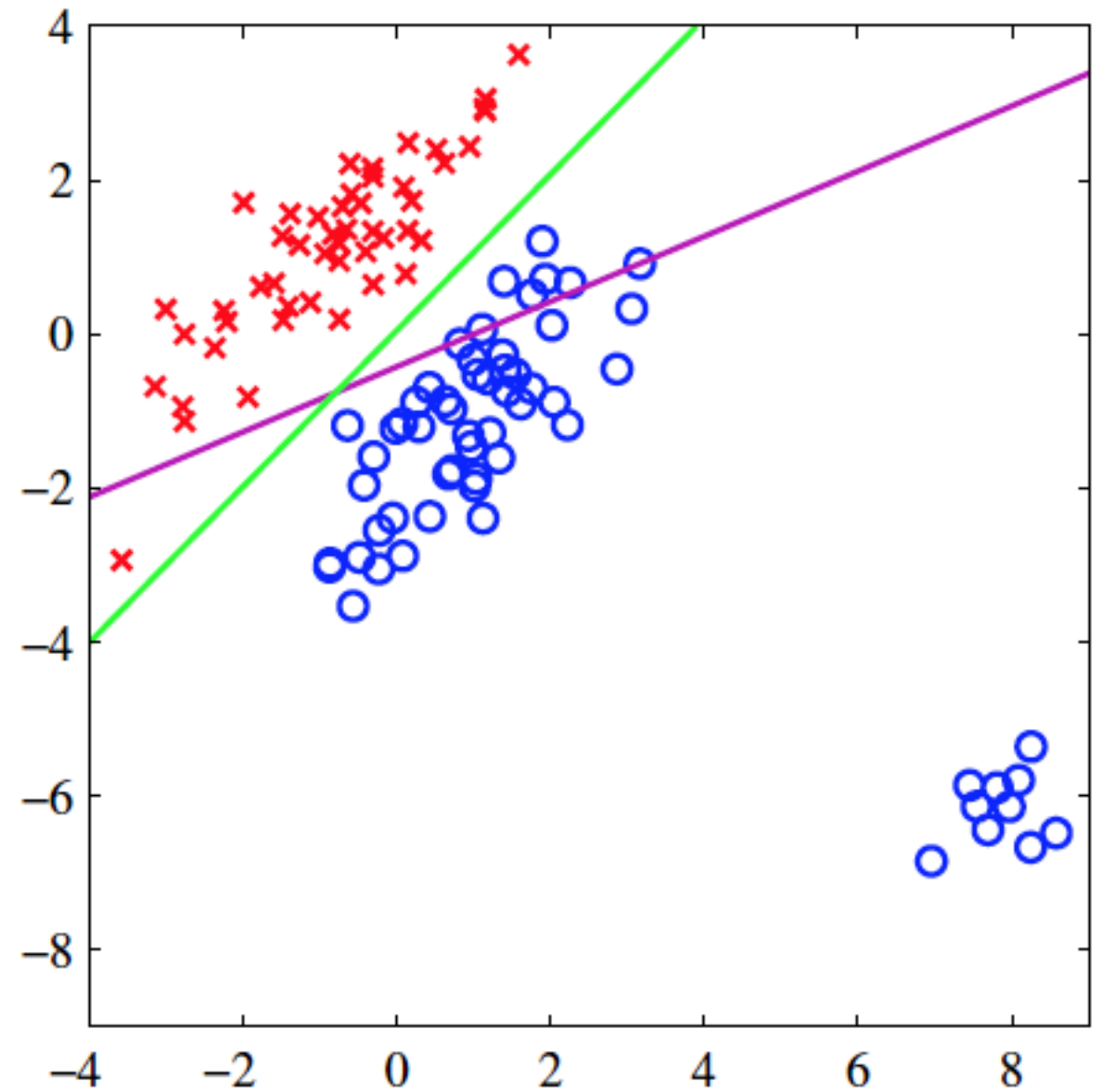
