CRITERIA III: RESEARCH, INNOVATION AND EXTENSION

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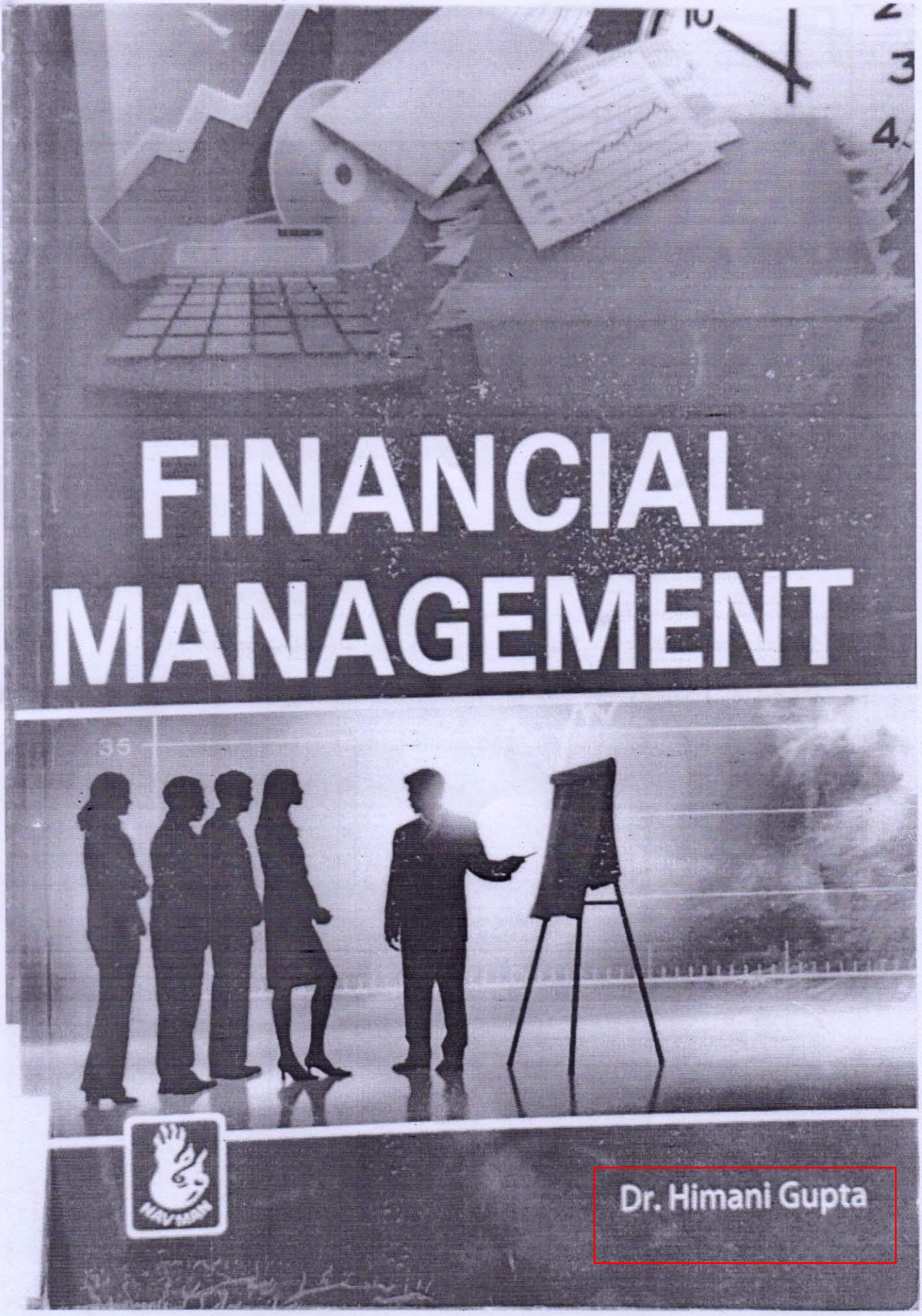


