wtech
Teknolojide Kadın Derneği

Introduction to Machine Learning with Python

Supervised Learning: Naive Bayes and Tree based Algoritms

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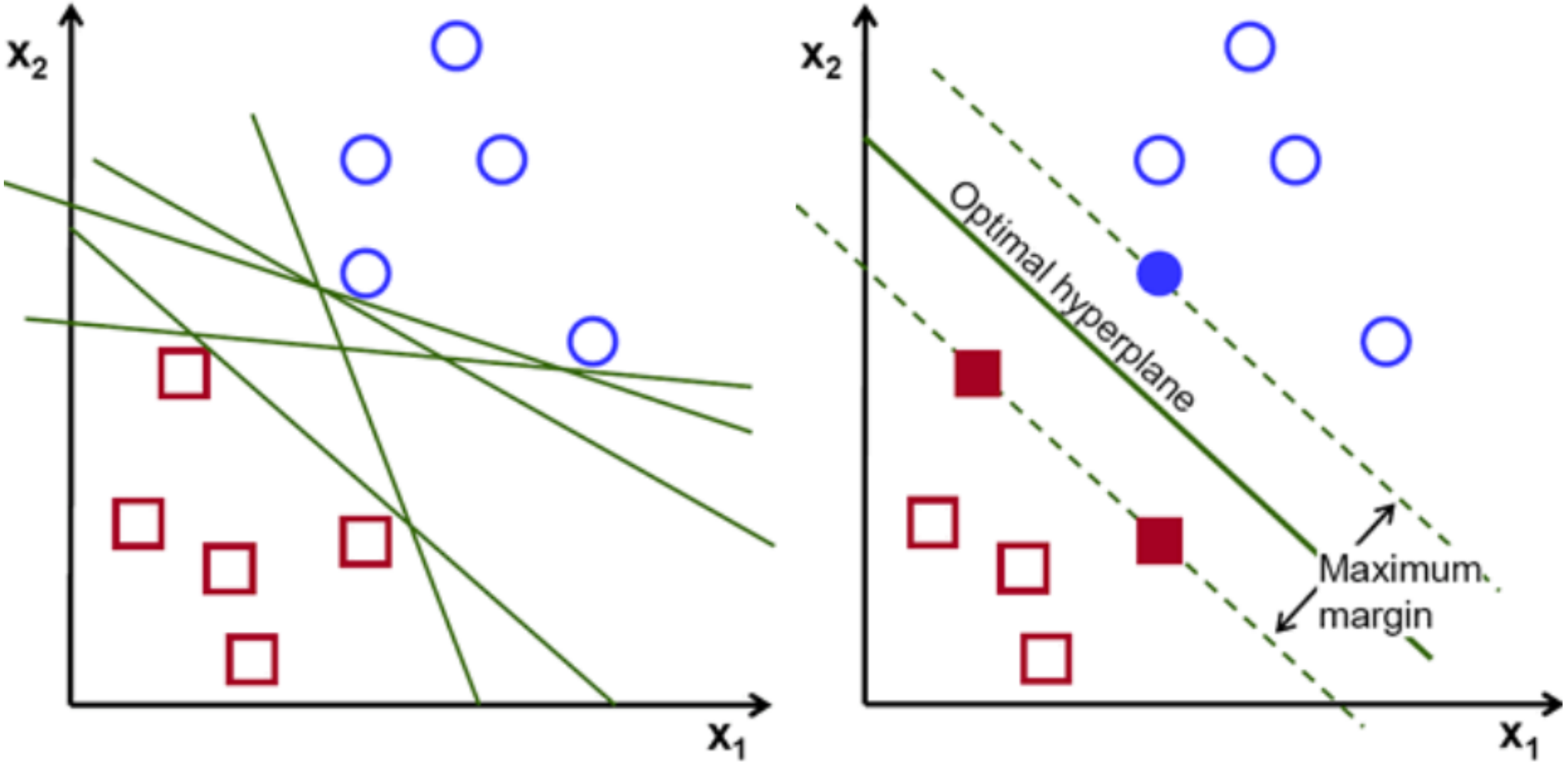
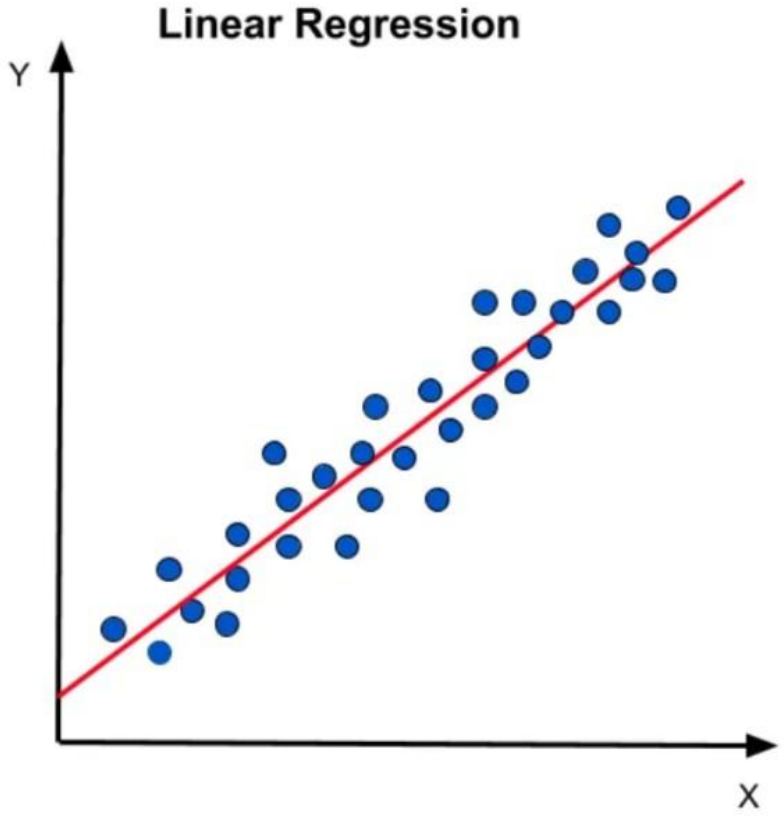
The Models to be Covered

