IMPACT OF YOUTUBE ADVERTISEMENTS ON SALES

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Abstract: Technology plays a major role in our daily life especially computer technology. This technology mainly used in *education* system healthcare system advertisement. This Technologies makes the works easier. In Social Media you tube is most common know service daily millions of the videos are being uploaded and up to date today more than 30 million you tube channels are created and billions of peoples are being educated and knowledgeable. And billions of Revenue are generating. In this research paper we came up with impact of you tube advertisement we used linear regression result in this research article shows the relation between you tube advertisement and sales.peoples are being educated and knowledgeable aand billions of Revenue are generating. In this research paper we came up with impact of you tube advertisement we used linear regression result in this research article shows the relation between you tube advertisement and sales

Key words : Simple linear Regression, Data Analysis, Kaggle Dataset, Data pre-processing, Heat Map, Data Inspection.

I. INTRODUCTION

Marketing; in simple words marketing is promoting their brands to their customers in different ways, and in different strategies.

On of main marketing is B2B [directly to business] marketing next one is B2C [products to consumers] marketing basically marketing based on four principles known as 4P'S

1. PRODUCT[p1]

2. PRICE[p2]

3. PLACE[p3]

4. PROMOTION[p4]

These unitedly known asmarketing matrix.

P1 is known as product shown to their customers, itmainly depends upon the warranty, quality and appearance.

P2 is known as price of theproduct's price and also shows the discount and payment methods.

P3 is known as location of the Companies product distribution office.

P4 is known as the promotions, promotions made by the company to influence the consumer tobuy the product.

II. METHODOLOGY

In the practices of economic studies Regression Analysis is prominent technique that helps economic calculators to know how the dependent variable change in relation to change in independent variables. In the normal words the regression analysis the regression analysis helps to know how the likelihood of the sale is impacted by quantity purchased there are two types of regression analysis 1.simple linear regression analysis (SLRA) 2. MULTIPLE LINEAR REGESSION ANALYSIS(MLRA) in this research article, we mainly focus on simple linear regression analysis only, the simple linear regression analysis focus on the relationship between Y (the output of regression model) and explanatory variable X (input of regression model. The Simple linear Regression Model is $Y=B0+B1X+E$, Here, Y is the outcome of the model which we are trying to predict

X is the input of the model which helps in predicting y . B0 is intercept of the model. If x=0 (that means x has no effect on y), then y =B0 . B1 is the slope of the model, shows unit changes in outcome of regression model 4.E shows the residual error term having a mean or average value of zero (0) (A) data collection: We collected the data from the you tube, chrome, research article and some other online platforms Data collection is an important aspect for preparing research article. Our team together worked to gain the information from different sources (B) Data pre-processing Data pre-processing is known as manipulating (or) deleting the unwanted data, the data which is gained from the different source before use it mainly used in machine learning project. Data pre-processing is the most important phase of the machine learning project. Data pre-processing can effect the outcomes of the final data, the aspect should be carefully considered in the interpretation of the result. It is more difficult when there is much more irrelevant and redundant information.

a. Model diagram and data visualition algorithm:

Regression Analysis: The regression Analysis is mostly used for the two different conceptual purposes. first of all RA is used for prediction and forecasting, its uses are closely related to Machine Learning field and Second purpose is used to establish a Casual relationship between X and Y, here X is predicted variable and Y is a Response variable. The regression Analysis has many applications in different areas like insurance, finance and business.in business and finance sector the regression analysis is used to calculate beta (return volatility relative to the entire market) for stocks. The regression analysis can also be used to predict the returns and business performance.in this article the regression analysis used to predict the Y(sale) based on predictor variable X (YouTube advertising)
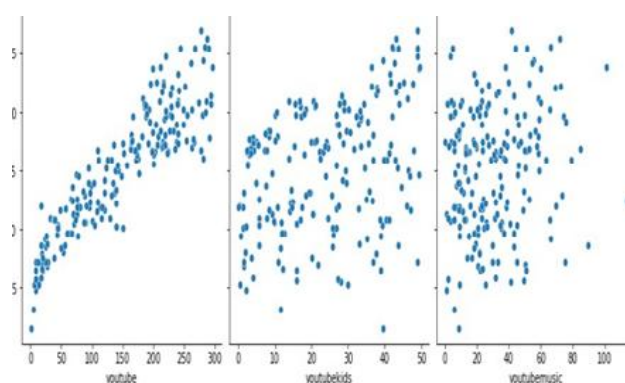

Fig no:1

b. Data inspection:

Simple Linear Regression Model: In the above Methodology we said about SLRM that is to explain the relationship between YouTube Advertising and sales is given by Y=B0 + B1 YouTube + E After performing the RA Technique we can see that the value of B0 is 4.847 which shows the predicted dollar sales (in thousands) for spending no advertising budget on YouTube. hence for not spending nothing in YouTube Advertising the estimated sale is 4.847*1000= $4847, and the slope of model is provided is that in EQ (2) is 0.048 indicates

