

# Game Theory Model Application In Social Networking Sites: A Comparative Analysis Of Facebook And Instagram

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**Abstract:** *Decision making is a helpful tool which can be used to optimize strategies of the companies for their competitors. The Research work application is based on the social networking sites namely Facebook and Instagram. A game theory practice is used by competitors and their interaction between competitors. The main purpose was to identify the common features among two competitors for the interaction criterion. Interactive strategies were considered. Simple random sampling has been applied. Cronbach's alpha test is used to check the reliability of the questionnaire. The regression analysis tool used to analyze. Data is collected as payoff values. The result found that the effect of decision making for the optimum strategies and their values reflect under the game theory model.*

**Key words:** *Game theory model, decision making process, Optimum strategies, Value of the game.*

## INTRODUCTION

Business situations are always engaged in employee competition. Every decision has a direct impact on the revenue of business organizations. Nowadays social networks play an important role for sharing knowledge and experience, for example: Facebook, Instagram, Twitter, Blogs etc. This is the pattern where people communicate and respond to the social, economical and political behavior of others. The social network sites use methods to explain the structures, analysis of the structure of the social entities.

Edison Research (2020) described that Instagram has more followers than Facebook in total usage nowadays. This report explicates major competitors of social media. The main objective was to apply a game theory on the basis of models and common responses of Facebook and Instagram. The comparative analysis has been done to analyze the most prominent features of the site. The result showed the value of the game and the win-win situation for both the competitors.

## COMMON FEATURES OF FACEBOOK AND INSTAGRAM

- Privacy
- Stories
- Public/private account
- Group created
- Chat option
- Live Videos
- Likes, dislikes and comment

These features are based on the feedback and certain assumptions of the game theory and day to day interaction between Facebook and Instagram. On the basis of game theory, Facebook and Instagram are called as two players. These common features work as the strategies. The payoff values are required to build a game theory model.

## REVIEW OF LITERATURE

**Karami., H. et.al** (2021) Stated the application of a socialist cooperative game for propensity to cooperate and improve agriculture's cumulative net benefit and stimulate the balanced use of groundwater in "An optimal

The main objective was to prevent groundwater level draw down and compensate for part of the groundwater-reservoir deficit in Iran. The main factor in groundwater resources management has been found. Cooperative game theory method was used in the form of an eco-socialism model. Results found that net benefit from agricultural activities will also increase by 26%.

**Chenc,. Z. et.al** ( 2021) proposed this method has been extensively used in the research works about different kinds of power usage fields, especially the smooth power utilizations that can facilitate the sustainable power improvement is the evolutionary game concept in “A comprehensive evaluation of studies works based totally on evolutionary recreation concept for sustainable strength development”. It promoted the sustainable developments of power utilization technology, normal existing problems and several trendy hints about EGT- based studies. The evolutionary game concept approach is primarily based on practical examples and with evolutionary game models including more participants, and research and development (R&D) works primarily based on hybrid algorithms.

**Napoleon Cat** (2019), explained in “interact and assist customers on social media “about the contemporary users of Facebook and Instagram. Result determined that in India, 18.6% of its complete population are Facebook customers, whereas 4.8% of Indian population is Instagram customers.

**Kwatra,.N.** (2018) proven gratifications theory and its importance and usages in social media. It provided a higher expertise for customers' of social media. It also

displays a higher knowledge of the causes and outcomes of the adoption and usage of social media.

**Gutor., T. et.al (2017)**, " defined in "game theory model for the improvement of best approach towards innovative merchandise production at the company” about the innovative method for product manufacturing on the enterprise considering the charges because of the manufacturing, storage and transportation of basic goods; extra charges for the development of revolutionary merchandise and supplementary costs granted by way of the business enterprise for the innovative merchandise improvement in order to decrease feasible material losses by way of the described motives by using designed recreation concept model. End result discovered that organization's managers determine the useful and non-beneficial marketplace nation for certain styles of innovative merchandise and to improve the choice making method concerning the growth or the reduction of innovative products production.

## RESEARCH METHODOLOGY

This technique section consists of the subsequent steps.

An exploratory research design has been used that is based on customer survey, Questionnaire technique has been used for research work, and Google form turned into designed to have the demography details of the respondents. Linear scale turned into used to acquire the records from the respondents.