FINANCIAL MANAGEMENT

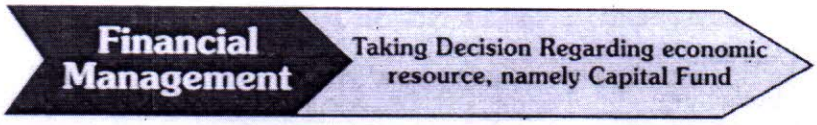
Dr. Himani Gupta

CONTENTS

1

Financial Management : An Introduction

"If you want your income to grow, you too must grow." — ***Idowu Koyenikan***



1. MEANING OF FINANCIAL MANAGEMENT

Financial Management means planning, organizing, directing and controlling the financial activities such as procurement and utilization of funds of the enterprise. It means applying general management principles to financial resources of the enterprise. Actually, Finance is the oxygen to all activities of business. Finance is that blood of business which is concerned with the acquisition and conservation of the capital funds in meeting financial needs and overall objective of business enterprise. Therefore, finance is considered as the backbone of every business. So, Financial management is the study of raising financial resources and their effective utilization with a view to maximize the value of the firm i.e. maximizing the value of shareholders who are the real owners of the company. Raising of finance and utilizing it in the best manner is the key for every business to be successful, therefore, financial management has got a place of prime relevance in every business. Financial management is important in all types of businesses, may be in retail organization, industrial firm, the financial institutions or banks. Financial management is also essential in governmental operations, from school to hospitals to highway departments. Financial management basically relates to decision made by firm or investor that is related to its finance.

ABOUT THE BOOK

The book "Financial Management" has been written to meet in all measure, requirements of undergraduate students, particularly at the BBA and B.Com. level. This book covers the syllabi of various major universities across the country, providing basic knowledge of Financial Management in a systematic manner. The topics have been dealt with in a lucid manner to enable better understanding on the part of students who do not have a finance background. The text is explained in a simple, pragmatic and student friendly language. Numerous examples through tables and solved graded illustrations have been given to have a better understanding of the subject. Multiple choice questions (MCQs) are also given at the end of every chapter.

ABOUT THE AUTHOR

Dr. Himani Gupta is Associate Professor in the Department of Management Studies, Jagannath International Management School, New Delhi affiliated to Guru Gobind Singh Indraprastha University, Delhi. She has been the visiting faculty at KKMII-Stratford University. She has done B.Com. (Hons) and M.Com. from the University of Delhi. She obtained her Ph.D degree on Capital Structure Pattern in Multinational Companies- FMCG Sector. She is associated with teaching of Financial Accounting, Cost & Management Accounting, Financial Management and Taxation Laws to graduate as well as post graduate students.

Dr. Himani Gupta has published several research papers in reputed national journals and has attended many conferences and seminars.

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Cooperative Caching in VANETs: Latest Trends

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Abstract – Internet Based Vehicular Adhoc Networks (IVANETS) are subsets of MANETs formed by high speed moving vehicles equipped with communication facilities like IEEE802.11. In IVANETs Inter- vehicle communication is possible without the existence of any permanent infrastructure. Due to frequent disconnections, data availability and consistency is the major concern in IVANETs. To reduce query latency time and communication costs, it is imperative to cache the frequently access data. Caching of popular data in MTs can further reduce the query response time. There are no limits to the caching content as vehicles have their own cache memory embedded in them. Co-operative caching further increases the communication performance. In cooperative caching environment multiple nodes coordinate and share cached data among themselves. In co-operative caching the data request raised by one vehicle is satisfied by the neighbour vehicle and no data request is sent to the server. Researchers have proposed a number of cooperative caching techniques in MANETs, but it has not been discussed much in IVANETs. In his paper we have discussed the recent cooperative caching techniques in VANETs, which are based on the different cooperative caching schemes in MANETs.

Keywords – Vehicular Adhoc Networks, Mobile Adhoc networks, Co-operative caching.

I. INTRODUCTION

VANETs have emerged as an innovative area of research for many researchers and academicians in the past few years. In VANETs vehicles establish communication link among themselves to share the information [1]. In VANETs, Vehicles access Internet using IEEE 802.11 and each vehicle act as a MT (Mobile Terminal) which collects data from other vehicles in the network. To access Internet mobile devices like mobile phones, PDA, and Mobile Nodes (MN) use this standard and for this the device must have unique ID to be recognized in network. Vehicles require some infrastructure to connect to the Internet. The exchange of information between cars for road safety is one of the applications of Internet of Things (IoT) in Internet bases Vehicular Ad Hoc Network (IVANET) [2, 3, 4].

