AI1103 Assignment-1
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March 15, 2021

Download all python codes from
https://github.com/rajasekhar156/AI1103/blob/main/assignment–1.py
and latex-tikz codes from
https://github.com/rajasekhar156/AI1103/edit/main/assignment-1.tex

QUESTION:
A manufacturer has three machine operators A, B and C. The first operator A produces 1% defective items, where as the other two operators B and C produce 5% and 7% defective items respectively. A is on the job for 50% of the time, B is on the job for 30% of the time and C is on the job for 20% of the time. A defective item is produced, what is the probability that it was produced by A?

ANSWER:
Let X $\in \{0, 1, 2\}$ be the random variable denoting that item was produced by operator A when X=0, and random variable Y $\in \{0, 1\}$ be the random variable deoting that item produced was defective when Y=1.

P(X=0) = $\frac{50}{100} = 0.5$

P(X=1) = $\frac{30}{100} = 0.3$

P(X=2) = $\frac{20}{100} = 0.2$

P(Y=1/X=0) = 0.01

P(Y=1/X=1) = 0.05

P(Y=1/X=2) = 0.07

From conditional probability we say that

P(X=0/Y=1) = $\frac{P(Y=1/X=0)P(X=0)}{\sum_{i=0}^{i=2} P(Y=1/X=i)P(X=i)}$

$$P(X=0/Y=1) = \frac{(0.01)(0.5)}{(0.01)(0.5)+(0.05)(0.3)+(0.07)(0.2)} = \frac{5}{34} = 0.147058$$

Probability that defective item is produced by operator A is 0.147058