

Data Science
Lab Exercise (Naïve Bayes)
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- Create text file for the following data and load data through Pandas libraries
- Build your own Naïve Bayes classifier model using steps below
- Class: $P(C) = N_c/N$
- e.g., $P(\text{No}) = 7/10$,
 $P(\text{Yes}) = 3/10$
- For discrete attributes:

$$P(A_i | C_k) = |A_{ik}| / N_{ck}$$

where $|A_{ik}|$ is number of instances having attribute A_i and belongs to class C_k

Examples:

$$P(\text{Status}=\text{Married}|\text{No}) = 4/7$$

$$P(\text{Refund}=\text{Yes}|\text{Yes})=0$$

- Normal distribution:
One for each (A_i, c_i) pair

$$P(A_i | c_j) = \frac{1}{\sqrt{2\pi\sigma_{ij}^2}} e^{-\frac{(A_i - \mu_{ij})^2}{2\sigma_{ij}^2}}$$

For (Income, Class=No):

If Class=No

sample mean = 110

sample variance = 2975

- Once Trained, test your model for the cases below

$X1 = \{\text{Refund} = \text{Yes}, \text{Status} = \text{Divorced}, \text{Income} = 90\text{K}, \text{Evade} = ?\}$

$X2 = \{\text{Refund} = \text{No}, \text{Status} = \text{Married}, \text{Income} = 60\text{K}, \text{Evade} = ?\}$

	categorical	categorical	continuous	class
<i>Tid</i>	Refund	Marital Status	Taxable Income	Evade
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes