How to perform and interpret regression analysis

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How to Perform and Interpret Regression Analysis

Regression analysis is a statistical tool for the investigation of relationships between variables. This technique is used to predict the value of a dependent variable using one or more independent variables.

For example, we can predict a Product line Worker's output (the dependent variable) from his age, education, and years of experience (the independent variables).

There are two types of regression analysis namely;

Simple Regression: Involves two variables, the dependent variable and one independent variable. Mathematically, the simple regression equation is;

$y_1 = b_0 + b_1x$ OR $y = b_0 + bx$

For example we can predict the effect of price increase (x) on demand (y).

Multiple Regressions: Involves many variables, one dependent variable and many independent variables. Mathematically, the multiple regression equation is;

$y_1 = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + ... + b_nx_n$

Where y_1 is the estimated value for y (the dependent variable), b_1, b_2, b_3,... are the partial regression coefficients, x, x_1, x_2, x_3,... are the independent variables and b_0 is the regression constant.

In this competitive age, all efforts are made to retain good work force, which requires motivational incentives on the part of the company, because there's direct correlation between the satisfaction level and the output of the company. The results of a statistical and probability analysis conducted using the database provided by a company indicate that;

1. Employee turnover ratio also depends on the gender of the staff. Female staff remained with the company for much longer (20. 83% of the female

population had worked in the company for over five years as against 12. 50% of male population).

2. The study further suggests that most of the workforce is in the administration work (61. 46%).

3. But in another revealing outcome the study suggests that on a scale of 1-7, job satisfaction of male workforce is 4. 43, while that of female workforce is 4. 26.

Correlational Research: Here we study the effects (correlation) of two variables on each other. For example;

Increasing sale of ashtrays in market indicates that number of smokers is on the rise.

On the other hand increase in number of smokers will be good news for ashtray making companies, as they can easily figure out that there will be more sale of ashtrays.

Similarly studies relating smoking to lung cancer are correlational (increasing number of lung cancer cases means increasing number of smokers and vice-versa). Therefore, measurement of two variables and determining whether they are associated with each other is called correlational study.

Difference between Correlation and Causation:

Causation: If an event of the first kind occurs, an event of the second kind will or must occur, and the first event is the ' cause' of the second event. This is called causation. A relation is called a causal relation if a change in one variable is not only correlated with but actually produces a change in another variable. For example negligence on the part of a computer programmer may cause, malfunctioning of the inventory control programme.

On the other hand in a correlation two correlated variables might or might

not result in a change in each other. In correlation the changes are in general proportionate, but in Causation the changes may not be proportionate and measurable.

Resources:

I. University of Newcastle Upon Tyne, How to Perform and Interpret Regression Analysis, accessed on May 26, 2006, available online at http://www. ncl. ac. uk/iss/statistics/docs/regression. html.

II. Arsham, H. (n. d). Business statistics: Revealing facts and figures. Retrieved 4 May. 2006 from: http://ubmail. ubalt. edu/~harsham/Business-stat/opre504. htm.

III. Introduction and Univariate Descriptive, Correlation and Causation, available online at, http://www. stat. tamu. edu/stat30x/notes/node42. html.