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Analysis of Relation between Budgets and Revenues from Movies

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Abstract:- There are two variables i.e. budget and worldwide gross revenue. We investigate if there is a direct correlation between the two variables. To analyse the data, we perform correlation and regression on the two variables and determine the result with sufficient facts and figures in the graphs. This analysis will be performed on a data set of 597 movies ranging from 1939 to 2018. We will predict the future values for the year 2019 and 2020 with a conclusion for the same.

➢ ***Objective***

- To determine correlation between budget and worldwide gross revenues.
- To perform regression analysis on the data.
- To display the data values in form of graphs and tables.
- To understand the growth of revenues per year and to predict the future growth.
- To analyse the data statistically.
- To interpret the result and give a suitable conclusion.

I. INTRODUCTION

Back then in 90's, there were rarely any movies produced but as the generations passed the number of movies produced in a year started to increase and their budgets were higher than before. As we all know that the world is moving towards modernization, people are starting to make movies of the famous books and animated films to attract more people to increase their revenue collections. This has led to a huge increase in revenues worldwide and gave a boost to the film sector and their actors. In this research paper, we analyse and predict how the current data leads to a gradual increase in budgets and revenue collections.

This is one part of the data of 597 movies and contains approxiamate values as exact values couldn't be otained.

Movie	Month	Year	Budget($M)	Worldwide Gross($M)
Gone with the Wind	Dec	1939	3.9	390.525192
Bambi	Aug	1942	0.858	268
Cinderella	Feb	1950	2.9	263.591415
The Sound of Music	Mar	1965	8.2	286.214286
The Godfather	Mar	1972	7	268.5
The Exorcist	Dec	1973	12	402.735134
Jaws	Jun	1975	12	470.7
Rocky	Nov	1976	1	225
Star Wars Ep. IV: A New Hope	May	1977	11	786.598007
Close Encounters of the Third Kind	Nov	1977	20	340.800479
Grease	Jun	1978	6	387.51377
Superman	Dec	1978	55	300.2
Superman	Dec	1978	55	300.2
Star Wars Ep. V: The Empire Strikes Back	May	1980	23	534.17196
Raiders of the Lost Ark	Jun	1981	20	367.452079
ET: The Extra-Terrestrial	Jun	1982	10.5	792.965326
Star Wars Ep. VI: Return of the Jedi	May	1983	32.5	572.705079
Indiana Jones and the Temple of Doom	May	1984	28	333.080271
Beverly Hills Cop	Dec	1984	15	316.3
Ghostbusters	Jun	1984	30	295.212467
Back to the Future	Jul	1985	19	385.524862
Rambo: First Blood Part II	May	1985	44	300.4
Out of Africa	Dec	1985	31	258.21086
Top Gun	May	1986	15	356.800601
Crocodile Dundee	Sep	1986	8.8	328.203506
Fatal Attraction	Sep	1987	14	320.1

