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Submitted to

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***BS-Software Engineering 4th-E***

Title: Assignment 3

Stats & Prob

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**Probability in Data Science:**

Probability provides information about the likelihood that something will happen. OR Probability is the chances of occurrence. Probability = No of ways an event occur / No of possible outcomes.

Examples:

* Tossing of Coin
* Rolling a dice
* Weather forecast
* Sports and gaming strategies
* Determining blood group
* Analyzing political strategies

**Mutually Exclusive Events:**

In probability theory, two events are said to be mutually exclusive if they cannot occur at the same time or simultaneously. In other words, mutually exclusive events are called disjoint events. If two events are considered disjoint events, then the probability of both events occurring at the same time will be zero. Example: If A and B are the two events, then the probability of disjoint of event A and B is written by:

**Mutually Exclusive Event = P (A and B) = 0**

If A and B are said to be mutually exclusive events, then the probability of an event A occurring or the probability of event B occurring that is P (a ∪ b) formula is given by

**P(A) + P(B), i.e., P (A or B) = P(A) + P(B) P (A ∪ B) = P(A) + P(B).**

**Not Mutually Exclusive Events:**

The two events occur at the same time; they are called not mutually exclusive events. Example: If we draw a card from an ordinary deck of 52 playing cards, it can be both a king and a diamond. Therefore, kings and diamonds are not mutually exclusive.

**Multiplicative Role:**

In multiplicative role two types of events are occur:

1.Independent Event Example: Tossing a coin.

**Formula: P (A and B) =P (A) \* P (B)**

2.Dependent Event Example: Taking a card from deck.

**Formula: P (A and B) =P (A) \* P (B/A)**

**Real Life Examples**

**1.Sports Outcomes:**

Coaches use probability to decide the best possible strategy to pursue in a game. When a particular batter goes up to bat in a baseball game, the players and coach can look up the player’s specific batting average to deduce how that player will perform. The coach can then plan their approach accordingly.

**2.Election Results:**

Political pundits are everywhere, and once election results draw near, you can be sure every news channel in your country will be filled with buzz about the winner. Election officials use historical data to understand how a region voted previously to understand who they will vote for this time.

They combine this with current trends, current polls, and do a lot of math to arrive at a conclusion on who is going to win.

**3.Insurance:**

If you were absolutely certain that you’d never get into a car accident, then you never need to spend money on car insurance, right? But the moment you own a car and drive around, the chances of you getting into an accident becomes non-zero. Or more than 0 percent. The higher the likelihood of you running into an accident, the higher the premium you have to pay. Teenage boys end up paying a whole lot more on car insurance than other people.

This is one-way insurance companies do business by breaking down complex real-life situations into numbers so they can help the most number of people and penalize people that are at high risk. Insurance companies make use of probability in the real world to make money.