In VANETs, continuously moving vehicles leads to constant topological changes. Continuous movement of vehicles causes topology changes which results in higher delays. The performance of Internet based VANETs (IVANETs) can be optimized, if we cache popular data items in vehicle's cache. In VANETs, vehicles can have their own storage space. So caching of data is not a problem with vehicles but the major concern is the availability of latest and consistent data. All nodes must have consistent data, validated by the server, so that vehicles don't use any stale data. Cache inconsistency can increase communication costs and there will be longer delays. Reduced query latency and uplink requests are our concerns in VANETs.

Cooperative caching is best solution to longer delays. It will reduce the bandwidth consumption and increase the efficiency of VANETs. It is the enhancement of caching technique which improves caching efficiency. In Cooperative caching nodes cache the popular data and share it with their neighbour nodes. In mobile ad hoc networks if there will be a cache miss, it may be followed by a series of cache misses. To avoid a cache miss, prefetching of data plays an important role. In VANETs moving vehicles may have common interest as mobile nodes in adhoc networks. In VANETs vehicles can pre fetch the data, can store them in their cache and can share this data among themselves, so that the uplink data requests to the server can be reduced. Combining caching with prefetching can further improve response time. Cooperative caching schemes discussed here assumes the integration of both strategies to improve the network performance. Cooperative caching strategies of MANETs guide for the study of Cooperative Caching strategies in VANETs also.

In this paper, we are providing the detailed information to the researchers regarding concepts of cooperative caching and we have also discussed related researches in the field of MANETs, which provides the basis for Cooperative Caching techniques in VANETs .This paper is organized as follows. We have presented the overview of Cooperative Caching in Section II, Section III presents the Cooperative Caching schemes in MANETs. In section IV recent researches in VANETs have been discussed and in section V the future

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Improved 2Tier Cooperative Caching Scheme for Internet Based Vehicular Adhoc Networks (IVANETs)

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Abstract— **IVANETs (Internet Based Vehicular Adhoc Networks) are the adhoc networks formed by moving vehicles without any permanent infrastructure and are characterized by frequent disconnections, frequent topological changes, as vehicles move at very high speed and can take unpredictable turns on their route. So their cached data items become stale, need to be updated from the server and it results in high data traffic and long query delays. In such circumstances, data availability and data consistency becomes very crucial. Availability of consistent and updated data is one of the important requirements in VANETs. Cooperative caching concept is beneficial to reduce the query latency time as well as network traffic as vehicles can share their cached content and uplink connections to the server is reduced. In our paper we are proposing a cooperative caching scheme which is an improvement over existing 2Tier CoCS (2tier Cooperative Caching Scheme).**

Keywords— VANETs, Cooperative Caching, 2Tier CoCS

I. INTRODUCTION

IVANETs have emerged as an innovative area of research for many researchers and academicians in the past few years. In IVANETs vehicles establish communication link among themselves to share the information [1]. In IVANETs, Vehicles access Internet using IEEE 802.11 and each vehicle act as a MT (Mobile Terminal) which collects data from other vehicles in the network. Mobile devices use IEEE standards to access Internet and they must have a unique ID so that they can be recognised in network. Vehicles require some infrastructure to connect to the Internet. This infrastructure is provided by the RSUs (Road Side Units) in VANETs. The information exchange between vehicles for road safety is an application of Internet based Vehicular Ad Hoc Network (IVANET) and concept is known as Internet of Things (IoT) [2, 3, 4].

In IVANETs, continuously moving vehicles leads to constant topological changes. Continuous movement of vehicles causes topology changes which results in higher query delays. The efficiency of IVANETs can be optimized, if we cache popular data items in vehicle's cache. In IVANETs, vehicles can have their own storage space. So caching of data is not a problem with vehicles but the major concern is the availability of latest and consistent data. All nodes must have consistent data, validated by the server, so that vehicles don't use any stale data. Cache inconsistency can increase communication costs and there will be longer delays. Reduced query latency and uplink requests are our concerns in IVANETs.