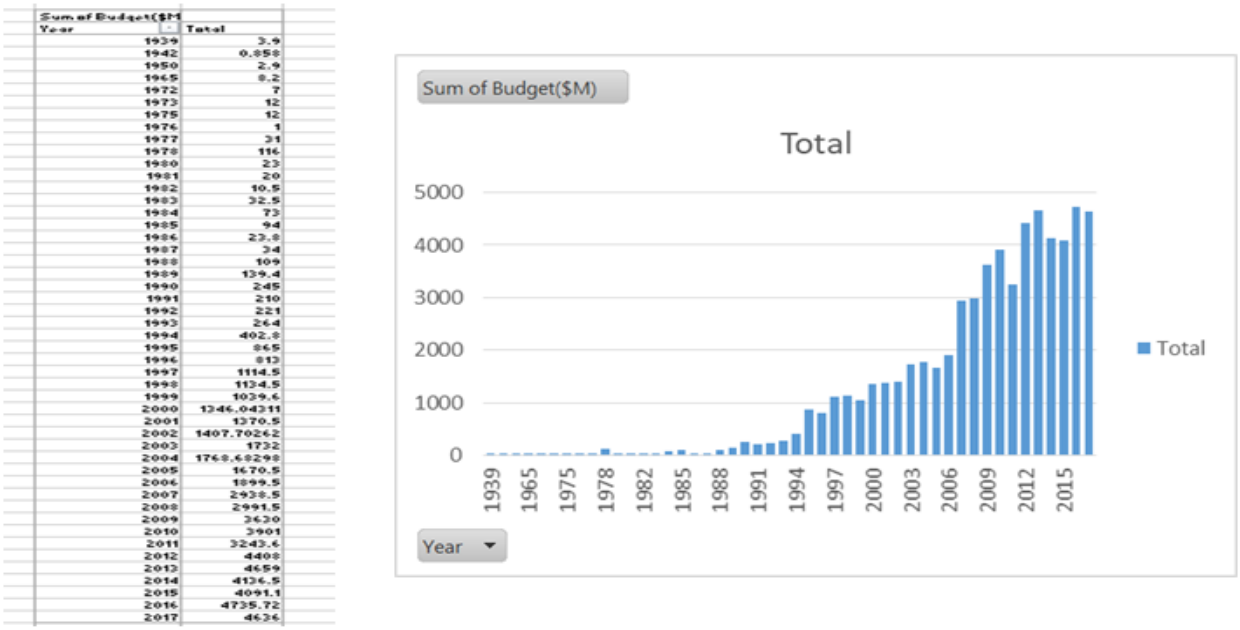
	Year	Budget	Worldwide Gross
Min	1939	0.6	224.117573
Max	2017	425	2783.918982

MoviesData | CorrelandRegression | ChartOutputHistogram | ForecastFutureValues | Sheet1

