Indian Institute of Technology Madras

MS4610 – Introduction to Data Analytics

Tutorial session - 2

Inferential Statistics, EVPI/EVSI, Distribution Fitting

23rd October 2020

Questions

1. In a random sample of 100 bulbs, 10 bulbs are found to be defective. Find a 95% two-sided confidence interval for the proportion of bulbs that are defective in the population.
   Given: $z_{0.025} = 1.96$

2. The manufacturer of a certain type of automobile claims that under typical urban driving conditions the automobile will travel on average 18 miles per gallon of gasoline. The owner of this type of automobile notes the mileages that she has obtained in her own urban driving when she fills her automobiles tank with gasoline on nine different occasions. She finds that the results, in miles per gallon, are as follows: 15.6, 18.6, 18.3, 20.1, 21.5, 18.4, 19.1, 20.4, and 19.0. Test the manufacturers claim by carrying out a test at the level of significance $\alpha = 0.05$.

Questions

3. Consider the following table, which gives the time taken to complete three types of tasks. Determine whether the mean time taken is equal for three tasks. Take 0.05 as significance level.

Type	Observations				
	1	2	3	4	5
A	20	25	22	30	28
B	27	26	23	31	35
C	32	28	30	33	25

Questions

4. A person has to make a decision whether to choose to invest in Bonds, Stocks or Mutual Funds. The payoff table for the three alternatives is given below:

Alternatives	Economy		
	Growing	Stable	Declining
Bonds	40	45	5
Stocks	70	30	-13
Mutual funds	53	45	-5

   The probability of the three states of nature (Growing, Stable, and Declining) is given by 0.2, 0.5 and 0.3. What is the expected value of perfect information (EVPI)?

5. Let $X_1, X_2, \ldots X_n$ be a random sample from a uniform distribution on the interval $[0 , \theta]$, where the parameter $\theta > 0$ is unknown. Find the maximum likelihood estimate of θ.