# Study of Brand Affinity and Crowd Craze

Prabal Mahanta and Kapil Ratnani
SAP Labs India Pvt. Ltd., Bangalore, India
Email: { p.mahanta, k.ratnani}@sap.com

***Abstract*—There has been several technical advances in the domain of supply chain and brand marketing but there are few studies which try to explain the impact of random events on the supply chain of the brand item and also how to position the brand in the market and how the certain social events and people choice can affect the market of the particular product. There are certain intangible aspects, which the brand may not be ready to compete and meet the challenge. This leads to failure of the brand and sometimes this helps to rebuild the brand. Here we see it from the algorithmic point of view on how to create the simulation environment on local machines and cloud infrastructure. The paper presents the conceptual research that deals with the study of the issue and also simulates the same.**

***Index Terms*—bigdata, simulation, affinity, crowd simulation**

## I. Introduction

The goal of this paper is to present the holistic environment of the sociology that persists in the crowd and understanding of this trend to illustrate the general tendency of affinity towards a particular product.

We see that Sociology [1] provides us the template to study the crowd in terms of simulation, chaos and modeling. The term also explains the group dynamics [2] and the psychology [3] of the crowd which is predominantly the factor behind ensuring the planning of the community is perfectly balanced in terms of safety. This particular feature of understanding the crowd has led to multiple researches on the subject leading to various interesting outcomes.

The artificial intelligence that is involved in the simulation of the crowd has led to advancement in the entertainment industry where large scale battles are simulated through the logic of crowd AI simulation which can be seen in movies like The Lord of the rings [4, 5].

Our aim is to conceptualize the crowd in terms of events which resembles the trends of crowd towards products or brands in ideal conditions and ad-hoc conditions where the affinity triggers the attraction towards the products and in some cases we can also simulate any event affinities say for e.g. There are two rock concerts in a city and the affinity towards each concerts seems to be divided among the crowd and the marketing of the concerts with offers catches more revenue in this scenario.

This helps in understanding the nature of the crowd and in turn helps the firms to choose better ground for introducing their product to the market. This becomes an interesting topic for research and this helps to quantify the perspective of the people and tries to mitigate and also to forecast cause of the failures and success likewise.

## II. Past Work

The idea for research came from the study of the behavior models as well as the crowd models, which were put forward in TRA (Schepers & Wetzels, 2007) [6] where we understand the perceived notion of behavior of a person. There emerges a model for intention analysis for behavior and the technical utility of the concept in today's scenario.

In relation to the fundamental state of intention, we need to know the attitude of the subject in consideration which was presented by the attitude object (Ajzen & Fishbein, 2005) [7] and also "Motivation and Opportunity as Determinants" (Fazio & Towles-Schwen, 1999) [8] presents a concept of reason and action based on the reason.

In context of the above, Muduganti, Sogani, and Hexmoor (2005) [9] also tried to understand the logic behind the reason of subjects under evaluation on choice of a certain technology and the rejection of others in the market space. They were also successful to quantify attitudes, norms and intentions against a bell curve.

Similarly in the field of crowd simulation; Lacks, Gordon, and McCue (2005) [10] presented the relationship between the nature of a crime scene and the crowd gathering in the place of incident. Their study revealed new norms that are emerging in the society.

They all proposed a life cycle of the crowd which is shown in Fig. 1.

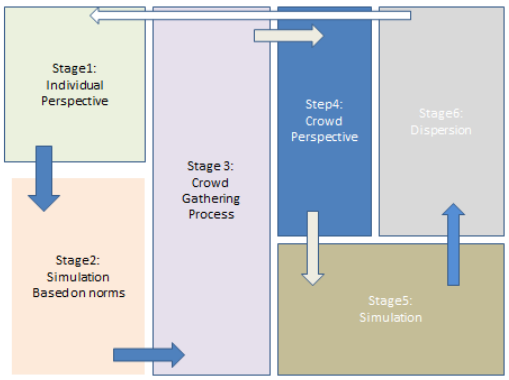


Figure 1. Crowd Simulation Life Cycle

Manuscript received July 19, 2013; revised September 23.


doi: 10.12720/jiii.1.4.223-225

The observation from Gayle and Manocha (2008) [11] for the population behavior in terms of human immersion in virtual worlds like Second life [12].

Finding a similarity to the ant colony behavior to that of people crowd is one aspect we tried to model in terms of the affinity of the crowd for the products and understand the logic behind the behavior, which forms the key aspect for the source in study.

## III. Concept Implementation

The nature of events always determines the behavior of the crowd and in regard to this notion we came up with the simulation of such events in ideal and ad-hoc stimulations.

