Introduction to bayesian concepts to machine learning

Notes of class

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1 Introduction to bayesian

In Bayesian analysis we take a certain degree of belief about the distribution of Θ prior distributions.

the joint distribution as defined as;

$$P(X \cap Y) \tag{1}$$

The joint distribution in some text is also written as $P(X, Y)$.

Note that we can said that conditional probabilities

$$P(X \mid Y) = \frac{P(X \cap Y)}{P(Y)} \tag{2}$$

note also that $P(X \cap Y) = P(Y \cap X)$, thus:

$$\begin{gathered} P(Y \mid X) = \frac{P(Y \cap X)}{P(X)} \\ P(Y \cap X) = P(X)P(Y \mid X) \end{gathered} \tag{3}$$

Note that we can reduce the uses of joint to only conditional probabilities:

$$P(X)P(Y \mid X) = P(Y)P(X \mid Y) \tag{4}$$

1.1 hyper parameters

2 Modeling in python

3 Machine learning and Bayesian analysis

4 joint distribution

Is the measure:

5 Marginal distribution and Conditional distribution

To discrete case; Suppose that $m(x) = \sum_y f(x,y)$ this over all domain the y we can calculate the probability of get $X = x$, to the continuous case we have $M(x) = \int_{-\infty}^{\infty} f(x,y)dy$.
According to the equations [3] or [2] the events $X = x$ and $Y = y$ then:

$$P(X = x \mid Y = y) = \frac{P(X = x \cap Y = y)}{P(Y = y)} \tag{5}$$

this could be reduced or rewritten as;

$$f(x \mid y) = \frac{f(x,y)}{m(y)} \tag{6}$$

Where x is a variable and y is fixed.