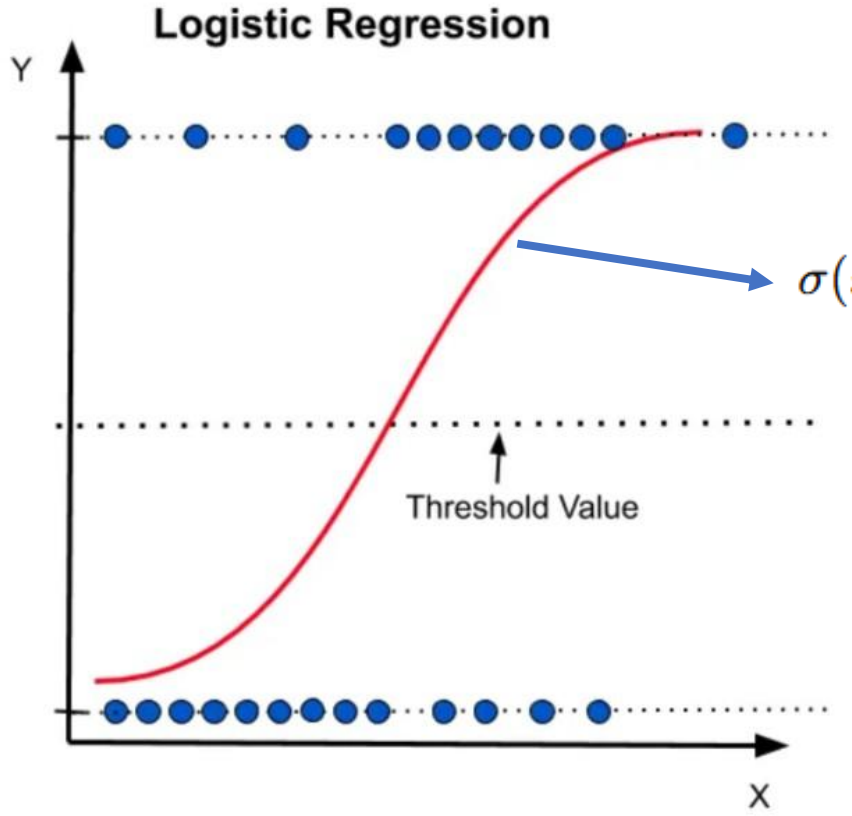
- Linear Support Vector Classifier
- Logistic Regression
- Decision Trees
- Naive Bayes