Fig 1

II. ANALYSIS

➢ *Budgets of Movies*

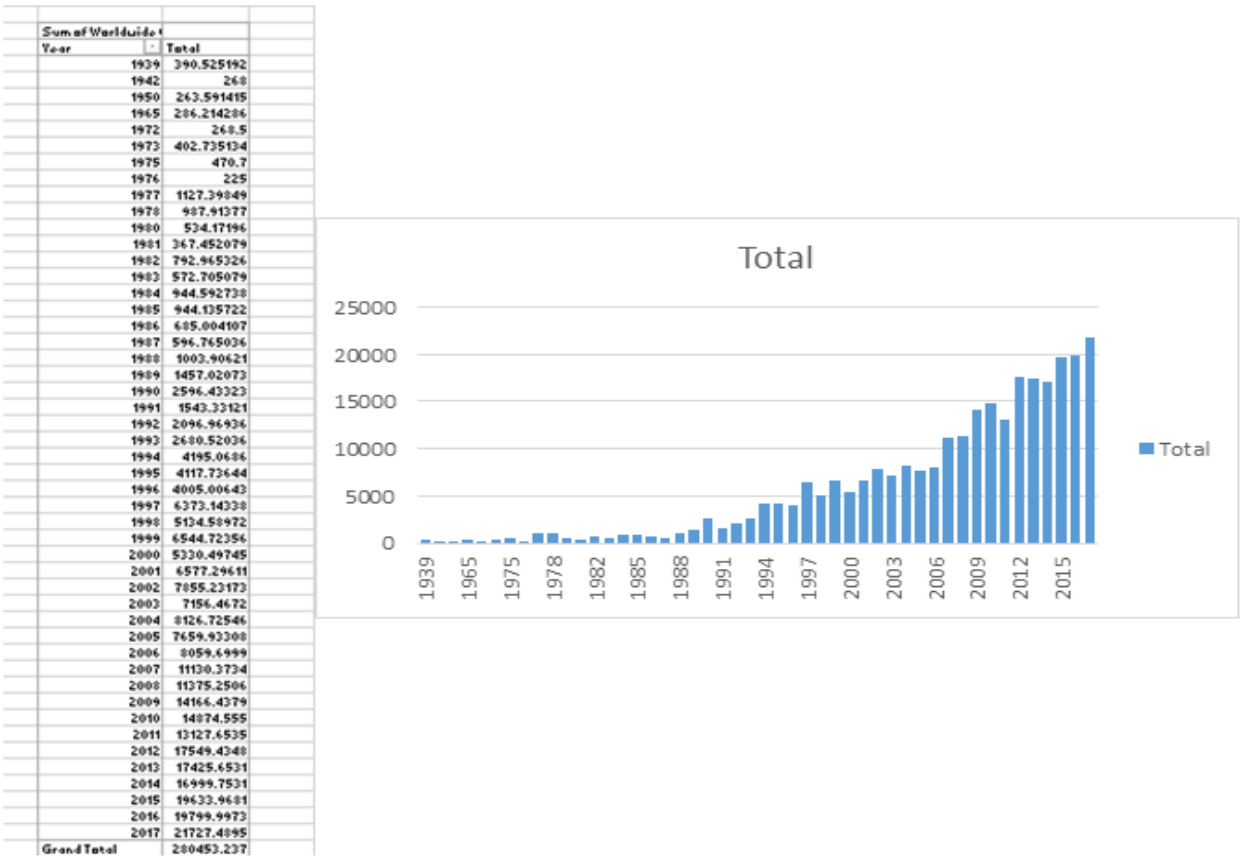


Year	Total
1939	3.9
1942	0.859
1950	2.9
1965	0.2
1972	7
1973	12
1975	12
1976	1
1977	31
1978	116
1980	23
1981	20
1982	10.5
1983	32.5
1984	73
1985	94
1986	23.8
1987	34
1988	109
1989	139.4
1990	245
1991	210
1992	221
1993	264
1994	402.8
1995	865
1996	813
1997	1114.5
1998	1134.5
1999	1039.6
2000	1346.04211
2001	1370.5
2002	1407.70262
2003	1732
2004	1760.69298
2005	1670.5
2006	1899.5
2007	2938.5
2008	2991.5
2009	2620
2010	3901
2011	3243.6
2012	4408
2013	4659
2014	4126.5
2015	4091.1
2016	4735.72
2017	4636

Fig 2

The above histogram is the graphical representation of the table showing Budgets of Movies in different years. As we can see from 1939 to 2017 there has been a steep increase in the budgets required by film industries to make movies in a year. It is an upward sloping graph.

➢ *Gross Revenue Collection Worldwide*



Year	Total
1939	390.525192
1942	268
1950	263.591415
1965	286.214286
1972	268.5
1973	402.735134
1975	470.7
1976	225
1977	1127.39849
1978	987.91377
1980	534.17196
1981	367.452079
1982	792.965326
1983	572.705079
1984	944.592738
1985	944.135722
1986	685.004107
1987	596.765036
1988	1003.90621
1989	1457.02073
1990	2596.43323
1991	1543.33121
1992	2096.96936
1993	2680.52036
1994	4195.0686
1995	4117.73644
1996	4005.00643
1997	6373.14338
1998	5134.58972
1999	6544.72356
2000	5330.49745
2001	6577.29611
2002	7855.23173
2003	7156.4672
2004	8126.72546
2005	7659.93308
2006	8059.6999
2007	11130.3734
2008	11375.2506
2009	14166.4379
2010	14874.555
2011	13127.6535
2012	17549.4348
2013	17425.6531
2014	16999.7531
2015	19633.9681
2016	19799.9973
2017	21727.4895
Grand Total	280453.237

Fig 3

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The above histogram is the graphical representation of the table showing Gross Revenue Collection Worldwide from Movies in different years. As we can see from 1939 to 2017 there has been a gradual increase in the revenues as the budgets have increased causing increase in cost of purchasing tickets leading to increased revenues. It is an upward sloping graph.