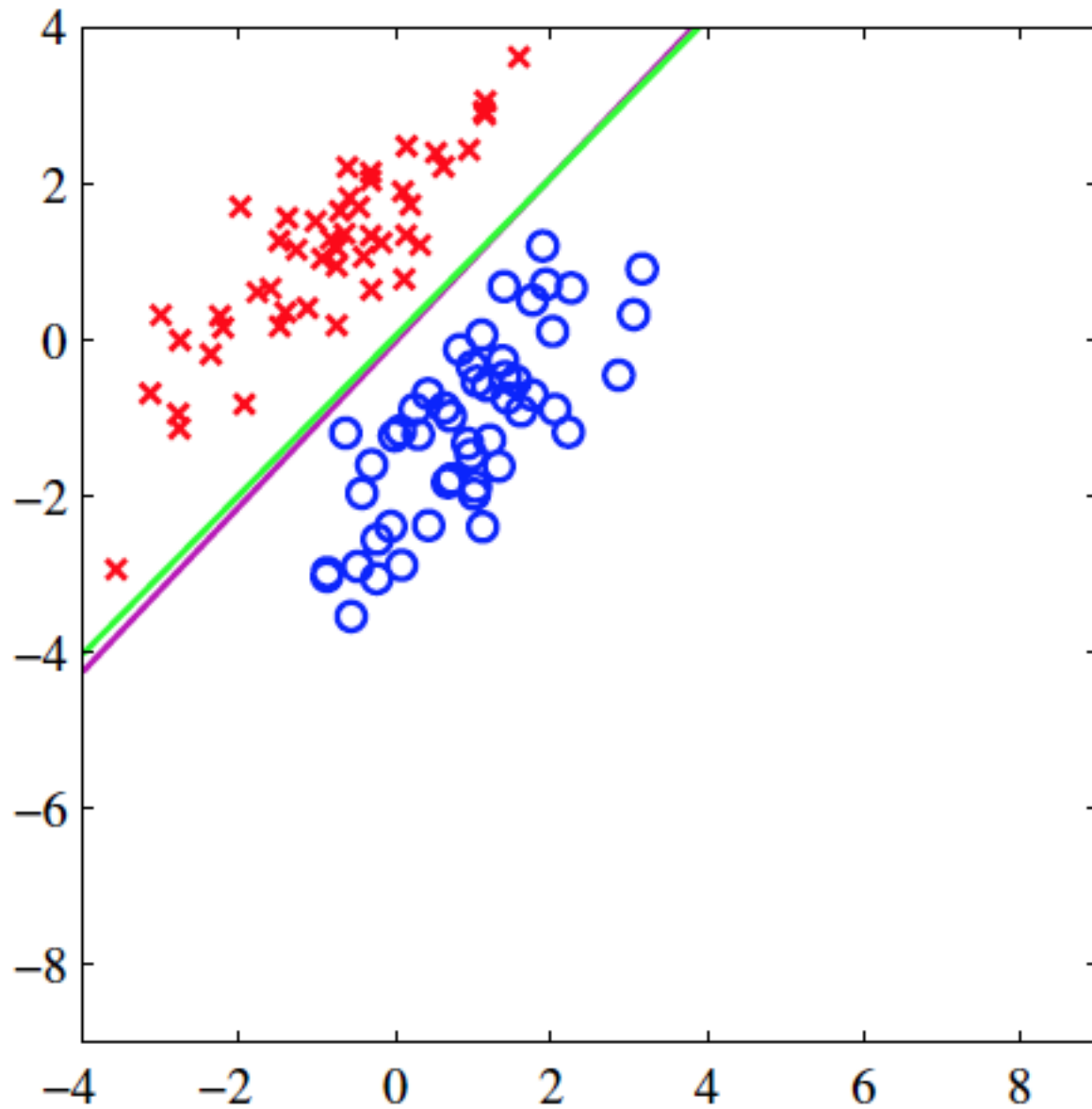
deeplearning.cce2018@gmail.com