Linear Support Vector Classifier



Logistic Regression

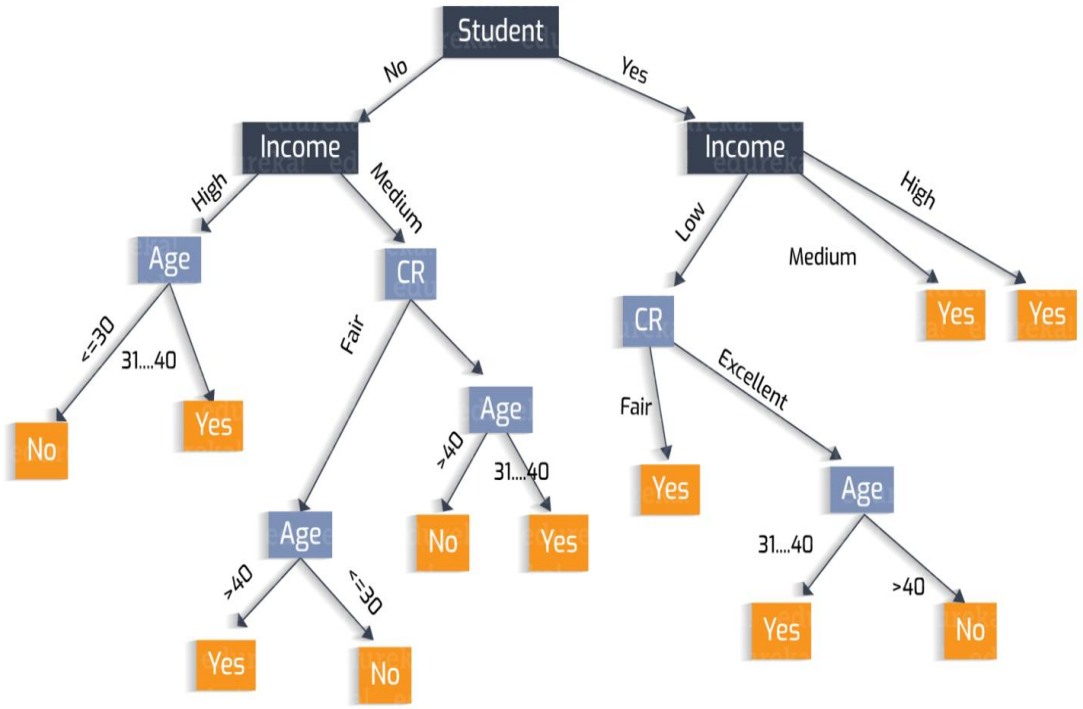




$$\sigma(x) = \frac{1}{1 + \exp\left(-(b_0 + b_1 x)\right)}$$

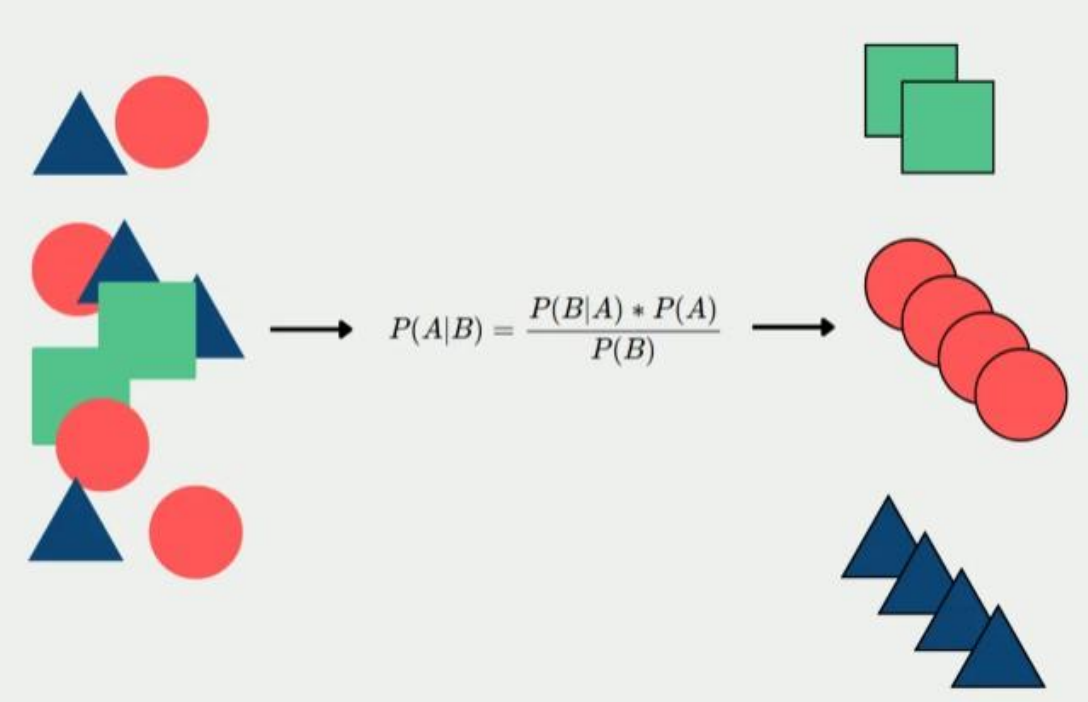
$$L_{BCE} = -\frac{1}{n}\sum_{i=1}^{n}(Y_i \cdot \log \hat{Y}_i + (1 - Y_i) \cdot \log\left(1 - \hat{Y}_i\right))$$

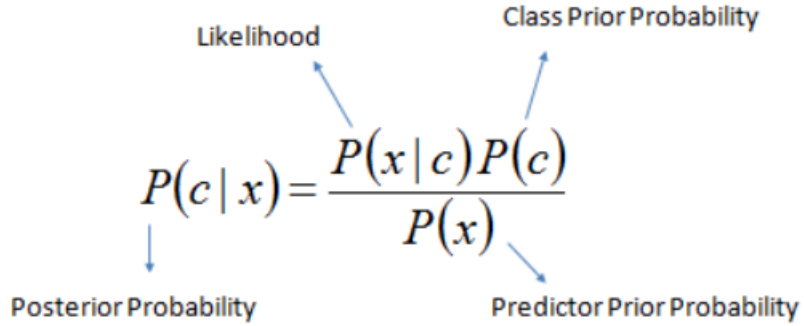
Decision Trees



Student	Income	CR	Age	Buys
No	High	-	<=30	No
No	High	-	31…40	Yes
No	Medium	Fair	>40	Yes
No	Medium	Fair	31…40	Yes
No	Medium	Fair	<=30	No
Yes	Low	Fair	-	Yes
Yes	Low	Excellent	>40	No
Yes	Low	Excellent	31…40	Yes
Yes	Medium	-	-	Yes
Yes	High	-	-	Yes
No	Medium	Fair	>40	? -> YES

Naive Bayes Classifier





$$P(c \mid \mathrm{X}) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

- $P(c|x)$ is the posterior probability of *class* (*target*) given *predictor* (*attribute*).
- $P(c)$ is the prior probability of *class*.
- $P(x|c)$ is the likelihood which is the probability of *predictor* given *class*.
- $P(x)$ is the prior probability of *predictor*.