Experiment No.: 11

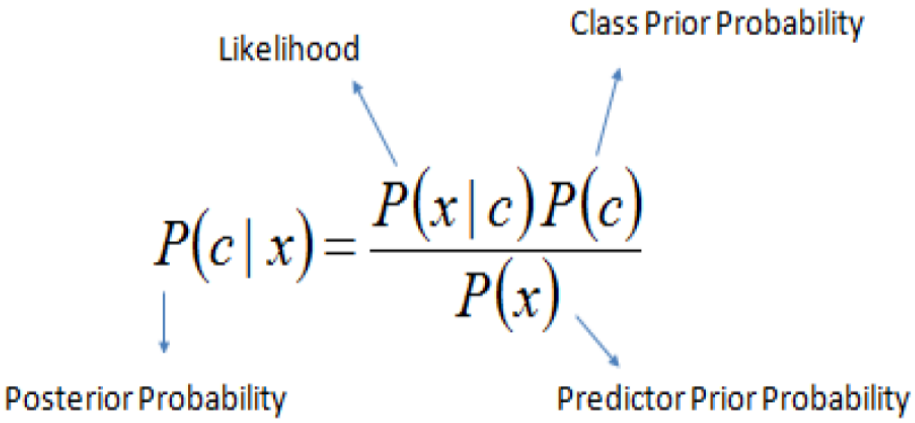
Title: Implementation of Naïve Bays Classifier.

Objectives: To learn Naïve Bayes Classifier.

Theory:

Naïve Bayes Classifier

- Naive Bayes is a family of probabilistic algorithms that take advantage of probability theory and Bayes' Theorem to predict output.
- A Naive Bayesian model is easy to build, with no complicated iterative parameter estimation which makes it particularly useful for very large datasets.
- They are probabilistic, which means that Naive Bayes classifier calculates the probabilities for every factor. Then it selects the outcome with highest probability.
- The way they get these probabilities is by using Bayes' Theorem.
- This classifier assumes the features are independent
- Bayes' Theorem finds the probability of an event occurring given the probability of another event that has already occurred.
- Bayes' theorem is stated mathematically as the following equation:



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

Implementation Procedure:

1. Take input from below table

Outlook	Temp	Humidity	Windy	Play Golf
Rainy	Hot	High	False	No
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	False	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No

2. Construct frequency table for each attribute against the target.
3. Then, transforming the frequency tables to likelihood tables.
4. Consider below input

Outlook	Temp	Humidity	Windy	Play
Rainy	Cool	High	True	?

5. Use the Naive Bayesian equation to calculate the posterior probability for each class given above.
6. The class with the highest posterior probability is the outcome of prediction.
7. Display result