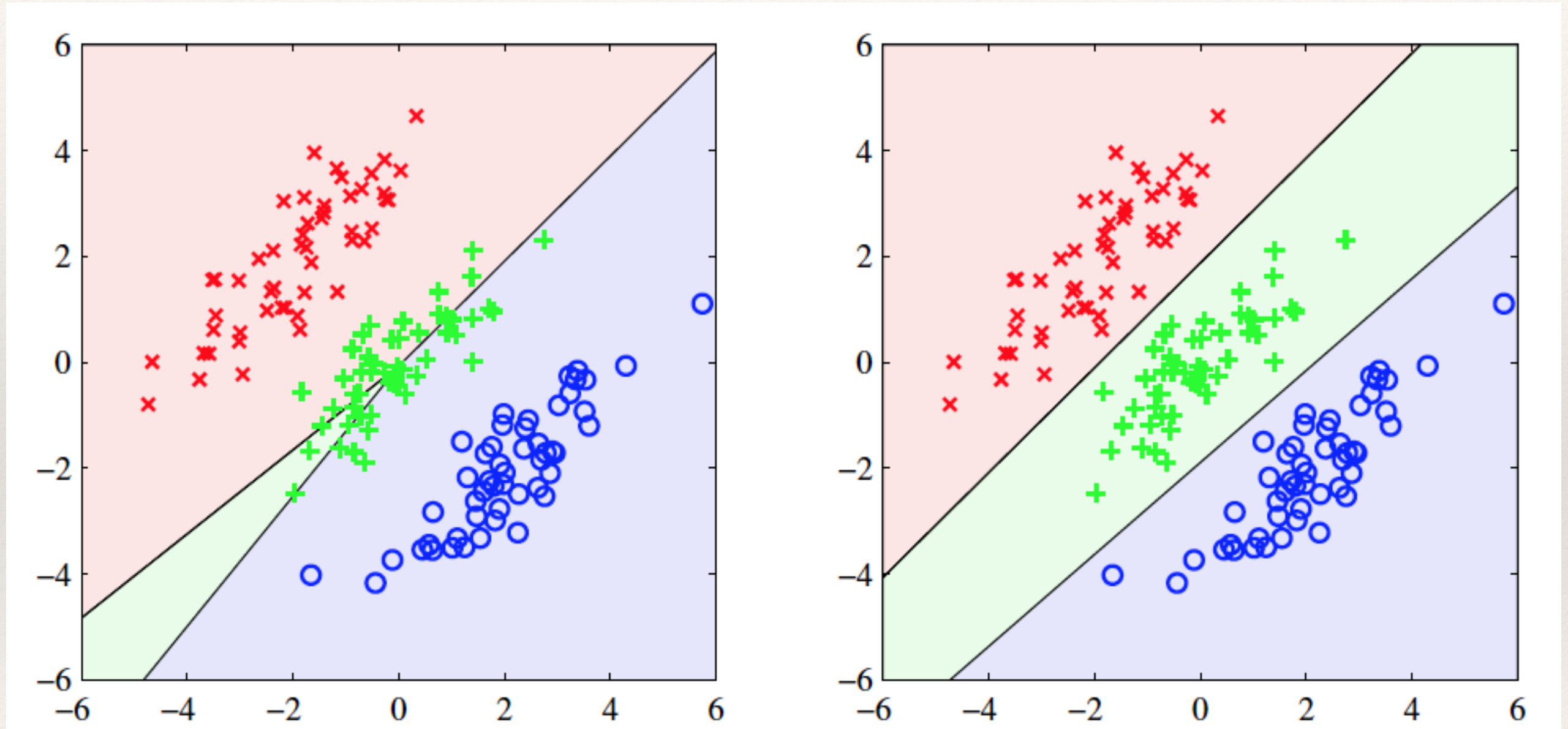
Summary so far ...

