AI1110 Assignment 5

DEEPSHIKHA-CS21BTECH11016

May 16, 2022

Outline

Abstract

- This document contains the solution to Question of Chapter 12 (Probability) in the NCERT Class 12 Textbook.

Question

Probability ex 13.1 q11.

A fair die is rolled. Consider events E = {1,3,5}, F = {2,3} and G = {2,3,4,5} .
Find

1. $\Pr(E|F)$ and $\Pr(F|E)$
2. $\Pr(E|G)$ and $\Pr(G|E)$
3. $\Pr((E \cup F)|G)$ and $\Pr((E \cap F)|G)$

Solution

Let sample space S $=\{1,2,3,4,5,6\}$.

Event	Set
E	$\{1,3,5\}$
F	$\{2,3\}$
G	$\{2,3,4,5\}$
E+F	$\{1,2,3,5\}$
EF	$\{3\}$
E+G	$\{1,2,3,4,5\}$
EG	$\{3,5\}$
(E+F)G	$\{2,3,5\}$
(EF)G	$\{3\}$

Table 1: Events

1

$$\Pr(E|F) = \frac{\Pr(EF)}{\Pr(F)} \tag{1}$$

$$= \frac{\frac{1}{6}}{\frac{2}{6}} \tag{2}$$

$$= \frac{1}{2} \tag{3}$$

$$\Pr(F|E) = \frac{\Pr(EF)}{\Pr(E)} \tag{4}$$

$$= \frac{\frac{1}{6}}{\frac{3}{6}} \tag{5}$$

$$= \frac{1}{3} \tag{6}$$

1

$$\Pr(E|G) = \frac{\Pr(EG)}{\Pr(G)} \tag{7}$$

$$= \frac{\frac{2}{6}}{\frac{4}{6}} \tag{8}$$

$$= \frac{1}{2} \tag{9}$$

$$\Pr(G|E) = \frac{\Pr(EG)}{\Pr(E)} \tag{10}$$

$$= \frac{\frac{2}{6}}{\frac{3}{6}} \tag{11}$$

$$= \frac{2}{3} \tag{12}$$

1

$$\Pr(E+F|G) = \frac{\Pr((E+F)G)}{\Pr(G)} \tag{13}$$

$$= \frac{\frac{3}{6}}{\frac{4}{6}} \tag{14}$$

$$= \frac{3}{4} \tag{15}$$

$$\Pr((EF)|G) = \frac{\Pr((EF)G)}{\Pr(G)} \tag{16}$$

$$= \frac{\frac{1}{6}}{\frac{4}{6}} \tag{17}$$

$$= \frac{1}{4} \tag{18}$$