**DAILY ASSESSMENT FORMAT**

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| **Date:** | **18/June/2020** | **Name:** | **Prashantha naik** | |
| **Course:** | **Statistical Learning** | **USN:** | **4al17ec074** | |
| **Topic:** | **1.Agenda**  **2.Case study on statistics and probability theory**  **3.solution for case study**  **4.Introduction to probability.** | **Semester&Section:** | **6th b** | |
| **Git hub repository** | **prashanth\_couse** |  |  | |
| **Forenoon SESSION DETAILS** | | | |
| **Image of session** | | | |
| **Report – Report can be typed or hand written for up to two pages.**  **Probability is the science of how likely events are to happen. At its simplest, it’s concerned with the roll of a dice, or the fall of the cards in a game**  **The probability (P) that an event will happen is:**  **P = Number of ou** **Probability of Multiple Events**  **Probability gets a bit more complicated when you have multiple events, for example, when you’re tossing more than one coin, or throwing several dice.**  **The reason is that you have more possible outcomes.**  **For example, when you are tossing two coins, each one could land heads or tails up. So instead of just two possible outcomes (heads or tails), there are now four:**  **First Coin Head Head Tail Tail**  **Second Coin Tail Head Tail Head**  **More coins will mean more possible outcomes.**  **As a rule of thumb, the number of possible outcomes is equal to:**  **The number of outcomes per item to the power of the number of items.**  **So if you have five coins, each with two possible outcomes, the total number of possible outcomes is 25 = 2 x 2 x 2 x 2 x 2 = 32. tcomes that will lead to that event/**  **Total number of possible outcomes** **Independent and Dependent Probability**  **The above rules apply when the items are independent, for example, dice or coins, and the outcome of the first one does not affect the second or subsequent events.**  **However, it gets more complicated when the first event affects the second and subsequent events, that is, they are dependent.**  **Dependent Probability**  **Probability of multiple events when the first event affects the second.**  **Dependent events are not as unusual as you might think. Consider drawing cards from a pack. If you do not replace the cards after each draw, you have a different number of possible outcomes each time. In this case, you need to work out the probability of each event happening and then combine them in some way.**  **Independent events**  **If two events, A and B are independent then the joint probability is**  **{\displaystyle P(A{\mbox{ and }}B)=P(A\cap B)=P(A)P(B),\,}P(A{\mbox{ and }}B)=P(A\cap B)=P(A)P(B),\,**  **for example, if two coins are flipped the chance of both being heads is {\displaystyle {\tfrac {1}{2}}\times {\tfrac {1}{2}}={\tfrac {1}{4}}}{\tfrac {1}{2}}\times {\tfrac {1}{2}}={\tfrac {1}{4}}.[31]**  **Mutually exclusive events**  **If either event A or event B can occur but never both simultaneously, then they are called mutually exclusive events.**  **If two events are mutually exclusive then the probability of both occurring is denoted as {\displaystyle P(A\cap B)}P(A\cap B).**  **{\displaystyle P(A{\mbox{ and }}B)=P(A\cap B)=0}{\displaystyle P(A{\mbox{ and }}B)=P(A\cap B)=0}**  **If two events are mutually exclusive then the probability of either occurring is denoted as {\displaystyle P(A\cup B)}P(A\cup B).**  **{\displaystyle P(A{\mbox{ or }}B)=P(A\cup B)=P(A)+P(B)-P(A\cap B)=P(A)+P(B)-0=P(A)+P(B)}{\displaystyle P(A{\mbox{ or }}B)=P(A\cup B)=P(A)+P(B)-P(A\cap B)=P(A)+P(B)-0=P(A)+P(B)}**  **For example, the chance of rolling a 1 or 2 on a six-sided die is {\displaystyle P(1{\mbox{ or }}2)=P(1)+P(2)={\tfrac {1}{6}}+{\tfrac {1}{6}}={\tfrac {1}{3}}.}P(1{\mbox{ or }}2)=P(1)+P(2)={\tfrac {1}{6}}+{\tfrac {1}{6}}={\tfrac {1}{3}}.**  **Conditional probability**  **Conditional probability is the probability of some event A, given the occurrence of some other event B. Conditional probability is written {\displaystyle P(A\mid B)}P(A\mid B), and is read "the probability of A, given B". It is defined by[32]**  **{\displaystyle P(A\mid B)={\frac {P(A\cap B)}{P(B)}}.\,}P(A\mid B)={\frac {P(A\cap B)}{P(B)}}.\,**  **If {\displaystyle P(B)=0}P(B)=0 then {\displaystyle P(A\mid B)}P(A\mid B) is formally undefined by this expression. However, it is possible to define a conditional probability for some zero-probability events using a σ-algebra of such events (such as those arising from a continuous random variable).[citation needed]**  **For example, in a bag of 2 red balls and 2 blue balls (4 balls in total), the probability of taking a red ball is {\displaystyle 1/2}1/2; however, when taking a second ball, the probability of it being either a red ball or a blue ball depends on the ball previously taken, such as, if a red ball was taken, the probability of picking a red ball again would be {\displaystyle 1/3}1/3 since only 1 red and 2 blue balls would have been remaining.**  **Inverse probability**  **In probability theory and applications, Bayes' rule relates the odds of event {\displaystyle A\_{1}}A\_{1} to event {\displaystyle A\_{2}}A\_{2}, before (prior to) and after (posterior to) conditioning on another event {\displaystyle B}B. The odds on {\displaystyle A\_{1}}A\_{1} to event {\displaystyle A\_{2}}A\_{2} is simply the ratio of the probabilities of the two events. When arbitrarily many events {\displaystyle A}A are of interest, not just two, the rule can be rephrased as posterior is proportional to prior times likelihood, {\displaystyle P(A|B)\propto P(A)P(B|A)}P(A|B)\propto P(A)P(B|A) where the proportionality symbol means that the left hand side is proportional to (i.e., equals a constant times) the right hand side as {\displaystyle A}A varies, for fixed or given {\displaystyle B}B (Lee, 2012; Bertsch McGrayne, 2012). In this form it goes back to Laplace (1774) and to Cournot (1843); see Fienberg (2005). See Inverse probability and Bayes' rule.** | | | |