CLO Business Decision Making Project Part 2

Sales Decline at McDonalds Inc.

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**Descriptive and Inferential Statistics**

There are generally two types of statistics in data, descriptive and inferential statistics. Descriptive statistics represent the facts related to the sample or population like mean, mode, median and standard deviation. Inferential statistics reference how a population is drawn based on the descriptive statistics of a sample. In inferential statistics, the null hypothesis is a generic statement that there is no evidence to establish a relationship among two measured phenomena, or when there are not any differences among groups.

**Types of Inferential Statistics**

Statistics provides large amounts of research data to grow viewpoints of individuals, presenting them with new ideas and data. It drives individuals to think fundamentally and offers them the ability to be creative. It assists their learning by enhancing maintenance through engagement.

There are several types of inferential statistics which are helpful in analyzing data. Hypothesis testing is very common. It is the use of statistics to determine the probability that a given hypothesis is true. Hypothesis testing is a method of observing and utilizing data related to single and to multiple fields.

The process of hypothesis testing consists of several steps.

1. Defining the research hypothesis

2. Stating the null hypothesis

3. Collecting data

4. Analyzing each variable

5. Conducting appropriate statistical tests

6. Accepting or rejecting the null hypothesis

7. Deciding critical value based on confidence intervals

8. Explaining the results and findings

The level of significance indicates how confident we are in research on the basis of inferential statistics. For example, if our case level of significance is 95%, which shows that there is a probability the null hypothesis is less than 5%, we reject the null hypothesis. If the probability of null hypothesis being true is greater than 5% we do not reject null hypothesis.

On the other hand, P value in inferential statistics is the probability of null hypothesis being true. If the p value is less than the level of significance, we reject the null hypothesis and if p value is more than level of significance we do not reject null hypothesis.

**Confidence Intervals**

Confidence intervals are ranges of value which describes the probability of occurring a point estimate. In statistics, one goal is to try to deduce the value of population parameter from sample estimate. We cannot be sure that the population will have similar parameters as a sample, therefore we approximate the characteristics of population parameters on the basis of sample properties. We require confidence intervals, which gives us the probability of a point estimate lying in particular range.

**Probability in Business Decision Making**

There are various tools, technology and trends which make the probabilistic approach useful for organization. Recently, the role of the probabilistic approach has become important due to emerging technologies like big data. As the role of data driven decisions have increased in organizations, the role of the probabilistic approach has taken center stage.

Various tools like SAS, SPSS, R, and Python make uses of the various probabilistic approach in order to build predictive and analytical models which are widely used by firms. These firms use the data to drive their decisions and helps them in achieving their strategic goals. There are various social media trends, like text analytics which help firms in building strategies to acquire and classify their customers by making use of probabilistic approach.

For example, McDonalds uses its data bases to make strategic decisions. McDonalds has database of customers, their buying behavior, buying frequency and their buying patterns. This database can be used to segment its customers into various clusters using big data technology by using suitable tools like R by implementing clustering algorithms in R. They also display advertisements on their social media platforms based on their previous buying patterns.

**The Role of Linear Regression for Trend Analysis**

Linear Regression is the process of establishing a linear relation between to variables. In regression, the ordinary least square method is used to establish linear relation between two variables.

Equation of linear Regression is

Y = α + ∑ βi \* Xi + €

Here Y is dependent variable

Xi = Independent variables

€ = Independent variables

βi = Covariance ( Y, Xi ) / Xi

The null hypothesis of regression is that the independent variable does not significantly affect the dependent variable or β = 0. The alternate hypothesis is the independent variable does not significantly affect dependent variable or β ≠ 0. Also, the

Accuracy of Regression Model is judged by its r square value which explains percentage variation in dependent variable explained by independent variables.

Therefore, regression can be applied toward a broad range of fields and subjects. For example, it can be used in the health care industry to find the cause of a disease or the effectiveness of a vaccine. It can also be used for business purposes to forecast sales in a firm or in the stock market to predict returns from investments, depending on economic conditions.

**Time Series**

Time series analysis is used to analyze the data which varies with a time. Time series analysis comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data. Time series forecasting is the use of a model to predict future values based on previously observed values. Time series analysis can be applied to real-valued, continuous data, discrete numeric data, or discrete symbolic data. There are several techniques for time series analysis, just as there are various methods of forecasting sales, such as naïve forecasting, exponential smoothening and Regression analysis.

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