III. CORRELATION AND REGRESSION ANALYSIS

- *Correlation*

Correlation Analysis		
	Budget($M)	*Worldwide Gross($M)*
Budget($M)	1	
Worldwide Gross($M)	0.554171987	1

Table 1

In the above analysis, the two variables are Budget as the X-Variable and Gross Revenue Worldwide as the Y-Variable. A weak positive correlation would be in the range of 0.3 to 0.5, moderate positive correlation from 0.5 to 0.70, strong positive correlation from 0.7 to 1 and a perfect correlation is 1+. The correlation between Budget and Revenues is found to be 0.554171987 which is a moderate positive correlation between the variables. This means that with increase in budget there is an increase in the Gross revenue collection worldwide.

- *Regression*

Regression Statistics	
Multiple R	0.554171987
R Square	0.307106591
Adjusted R Square	0.305940104
Standard Error	235.402918
Observations	596

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	14589245.65	14589245.65	263.2747159	2.80234E-49
Residual	594	32916233.08	55414.53381		
Total	595	47505478.73			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	225.1420701	17.93733706	12.55158831	3.21981E-32	189.913755	260.3703852	189.913755	260.3703852
Budget($M)	2.373360511	0.146271305	16.22574238	2.80234E-49	2.086088682	2.660632339	2.086088682	2.660632339

Table 2

Interpretation: - In the above regression analysis from the two variables, we get the vales of A as 225.142070128176 and B as 2.37336051068391 which help us determine future values. By the use of Equation: - Y=A +BX

Y = 225.142070128176 + 2.37336051068391X.

It also states that if there is an increase of 2.37 units in the Budget then Gross Revenue will increase by 1 unit.

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IV. PREDICTING FUTURE VALUES

➢ *Budget*

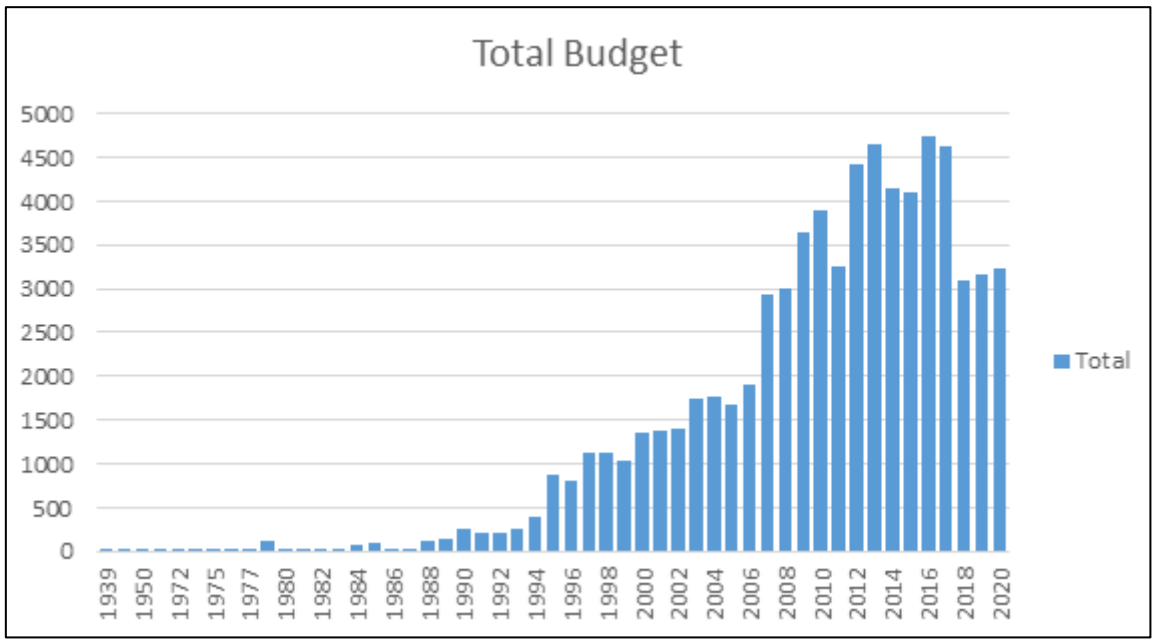

Fig 4

To find the future values, we forecast the values for the years 2018, 2019 and 2020 and plot the above graph. We see that the budget falls down a bit but then for the next few years is increases back again at an increasing rate. The values for the budget of 2018, 2019 and 2020 are 3084.864894, 3152.71749 and 3220.570087 (In Millions) respectively.