We consider two sets of worlds S1, and S2 which represent any brand of products and each has a weight associated to it which is quantified by the following equation, Eq. (1):

$$\text{Affinity Factor} = (\text{Social Factor} * \text{Norms}) + \text{Error}. \quad (1)$$

Here the social factor is calculated based on surveys and also other social media activities and this is average of all the responses for a particular product, Norms is the social attraction towards the product category based on seasonality and other factors and Error is introduced to balance the affinity factors for different products and here we consider only two.

For the simulation purpose, the two worlds act as sink for the crowd simulated on the ecosystem. The ecosystem is the grid where the world S1 and world S2 are present along with the population.

The population is generated randomly using the following craze factor so as to attract itself to the sink, Eq. (2):

$$\text{Craze Factor} = (\text{Norms} * \text{Social Influence}) + \text{Error}. \quad (2)$$

Here the Social Influence notion is calculated similarly as the case of the Social Factor but here the average per group is calculated.

Simulation of the population is done by defining the boundary of the ecosystem as a grid of 500 X 500 in a plane.

The population is a hybrid product comprising of three sets of craze factors which produces groups where the craze factor converges and some are not opinioned sets which are termed as neutral sets.

Once the sources S1 and S2 are generated the Social Factor is mapped to different coordinates in the grid. The population also similarly is provided coordinates based on the craze factor which while in our research also resembled the fan factor and this theory can be applied to the supply chain in terms of retaining loyal customers and also managing good vendor policies.

Once the Grid is populated the simulation starts which involves population to crawl towards the source for an iteration of 1000 stimuli.

When the iteration completes then we observe the population count in each of the sources or world as we call it. The remaining count provides the population, which is neutral.

Scenario1: S1 is not introduced, S2 generated

The experiment suggested that majority of the population didn't get attracted towards S2 so it would be advisable for the brand to revoke its operations in the ecosystem or tweak its Social Factor but the affinity towards S2 is higher due to the loyal customer or fan following as shown in Fig. 2.

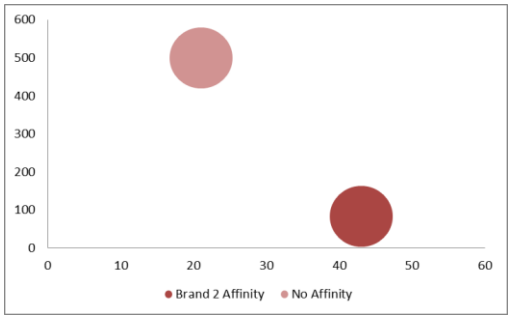


Figure 2. Scenario 1 (Affinity factor in Y axis and Craze Factor in X axis)

Scenario 2: Source S2 is not introduced while S1 is generated.

As shown in Fig. 3, the observation is some of the population having negative attitude towards S1 also got attracted to the brand S1 but still there is a negative influence which on comparison with Scenario 1 suggests that the Brand which represents the world S2 is performing better but to represent the case we did scenario 3.

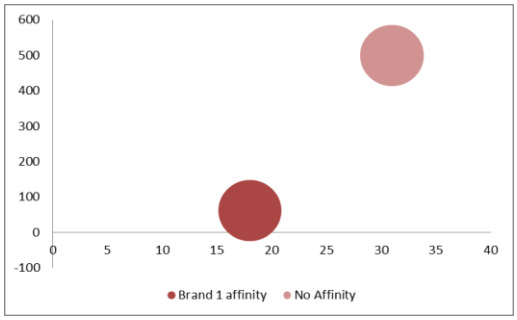


Figure 3. Scenario 2 (Affinity factor in Y axis and Craze Factor in X axis)

Scenario3: Both the worlds are generated

We observe that there exists a neutral group along the two groups with affinity towards brands 1 and 2. Here we can see that Brand 2 still competes well from Brand 1 but the case here is of a merge, which suggests that a certain population carries affinity towards both products and may be a random buyer as shown in Fig. 4.

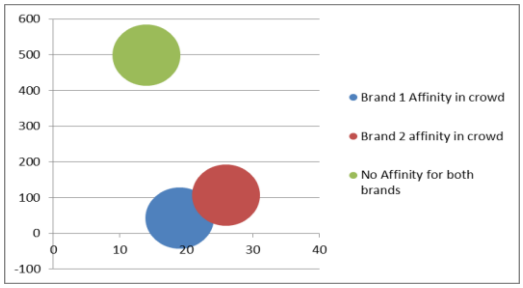


Figure 4. Scenario 3 (Affinity factor in Y axis and Craze Factor in X axis)

Since not all the real world applications are ideal in perspective so we simulated affinities for a 3 random products in study.

We tried to create population for three different products and observe in case of random addition of the products in the ecosystem during different phases of iteration.

We observed that if norms are kept constant and the social factor is varied from low-to-high for any product the affinity grows exponentially and becomes constant after the boundary condition is met but the interesting part was that the craze factor for the crowd kept on increasing and this suggested that there are lot of parameters from the perspective of the social factor that is required to be taken care of by any supplier/artist so as to succeed well in the ecosystem shown in Fig. 5.

