AI5002: Assignment 7

Debolena Basak

AI20RESCH11003

Download all Python codes from

and latex-tikz codes from

1 Problem

A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both diamonds. Find the probability of the lost card being a diamond.

2 Solution

Let A be the event that the lost card is a diamond. Then, A^c is the event that the lost card is not a diamond.

Let B be the event that the 2 cards drawn are diamond.

Here,

$$P(A) = \frac{13}{52} \tag{2.0.1}$$

$$P(B|A) = \frac{12.11}{51.50} \tag{2.0.2}$$

$$P(A^c) = \frac{39}{52} \tag{2.0.3}$$

$$P(B|A^c) = \frac{13.12}{51.50} \tag{2.0.4}$$

The Bayes Theorem is given by,

$$P(A|B) = \frac{P(B|A).P(A)}{P(B|A).P(A) + P(B|A^c).P(A^c)} \tag{2.0.5}$$

Using (2.0.5),

$$P(A|B) = \frac{\frac{12.11}{51.50} \cdot \frac{13}{52}}{\frac{12.11}{51.50} \cdot \frac{13}{52} + \frac{13.12}{51.50} \cdot \frac{39}{52}} \tag{2.0.6}$$

$$= \frac{12.11.13}{12.11.13 + 13.12.39} \tag{2.0.7}$$

$$= \frac{11}{11 + 39} \tag{2.0.8}$$

$$= 0.22 \tag{2.0.9}$$