MIS771 Descriptive Analytics and Visualisation

MIS771 Lecture Topic 2 – Worksheet

Exercise 1

(a) A recent NSW study found that, on average, households spend $232 a week on groceries. A retail organisation wishes to determine if Victorian households differ in their average spending on groceries. They take a random sample of 64 Victorian households and obtain a sample mean of $215 with a standard deviation of $56. Use $\alpha = 2\%$ to test the claim.

(b) Could you have come to a different decision if $\alpha = 1\%$?

Exercise 2

In a large organisation, currently 7.5% of all deliveries from suppliers arrive late. A supply chain manager is considering implementing a new system with its suppliers in order to reduce the number of late deliveries received by the organisation. It is estimated that the new system would cost approximately $200,000.

(a) Before deciding whether to purchase the new system, a trial was conducted in which a random sample of 120 deliveries revealed only 6 were late. Is there sufficient evidence to conclude that the new system is better than the previous one? Use $\alpha = 10\%$.

(b) Would the p-value be higher or lower than 10%? Explain.

(c) Write down what the Type I and Type II errors would be in this scenario.

(d) Do you think $\alpha = 10\%$ was appropriate for this scenario?

(e) Should the company purchase the new system?

Exercise 3

An Equal Opportunity Officer wishes to compare the average amount of unpaid overtime worked by female and male employees in an organisation. A random sample is taken and the results are as follows:

Females: $n_1 = 32, x_1 = 8.2, s_1 = 2.8$
Males: $n_2 = 36, x_2 = 6.1, s_2 = 2.4$

(a) Is there a significant difference between unpaid overtime worked by females and males?

(b) If so, provide an accurate estimate of the difference.

Exercise 4

Management at an organisation have implemented a new training program with the aim of improving productivity. 36 staff were randomly chosen to pilot the training program with the following results:

Productivity (after): $x_1 = 101.5$
Productivity (before): $x_2 = 99.0$

(a) Has there been a significant improvement in productivity after the training program? [Note: standard deviation of differences is 2.8]

(b) Suppose Management decided to only implement the training program to ALL employees if it can be demonstrated that the program improves productivity by more than 2%. Should they implement the training for ALL employees?

Exercise 5

Is there a smaller proportion of non-union members who feel 'insecure' in their job compared to employees who are union members?

Non-union: n1 = 25, p1 = 6/25 = 24.0%
Union: n2 = 23, p2 = 8/23 = 34.8%

Conduct a hypothesis test using $\alpha = 10\%$.