Logic of statistical significance

Science, Statistics

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Date

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The term “ significance level” has always been misleading to many researchers as they do not fully understand it (StatPac Inc, 2012). A research finding is said to be statistically significant if its statistics can be relied on. In statistics, a research finding is said to be significant if it has a high probability of being true. Significance levels depict the likelihood of a result being true (Creative Research Systems, 2012).

For example, suppose a survey is undertaken to determine if there exists a difference in preferences with respect to gender in the use of cell phones. Taking a sample of 1000 people, the nominal survey data collected is as shown:

Preferences

Total

Gender

Video

Sound

Neither

male

200

150

50

400

female

250

300

50

600

total

450

450

100

1000

Suppose the null hypothesis is gender and preferences are independent. Then on evaluating the test statistics, getting a value of 16. 2 using the degree of freedom of 2. Comparing this t-statistic with the critical value obtained from the chi- distribution table, suppose the significance level of 0. 05 is chosen. Then it can be ascertained that the finding is significant as the t-statistic is higher than the critical value. This leads to the rejection of the null hypothesis and also the arrival of a conclusion that there exists a relationship between preferences and gender for that product.

For the case of ordinal data survey, as in the example of a survey comparing the mean weights of male and female students. A statistical hypothesis test is used for making decisions on the data. The test result is calculated from the null hypothesis. The test sample is said to be statistically significant if its occurrence is unlikely to have been by chance alone. The statistically significant result that is given by probability p-value is less than the threshold of a significant level then it justifies the rejection of the null hypothesis. Once the variations have been attained, the Fischer value is

calculated and is compared to the f critical value from the table at a given degree of confidence (Carlson, 1976).

Another important concept to consideration is the use of one-tailed or two-tailed significance tests. (StatPac Inc, 2012) The hypothesis determines the selection of each. If the hypothesis gives directions, for example, men generally weigh more than women then the one-tailed significance test is employed. However, if the hypothesis gives no directions as in the example, there is no significant difference in performances between boys and girls, and then the two-tailed significance test is used. The two-test probability is exactly twice the one-test probability therefore; it is actually safe to use it. However, there are cases where the one-test is important.

WORK CITED

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