48(1000*0.048) units increment in sales. so spending money on YouTube the expected sale is 4.847 + 0.048 * 1000 = 52.867, shows a sale of $52867. correspond 's to equation (2), hence, the fitted regression model is given by Y=4.487+0.048 YouTube + E The visual display of the relationship between YouTube Advertising and sales. the plot obtained represents a positive relationship. therefore, spending money on YouTube Advertising results an increment in sales. Hypotheses testing : We adopted a well-known Statistical Procedure hypotheses testing to test the significance of YouTube Advertising on sales.to carry out the regression analysis the null hypothesis (H0) and alternative hypotheses (H1) can be formulated as H0=YouTube Advertising has no significant relationship with the sales. The standard error is useful in performing hypotheses testing to test the regression coefficients. T-Test: To test the null hypothesis(H0) we have to find whether the estimate of the regression coefficient (RC)B1 is far from 0 or not. If the standard error of the estimate of B1 will provide sufficient evidence against null hypothesis (H0). We will use the t Test to measure how far B1 from zero.

The value of the T- test shows how far the coefficient estimate is from zero. Relative to standard error, the larger value of the T statistics provides evidence against null hypothesis(H0) and indicates that the Y is associated with X. pr(>|t|) shows that the p is greater than the T statistic. If the p value is smaller there are high chances of rejecting null hypothesis (H0) It is common that the value of the t-statistic (for you tube advertising) is from the zero and the value of p.
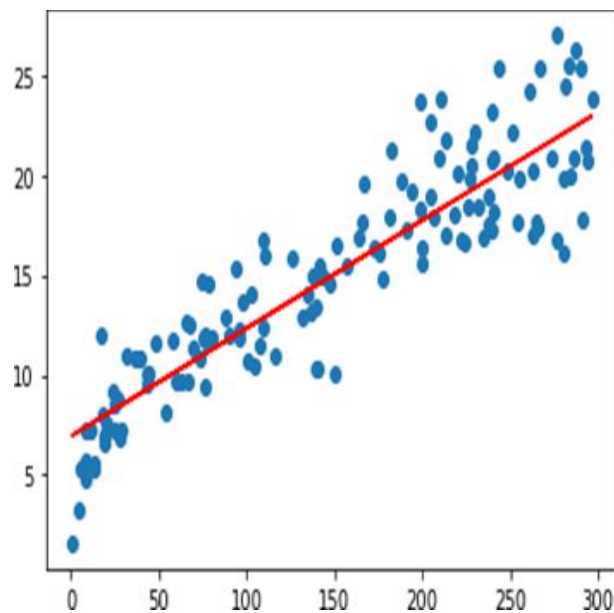

Fig no:2

c. Residuals Analysis

Value of an element and it's the theoretical value. In RA the residual is the difference between any data point and regression line they also known as error. An error in this context not mean that something is wrong with the analysis, it means there is an un explained difference between observed theoretical values.in other words the residuals is the error that is not explained by regression line In statistics, the residuals represent' s the deviation of observed The residual is represented by E that can also be expressed by an equation. The E is the difference between observed value (Y) and predicted value (Y^). Mathematically we can write as
E=Y-Y^ We need to check if error terms are also normally distributed (which in fact one of the major assumptions of linear regression), we plot the histogram of error terms. The normality of residual terms allows some inference on the coefficients.
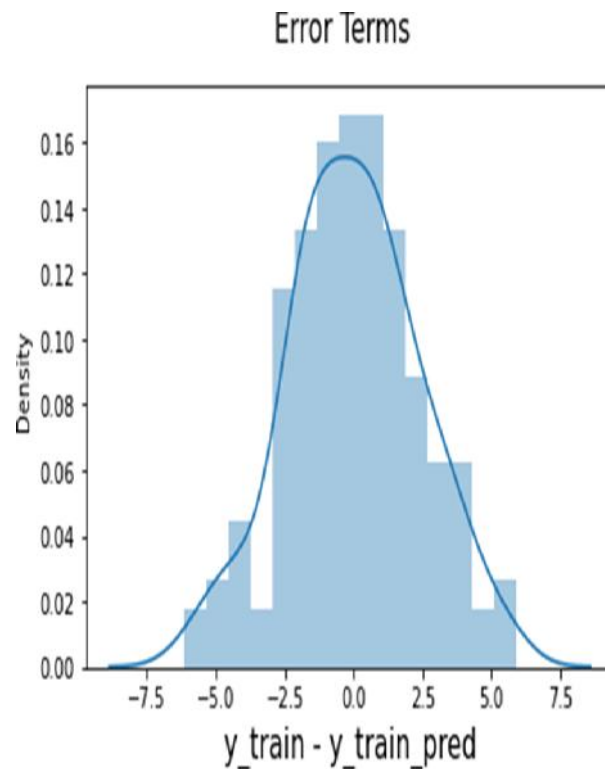
d. Residual graph