➢ *Gross Revenue Worldwide*

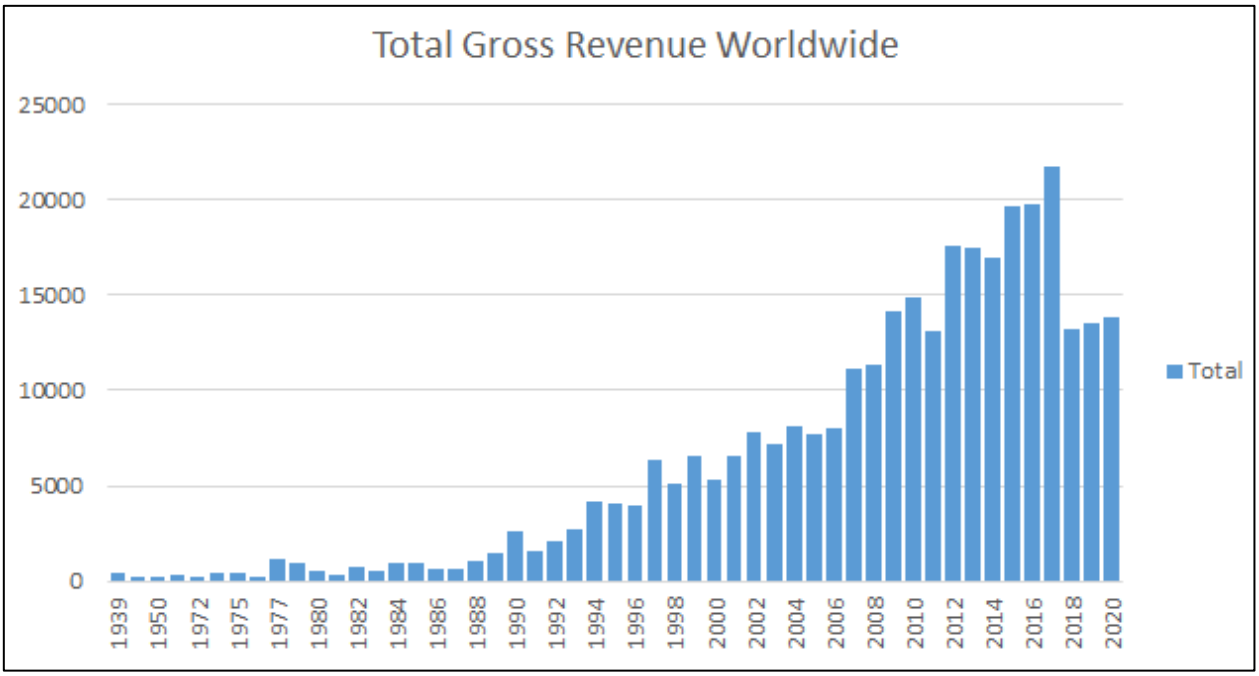

Fig 5

To find the future values, we forecast the values for the years 2018, 2019 and 2020 and plot the above graph. We see that the revenues falls down a bit but then for the next few years it increases back again at an increasing rate. The values for the revenues of 2018, 2019 and 2020 are 13232.79559, 13511.22648 and 13789.65737 (In Millions) respectively.

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V. CONCLUSION

From the above research, we can conclude that there is direct correlation between budgets and worldwide gross revenues from movies and with an increase in budget there is an increase in revenues and with a decrease in budgets causes a decrease in revenues worldwide affecting the film industry growth.

Due to increased budgets the production of movies has gone a new level which developed interests in people such that more and more people have started going for movies and this lead to a great boost to the film industries. The graphs showed how less the movies where preferred in 90's but now a high percentage of people are watching movies.

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