

UE Machine Learning: Supervised Techniques

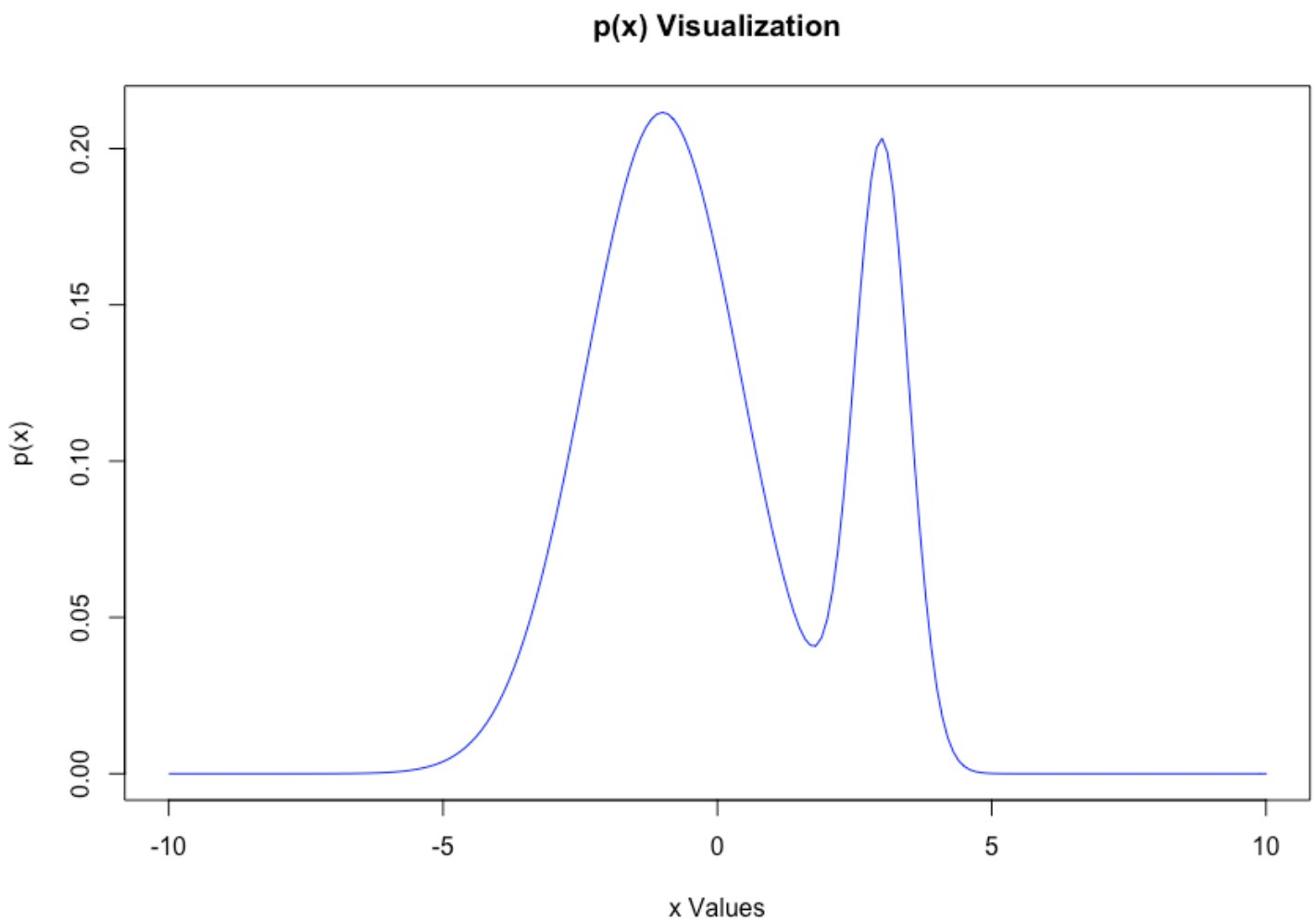
Exercise 2 Report

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Marginal Distribution Visualization:

$P(x)$ is the density of a value x as input regardless of the target value. The following figure shows that the input density is maximum around the values $x=-1$ and $x=3$ (Approximately).



Conditional Distribution Visualization:

Conditional distribution is the density of input values for a specific target value. The graph below shows that for $y=-1$, the density of the input x is concentrated for the following intervals $\{x < 2 \text{ or } x > 5\}$. On the other hand, the density for x where $y=1$ is concentrated in values between 2 and 5.

The graph below shows that input values that belong to the same class are close to each other. For example, most values between -10:2 and 5:10 belong to $y=-1$, and the other way around. This means that K-Nearest Neighbor Classification can be used here to classify a new input based on the majority of neighbors surrounding it.

Illustration:

An unknown input value $x = 4$ will be surrounded by other points between 2 and 5 that belong to the $y=+1$ class. Also, an input point $x = -7$ will have more close neighbors from the $y=-1$ class than $y=+1$ class, which means it will be classified as -1 class.