Fig no:3

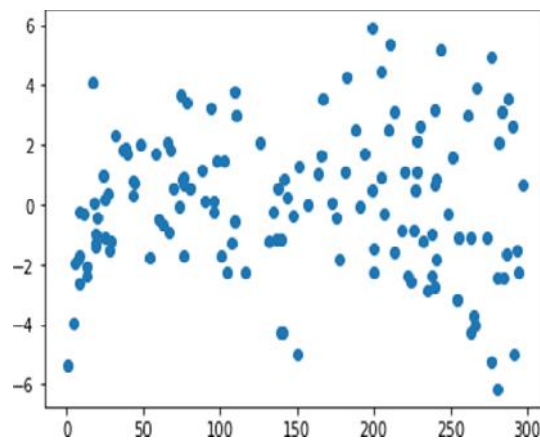The residuals are normally distributed with the mean 0.

Fig no:4

The regression line is good fit to data.

e. *Outlier analysis*

   we performed the outlier analysis to test whether there are outliers in the residual's data or not. We can observe that the outlier is present as shown in plot box provided. we divided boxplot into three sub plots of figure size (5,5) named plot1, plot2, plot3. plot1 represents advertising on you tube, plot represents advertising on you tube kids, plot3 represents advertising on you tube music.

f. Box plot
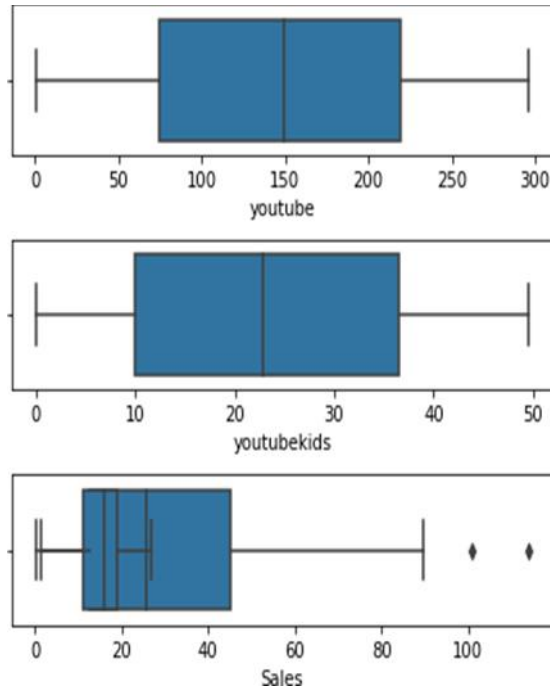
Fig no:5

Correlation test correlation test is used to test the correlation between two or more variables.as visible form the pair plot and heatmap the variable you tube seems to be most correlated with sales .so let's perform simple linear regression using youtube as our feature variable.

$$ r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}} $$

R=correlation coefficient
Xi=values of x-variable
X^=mean of values of the x-variable
Yi=values of y-variable   Y^= mean of the values of the y variable.

g. Heat map:
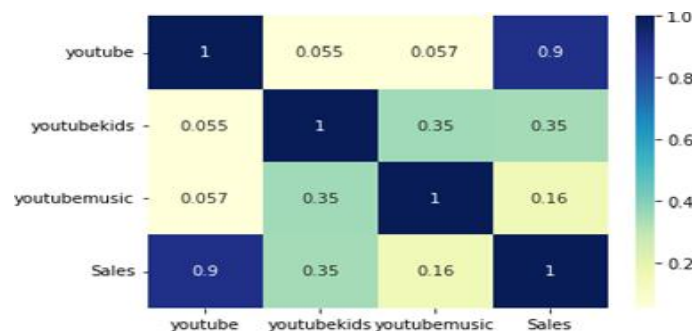
fig no:6

Building a Linear Model We building model with use of statmodel . api library in with this perform we'll perform linear regression. The statsmodels library fits a line on the dataset which passes through the origin in order to have

an intercept, we need to manually use the add_constant attribute of statsmodels we added the constant to your X_train dataset, fit a regression line using the Ordinary Least Squares(ols) attribute of statsmodels as shown below

h.   Error estimation:

We estimated error using methods like standard error and r squared is 0.002 and 0.816 respectively

i.   Result:

we observed that when ads areincreasing sales are increasing.

CONCLUSION

This article shows the relation between YouTube advertising vs sales and profit we considered a linear regression analysis modelling approach along with statistic known as T Test, F Test. By this we conformed that there is positive association with YouTube advertisement and sales. Along with this test's we performed co-relation test and out-layer test that shows the positive association with YouTube advertising and sales by allthis tests we found that sales are increased by YouTube advertising the more will be sales and the more will be profit.

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