- A simple random sample technique was used to gather the information. A sample size of 100 was used on a heterogeneous group

of respondents.

The approximation for round off value to be taken for this research work turned into finalized as one hundred samples. The scholars of our college were provided the questionnaire using Google shape to collect the applicable facts. Cronbach's alpha reliability test has been used to check the reliability of the questionnaire. Cronbach's alpha values are primarily based on the responses for selected features for facebook, Instagram and also for both of them.

**Table I Reliability check for Pilot survey**

Sr. No	Index	No. of	Initial Sample Size	C.alpha value	Indication
		Items			
1	Facebook	7	20	0.917	Excellent
2	Instagram	7	20	0.924	Excellent
3	Facebook & Instagram	14	20	0.903	Excellent

Considering that all the three Cronbach's alpha values are greater than 0.90, the questionnaire is an excellent one for carrying this research work. The model is reliable to conduct the survey for the remaining samples.

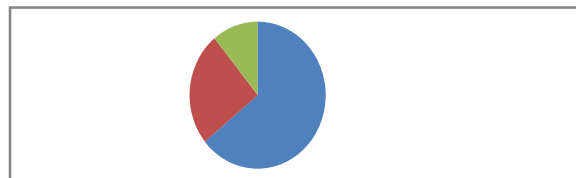
**DATA ANALYSIS AND INTERPRETATION**

- The average value and fashionable deviation were calculated, as to perceive the comparative figures and the consistency of the capabilities of descriptive facts has been used.
- Simple regression analysis is used in ways: Y on X and X on Y. The output of regression analysis in elements for example: Intercept determined by way of default cost of Y while X=0. This is the focus for accumulating the payoff values. The

subsequent element is the slope determining the positive or poor effect of the impartial variable on the dependent variable.

- Game concept model used to intercept records collected from the above procedures of Y on X and X on Y, payoff matrix of 7x7 in form inserted.
- Participant A as important and player B as minor, all the first entries axi amongst (axi, ayj) are answer of game theory to discover the cost of the game and strategies
- Participant B as principal and participant B as minor, all of the 2d entries ayj among (axi, ayj) are taken into consideration to discover the fee of the game and greatest techniques of the sport. The transpose of the authentic matrix values for ayj are taken to clear up for the player B. The final outcomes for both the players of the game concept.

**Fig:1 Sample Distribution based on Occupation**



Nearly 50% of the sample is shared through college students and teachers. Remaining is blanketed inside the subsequent 50%. The sort of the demographic facts primarily based on occupation, reflects the heterogeneity.

**Trends of responses at the seven functions for the 2 players**

The Chat Interface of Facebook is higher in comparison to Instagram. On the other hand, stay films on Instagram are more appreciated by the end users in comparison to the

live movies of facebook. Private or public accounts on Facebook share more contributions as compared to Instagram accounts.

Stories in addition to likes and feedback from each facebook and Instagram are appreciated by the end consumer. The features of groups created on each website are not as in line with the satisfaction level.

The security function stands maximum in case of each social networking website. Descriptive facts, the measure of valuable tendency and the dispersion within the facts help to find out the overall fashion. The ratio of trendy deviation and the average cost indicates the consistency of the belief of the respondents in the direction of facebook and Instagram. Following table offers the consistency ranges for each of the functions among each of the gamers.

**Table- II: Participant wise Descriptive statistics for numerous features players capabilities average Std. Dev. Coeff. of variation (%) consistent by way of ranking facebook .**

Chat Interface	Live Videos	Public or Privat	Stories	Like and Comments	Group Create	Privacy	Instagram Chat	Live Video	Public or Private
602	55	657	641	657	6483	69		625	738
261	285	283	256	272	266	275	562257	278	278
43345	5178	4312	3998	41353	55147	3992	45795	4453	3768
	6	4	2			1		4	1

*Game Theory Model application*

**Table- II: Player wise Descriptive statistics for various features Players Features Average Std. Dev. Coeff. of Variation (%) Consistent by Ranking Facebook**

Players Features Average Std. Dev.	Consistent by Ranking Stories	Like & Comments	Group Created	Privacy
Coeff.of Variation (%)	6.38 2.98 46.67 6	6.68 2.84 42.44 3	4.81 3.15 65.46 7	7.15 2.90 40.61 2

### Interpretation

Privateness of facebook is maximum steady whereas stories are subsequently consistent amongst all its features. On the other hand, a personal or public account of Instagram is most constant whereas security is next amongst all its features. Group created found to be least consistent a few of the two gamers. Safety in both cases is the constant function which plays an important role in the area of social networking websites. Game concept model after carrying the regression analysis, the intercept payoff matrix for both the players is given below.

