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Course Number

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Probability

Probability is a mathematical subject which falls under the category of applied mathematics and has a wide range of application in applied science. By definition, probability computes the likelihood of an event and its value remains between 0 and 1 inclusive. This essay will discuss the concept of mutually exclusive events and independent events and both the concepts fall under the scope of probability. Under the concept of mutually exclusive events, no two events can occur at the same time.

Flipping a coin for a toss is the best example that can be discussed to explain mutually exclusive events and their dependence or influence on one another. When the occurrence of one event gets nullified by the occurrence of other(s), the events will be termed as mutually exclusive. For instance, when some tosses a coin then the outcome will either be a head or a tail. Let suppose A is the event when the head appears after tossing the coin and B is the event when the tail appears after tossing the coin. Mathematically mutually exclusive events will be written as follows.

P (A ∩ B) = 0

P (A ∪ B) = P(A) + P(B)

P (A ∣ B) = 0

P (A ∣¬ B) = P(A) / 1- P(B)

The above formulas represent mutually exclusive events.

Mutually exclusive events cannot be independent because none of the aforementioned events in case of flipping a coin influence each other. Mathematically, it can be written as:

P (A ∩ B) = P(A) P(B)

P (A ∪ B) = P(A) + P(B) - P(A) P(B)

P (A ∣ B) = P (A)

P (A ∣¬ B) = P(A)

The above equations demonstrate that both A and B are independent.

The condition under which P (A and B) = P(A)\*P(B) is true when both the events are independent of each other i.e. the occurrence of the head is not being influenced by the tail and vice versa. This statement will hold if and only if both the events are independent.

The condition under which P (A and B) = P(A)\*P(B) is false when both the events are mutually exclusive i.e. if tail occurs after flipping a coin head cannot occur and vice versa.