Cooperative caching is best solution to longer delays. It will reduce the bandwidth consumption and increase the efficiency of IVANETs. It is the enhancement of caching technique which improves caching efficiency. In Cooperative caching, nodes cache the popular data and share it with their neighbour nodes. In mobile ad hoc networks if there will be a cache miss, it may be followed by a series of cache misses. To avoid a cache miss, prefetching of data plays an important role. In IVANETs moving vehicles may have common interest as mobile nodes in adhoc networks. In IVANETs vehicles can pre fetch the data, can store them in their cache and can share this data among them, so that the uplink data requests to the server can be reduced.

Our paper is proposing a cooperative caching scheme for IVANETs which is an improvement over 2Tier CoCS (2Tier Cooperative Caching Scheme). We have proposed the changes which can be accommodated in 2Tier CoCS and make it more efficient. Organization of our paper is as follows: Section I provides the introduction .We have presented the literature review along with the overview of 2Tier CoCS in Section II. Section III presents the proposed scheme and its model. In section IV, data discovery and detailed design of proposed scheme has been discussed. In section V we have discussed the analysis of proposed scheme. Section VI presents the future issues. In section VII we conclude the paper.

II. LITRETURE REVIEW

Many researchers are working on Cooperative caching in MANETs, but research work regarding cooperative caching is not much discussed in the field of IVANETs. IVANETs

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Dynamics of Online Social Network based on Parametric variation of Relationship

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Abstract: The current research in opinion mining is largely based on content analysis of social interactions of users on a network. However social interactions are also governed by relationships existing between the various nodes. The role of relationship specific attributes on categorical influence prediction in a social network forms the basis of the presented work. This paper proposes a two phased collaborative model for predicting spread of influence in a social network by utilizing multiple relationship specific parameters. The initial phase identifies and visualizes the varied opinions based on relationships in a network which are then quantified through a distinct measure, the opinion metric, in the second phase. The metric takes in consideration the opinion and page rank centrality of respective nodes to generate the strength of node's negative influence factor. A high value is indicative of higher probability of spreading maximum negative influence. An experimental study on a sample network of ten nodes is conducted using Gephi, a social network analysis software. Using the opinion metric, the node capable of spreading the maximum negative influence in the network was identified. Early identification of malicious nodes in a network can be of immense help in various sectors such as Marketing, Defense, Stock markets, IT industry etc.

Keywords—Social network analysis; relationship, opinion formation, centrality measurement

I. Introduction

Social relationships and networking are vital constituents of human life and their diffusion is facilitated by the evolution of social networks. The network of relationships and interactions among social entities such as individuals, groups and organizations comes under the ambit of the umbrella term social network [1]. The examples include twitter, email networks, facebook etc. Social Networking has an imperative effect on the process of opinion formation and exchange of views among users [2]. Other than the mass media, the exchange of information amongst community members also influences the dissemination of information within a network.

This paper proposes a collaborative approach of identifying the most influential user who can disseminate negative opinion in the network, taking in account the relationship parameters and centrality measures approaches. The paper is organized as follows: The following section presents the brief literature study of the work done in this domain in the past, followed by a detailed description of social network analysis and the role of relationships therein in Section 3: The model is proposed in Section 4: followed by the case study in section5. Section 6: concludes the paper.

II. Related Work

The vital aim of opinion mining is to detect interesting patterns which involves classification of social network content and thereafter opinion extraction of individual users. Numerous researchers have proposed the methods which reveal the online opinions concerning the products [3][4][5], some studies are done for opinion spreading in contagion approach[6][7] which is based on the spreading of disease.

"Social network analysis (SNA) is an approach, with set of techniques employed to study the exchange of resources among actors (i.e. individuals, groups or organizations) and also to examine the behavioral patterns and relationship among users" [8]. SNA aims at identifying the central nodes in a network using centrality analysis metrics such as closeness, betweenness and eigenvector centrality [9][10]. Current research is aimed to detect influential users in a social network using various SNA techniques such as degree centrality measures [11][12][13]. Kretschmer method [14] and clustering procedures [15][16]. However these approaches have drawbacks, as they only consider the structure of interaction among the users, the information exchange among the users play crucial role which needs to be addressed.

