Assignment-3

T-shirt Examples

Ans) Let us assume that we have 500 data out of which 200 out of 500 are Large t-shirt & 300 out of 500 are XL t-shirt.

we assume that $\alpha = 0.05$

1) Let $\hat{p}_1 = \frac{300}{500}$ and $\hat{p}_2 = \frac{200}{500}$

$\hat{p}_1 = 0.6$ $\quad$ $\hat{p}_2 = 0.4$

and $n_1 = 500$, $n_2 = 500$

upper bound $\Rightarrow \left[(\hat{p}_1 - \hat{p}_2) \pm Z_\alpha \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}} \right]$

which is the interval Estimate for the difference of proportion

$$\text{upper bound} = (\hat{p}_1 - \hat{p}_2) + Z_\alpha \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$$= (0.6 - 0.4) + 1.96 \sqrt{\frac{0.6(1-0.6)}{500} + \frac{0.4(1-0.4)}{500}}$$

$$= 0.2 + 0.0604$$

$$= 0.2604$$

$$\text{Lower bound} = (\hat{p}_1 - \hat{p}_2) - z_\alpha \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$$= 0.2 - 0.0607$$

$$= 0.1393$$

Confidence Interval