- ❖ Maximum Likelihood
- ❖ Linear Least Squares Classifiers
- ❖ Logistic Regression
 - ❖ Application of ML to Logistic Regression
 - ❖ Gradient Descent
 - ❖ Coding Logistic regression

Least Squares versus Logistic Regression



Least Squares versus Logistic Regression



Training, Validation and Test Set

Original Set

Training

Testing

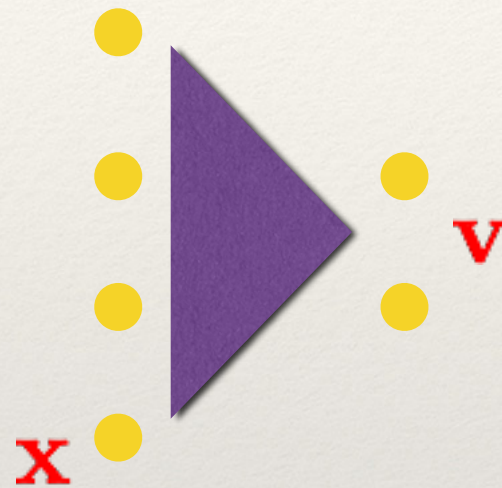
Training

Validation

Testing

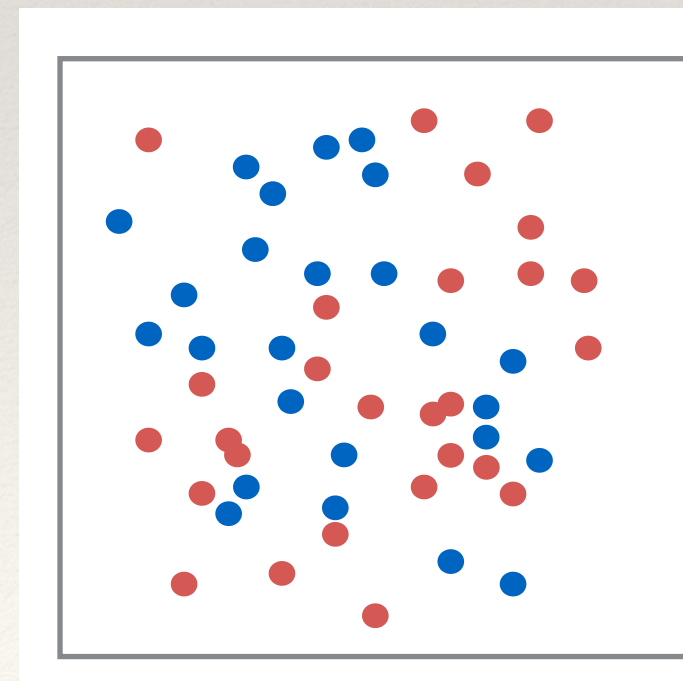
Perceptron Algorithm

Perceptron Model [McCulloch, 1943, Rosenblatt, 1957]



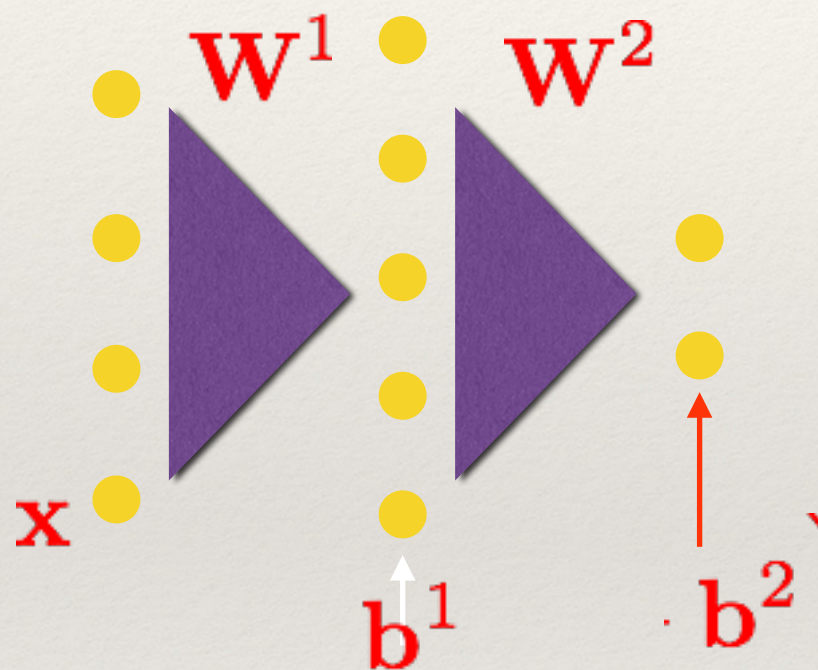
Targets are binary classes $[-1, 1]$

What if the data is not
linearly separable



Multi-layer Perceptron

Multi-layer Perceptron [Hopfield, 1982]



$$\mathbf{v}^2 = \psi \left(\mathbf{W}^2 \phi(\mathbf{W}^1 \mathbf{x} + \mathbf{b}^1) + \mathbf{b}^2 \right)$$

ϕ non-linear function (*tanh, sigmoid*)

ψ thresholding function