Assignment 4

SAVARANA DATTA - AI20BTECH11008

Download all python codes from

https://github.com/SavaranaDatta/AI1103/blob/main/Assignment4/codes/Assignment4.py

and latex-tikz codes from

https://github.com/SavaranaDatta/AI1103/blob/main/Assignment4/Assignment4.tex

1 Problem(CS 2010 Q.26)

Consider a company that assembles computers.The probability of a faulty assembly of any computer is p.The company therefore subjects each computer to testing process.This testing process gives the correct result for any computer with a probability of q.What is the probability of a computer being declared faulty?

(A) pq+(1-p)(1-q)
(B) (1-q)p
(C) (1-p)q
(D) pq

2 solution(CS 2010 Q.26)

Let $X_i \in \{0, 1\}$ where $\Pr(X_1 = 1)$ represents the computer is faulty before testing, $\Pr(X_2 = 1)$ represents the testing process gives the correct result.

TABLE 4

	$X_1 = 0$	$X_1 = 1$
$X_2 = 0$	(1-p)(1-q)	(1-q)p
$X_2 = 1$	(1-p)q	pq

Table 4 represents the probabilities of all possible cases.The probability of a computer being declared as faulty is

$$= \Pr((X_2 = 1)(X_1 = 1)) + \Pr((X_2 = 0)(X_1 = 0)) \tag{1.1}$$

$$= pq + (1 - p)(1 - q) \tag{1.2}$$

The required option is (A).

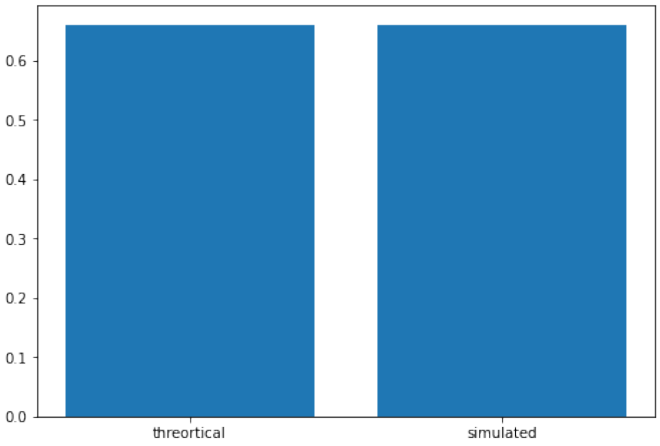

Fig. 4: Theoretical vs simulation for $p = 0.272, q = 0.688$