Consequently it is a 7x7 game concept model on a non-cooperative basis as these players do not share their internal rules; the not unusual features are the interaction factors between these two players.

Table- III: Formation of 7x7 Game theory model Interpretation

All of the values of the intercepts are effective. Maximum of the values revolve five to 7 indicating correct bonding of cell values. However values among 1 to three, suggest week bonding of cell values. Solution of game concept model Matrix game solver provides the online facility for fixing matrix game as a matrix where:

- Player I choose a row and simultaneously
- Player II chooses a column.

The matrix entry of the jointly selected row and column represents as usual the winnings of the row chooser and the loss of the column chooser.

Case 1: Keeping player A as major (row chooser) and player B as minor (column chooser), the game can be solved as - The matrix is

5.52	4.79	5.29	5.51	6.26	5.74
4.23	3.97	3.86	5.25	5.48	5.12
5.50	4.84	3.67	6.14	5.84	5.73
5.80	5.87	5.57	5.42	5.67	5.95
5.09	4.87	5.66	5.13	4.31	5.54
3.57	2.57	2.89	2.89	2.74	2.63
6.23	6.52	5.50	6.93	7.26	7.19

The solution is: The value is 5.59. An optimal strategy for Player A (Facebook) is:

(0, 0, 0, 0.02935, 0.55025, 0, 0.4204) An optimal strategy for Player B (Instagram) is:

(0.07944, 0, 0.90232, 0, 0.01824, 0, 0)

Case 2: Keeping player B as major (row chooser) and player A as minor (column chooser), the game can be solved as - The matrix is

5.10	4.61	4.59	4.91	4.07	4.61	4.90
4.91	4.97	4.49	5.60	4.38	4.34	5.82
6.70	6.22	4.90	6.53	6.53	5.99	6.05
5.75	6.15	5.90	5.03	4.60	4.54	6.42
6.93	6.66	5.96	5.81	4.26	4.97	7.08
4.31	4.28	3.39	3.87	2.91	1.72	5.36
6.51	7.67	6.79	6.83	6.71	7.19	4.93

The solution is:

The value is 5.93. An optimal strategy for Player B (Instagram) is:

(0, 0, 0.32607, 0, 0.29481, 0, 0.37912)

An optimal strategy for Player A (Facebook) is: (0, 0, 0.23636, 0, 0.31427, 0, 0.44937)

Interpretation of answers of games: The price of the game in both cases lies among 5 to 6, which is right enough for each of the players. In each case the most effective techniques are three for both gamers.

**Case 1** Facebook dominant Instagram functions like stories, likes and feedback and safety offer best strategies Likes and feedback, sharing the main contribution. However functions like Chat Interface, public and private accounts and likes, dislikes and comments are the greatest use of strategies for Instagram towards face book. The contribution is shared through non-public and public functions.

**Case 2** Instagram dominates facebook, features like public and private accounts, stories and privacy utilization are the most excellent strategies. Eventually these features are the main strategies for facebook. In each case privacy features share maximum contribution.

Interpretation of Solutions of games: The value of the game in both cases lies between 5 to 6, which is good enough for both the players. In both cases optimum strategies are three for both players.

**Conclusion**

Game theory is used as a decision making tool even in complicated situations. The privacy function for face book whereas public and private account function for Instagram were most prominent features as compared to other features. Data

analytical tools are sufficient to provide a feasible solution. They can offer more privacy to the quit users.

The effective intercepts are used because of the payoff values for creation of a 7x7 non-cooperative game through each of the gamers through regression analysis.

Average value gives the win-win situation and is right enough for each competition. The common functions of those two social networking websites show satisfactory results through the quit customers. it can be observed that features of Instagram share highest among all the strategies even under the dominance of facebook. On the other hand Instagram dominating Facebook reflects the same features as their optimum techniques.

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