

1. Define Experiment, Sample space, Outcome and Event.

Ans:

Experiment: The procedure which has well defined set of outcomes.

Sample space: All Possible Outcomes in a trial or Experiment.

Outcome: A possible result of an trial or experiment.

Event:  A set of outcomes of an experiment  to which a probability is assigned.

2. What is probability and explain different types of probability?

Ans:

Probability:

It is used to measure the uncertainity of an experiement.

Types of Probability:

* Theoretical Probability:

It is based on the possible chances of something to happen.The theoretical probability is mainly based on the reasoning behind probability.

* Experimental probability:

It is based on the basis of the observations of an experiment.The experimental probability can be calculated based on the number of possible outcomes by the total number of trials.

3. In loan defaulters older people make up only 1.4%. Now the probability that someone defaults on a loan is 0.184, Find the probability of default on loan knowing that he is an old person. Older people make up only 0.8%

Ans:

P(yes)=0.184

P(older person)=0.8%=0.008

P(older person|yes)=1.4%=0.14

P(yes|older person)=P(yes)\*P(older person|yes)/P(older person)

=(0.184\*0.14)/0.08

=0.322

4. Define Bayes theorem and write the formulae.

Ans:

Bayes theorem describes the probability of an event, based on prior knowledge of conditions that might be related to the event.

Formula:

P(A|B)=P(B|A)\*P(A)/P(B)

5. Solve the below problem using Bayes theorem:

Spam Assassin works by having users train the system. It looks for patterns in the words in emails marked as spam by the user.

For example, it may have learned that the word “free” appears in 30% of the mails marked as spam, i.e., P(Free | Spam) = 0.30. Assuming 1% of non-spam mail includes the word “free” and 50% of all mails received by the user are spam, find the probability that a mail is spam if the word “free” appears in it.

Ans:

P(spam)=50%=0.50

P(free|spam)=30%=0.30

P(free|notspam)=1%=0.01

P(notspam)=5%=0.50

P(spam|free)=P(free|spam)\*P(spam)/(P(free|spam)\*P(spam)+P(free|notspam).P(spam)

=0.30\*0.50/((0.30\*0.50)+(0.01\*0.50))

=0.967