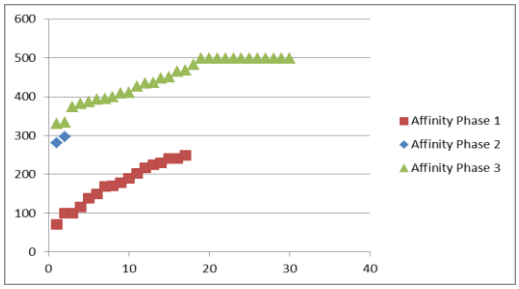


Figure 5. Scenario 3 (Affinity factor in Y axis and Craze Factor in X axis)

## IV. Practical Effectiveness

The application to the fields of Supply Chain, Entertainment and Education can be effective in terms of generating more revenue for the supplier in case of SCM, artist outreach factor in case of entertainment industry and course outliers and effectiveness in case of education industry.

## V. Conclusion

The paper deals with the concept of crowd behavior and its attraction towards the products based on their choices and social attraction features. We are using python Numpy and Scipy for simulating the scenarios and the plan is to further enhance the model and introduce complicated events to simulate the crowd behavior.

## Acknowledgment

The authors would like to express gratitude for all the support and motivation provided by Mr. Ganapathy Subramanian, Vice President, TIP DNA (CE&SP), SAP Labs India, Bangalore. We acknowledge his support for encouragement and guidance during this research.

## References

[1] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179-211, 1991.
[2] T. Postmes, R. Spears, and S. Cihangir, "Quality of decision making and group norms," *Journal of Personality and Social Psychology*, vol. 80, no. 6, pp. 918-930, 2001.
[3] S. D. Reicher, "The psychology of crowd dynamics," in *The Blackwell Handbook of Social Psychology: Group Processes.* M. A. Hogg and R. S. Tindale Ed., Oxford, England: Blackwell, 2001, pp. 182-208.
[4] The Lord of the Rings. 08 July 2013. [Online]. Available: https://en.wikipedia.org/wiki/The_Lord_of_the_Rings_(film_series).
[5] The Lord of the Rings. (08 July 2013). [Online]. Available: http://lotr.wikia.com/wiki/The_Lord_of_the_Rings.
[6] J. Schepers, and M. Wetzels, "A meta-analysis of the technology acceptance model," *Investigating Subjective Norm and Moderation effects. Information & management*, vol. 44, pp. 90-103, 2007.
[7] M. Fishbein, "A theory of reasoned action: Some applications and implications," in *Nebraska Symposium on Motivation*, H. E. Howe Jr. and M. M. Page, Ed., Lincoln, NE: University of Nebraska Press, 1980, vol. 27, pp. 65–116.
[8] R. H. Fazio and T. Towles-Schwen, "The MODE model of attitude-behavior processes," in Dual-process Theories in Social Psychology, S. Chaiken and Y. Trope Ed., New York, NY: Guilford Press, 1999, pp. 97-116.
[9] R. R. Muduganti, S. K. Sogani, and H. Hexmoor, "Comparison of information technology adoption rates across laggards, innovators and others," in *Proceedings of IEEE International Conference on Information Technology (ITCC 2005)*, 2005.
[10] R. D. Lacks, J. A. Gordon, and C. M. McCue, "Who, what, and when: A descriptive examination of crowd formation, crowd behavior, and participation with law enforcement at homicide scenes in one city," *American Journal of Criminal Justice*, vol. 30. no. 1, pp.1-20, 2005.
[11] R. Gayle and D. Manocha, "Navigating virtual agents in online virtual worlds," in *Proceedings 13th International Symposium on 3D Web Technology (Web3D '08)*, pp. 53-56, 2008.
[12] Second Life game. (09 July 2013). [Online]. Available: http://secondlife.com/.

**Prabal Mahanta** was born in the city of Guwahati, Assam, India in 1985. Mr. Mahanta holds a Master's degree in Information Technology (M.Tech) with majors in Embedded Systems from International Institute of Information Technology (IIIT), Bangalore, Karnataka, India. He is currently working as a Developer at SAP Labs, Bangalore, India. He has worked extensively on critical customer projects as well as research projects. He has a strong inclination for research and teaching. He has presented many papers in national conferences and his research interest lies in in-memory computing, cloud-infrastructure, chaos theory and real time simulations.

**Kapil Ratnani** was born in city of Raipur, Chhattisgarh, India 1987. Mr. Ratnani holds a Master's degree in Information Technology (M.Tech) with majors in Computer Science from International Institute of Information Technology (IIIT), Bangalore (Karnataka, India). He is currently working as a Developer at SAP Labs, Bangalore, India. He has research interests in Machine Learning, Programming Languages, and Compilers.