

Bayesian Data Analysis  
Sample Problems  
2022

1. Dangerous fires are rare (1%)  
but smoke is fairly common (10%) due to barbecues,  
and 90% of dangerous fires make smoke  
What is the probability of dangerous Fire when there is Smoke?
2. You are planning a picnic today, but the morning is cloudy  
Oh no! 50% of all rainy days start off cloudy!  
But cloudy mornings are common (about 40% of days start cloudy)  
And this is usually a dry month (only 3 of 30 days tend to be rainy, or 10%)  
What is the chance of rain during the day?
3. Hunter says she is itchy. There is a test for Allergy to Cats, but this test is not always right:  
For people that really do have the allergy, the test says "Yes" 80% of the time  
For people that do not have the allergy, the test says "Yes" 10% of the time ("false positive")  
If 1% of the population have the allergy, and Hunter's test says "Yes", what are the chances that Hunter really has the allergy?
4. Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1 : 2 : 4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8, 0.5 and 0.3, respectively. If the change does not take place, find the probability that it is due to the appointment of C.
5. In a neighbourhood, 90% children were falling sick due flu and 10% due to measles and no other disease. The probability of observing rashes for measles is 0.95 and for flu is 0.08. If a child develops rashes, find the child's probability of having flu.
6. There are three identical cards except that both the sides of the first card is coloured red, both sides of the second card is coloured blue and for the third card one side is coloured red and the other side is blue. One card is randomly selected among these three cards and put down, visible side of the card is red. What is the probability that the other side is blue?
7. Three urns are there containing white and black balls; first urn has 3 white and 2 black balls, second urn has 2 white and 3 black balls and third urn has 4 white and 1 black balls. Without any biasing one urn is chosen from that one ball is chosen randomly which was white. What is probability that it came from the third urn?

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8. An insurance company has insured 4000 doctors, 8000 teachers and 12000 businessmen. The chances of a doctor, teacher and businessman dying before the age of 58 are 0.01, 0.03 and 0.05, respectively. If one of the insured people dies before 58, find the probability that he is a doctor.

9. A card is lost from a pack of 52 cards. From the remaining cards two are drawn randomly and found to be both clubs. Find the probability that the lost card is also a club.

10. A man speaks the truth 4 out of 5 times. He throws a die and reports that it is actually a six. Find the probability that it is actually a six.

11. Three companies A, B and C supply 25%, 35% and 40% of the notebooks to a school. Past experience shows that 5%, 4% and 2% of the notebooks produced by these companies are defective. If a notebook was found to be defective, what is the probability that the notebook was supplied by A?