The above mentioned studies have shown how SNA can be used to find the most influential user in a network and opinion mining techniques can be used to find out the opinion of a specific network. In combining these two approaches this paper proposes the identification of opinions based on direction, strength and content also a novel metric is given which will enable to detect influential participant capable of disseminating negative propaganda.

III. Fundamentals Of Social Network Analysis

Social network analysis (SNA) is a set of analytical method to perform detailed quantitative analysis of a social network. It considers both physical structure as well as logical flow in order

to quantify various facts and metrics for the considered social network. SNA techniques can be applied to social network graphs which are generated by quantitative and qualitative analysis of interactions happening in real time among the entities of the organization under study. Entities and their interactions are represented as nodes and edges respectively in these graphs. These graphs can be directed/undirected and weighted/ unweighted. SNA help us to quantify node degrees, identification of central actors, bifurcation of communities, understand information diffusion and complex contagion patterns which in turn can help any organization in planning strategic decisions at various organizational levels. Generally applied SNA metrics are discussed below.

Centrality: Centrality signifies the most important nodes of a social network and can be measured using degree, betweenness and closeness metrics.

- Degree centrality metric indicates the number of connections that a node has with other nodes of the network and helps to identify most and least active nodes.
- Betweenness centrality metric of a considered node measures the number of shortest paths between any pair of nodes which contain the considered node. A high betweenness signifies that the considered node occupies a significant position and can act as brokerage among various pairs of nodes.
- Closeness metric measures the distance of a considered node with every other node by measuring number of hops that a person must go through to reach everyone else in the network. A high closeness indicates the nodes closeness to rest of the network making it an important agent in the network.

Density: This metric measures the strength of interconnectivity among a group of nodes. A social network with high density indicates strongly connected nodes groups [17].

Page rank: This metric quantifies the importance of a node relative to its neighboring nodes. A node with high page rank is treated as a significant node even if it has low value of degree metric.

Communities Identification: By applying SNA, we can also identify subsets of densely connected subgroups of nodes called communities. Communities are densely connected partitions of nodes which can indicate on collaborative and teams formation activities. Communities can be related to identification of maximum cliques in a social network graph.

A. Relationships Based Social Network Analysis

Apart from analyzing social networks by applying above discussed metrics, understanding the role of relationships at micro levels can help in predicting real time dynamic behaviors among actors.

Relationships and interactions maintained at the macroscopic level in the real world depend on the relationships maintained at the microscopic level of individual actors. Hence relationships and interactions form the key focus area in social networks which can be aggregated and analyzed so as to form ties in the social network graphs. Theoretical concepts, pertinent data and critical statistical tests employing distributions, all are based on the properties of these relationships. Relationships are indicative of a connection between two or more nodes and can be categorized depending upon the content of information exchanges.

Understanding various aspects of relationships can help us to categorize existing ties among actors. Hence this paper identifies various ties between pairs and also examines the relationships that form and maintain those ties. Three prominent aspects of relationships to categorize ties are examined here i.e. content, direction and strength, as shown in Fig. 1.

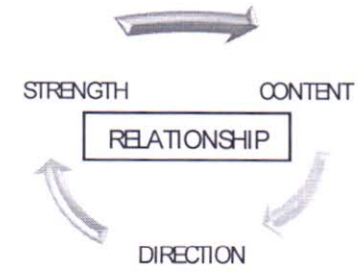

Fig. 1: Three aspects of relationships.

Content (C): Every relationship in a network can be characterized by its content (c). This content would vary with the domain of study, and careful choices must be made in choosing the attributes of contents available which have the most effect in classifying ties.

Direction (P): Information flow in any relationship in a network also has an associated direction (p) to it. One node assumes the role of a sender and the other as the receiver. At times the network may allow switch between these roles. Relationships may be unidirectional or bidirectional.

Strength (S): Another attribute of relationships is strength (s). Strength refers to the frequency of information exchanges in a relationship. A relationship in which actors meet and exchange information frequently is stronger as compared to a relationship in which information is exchanged less frequently.

Relationships parameters such as content, direction and strength therefore plays an important factor on accurately classifying ties enabling better social network analysis which can lead to real predictions and dynamic strategic planning. Hence this paper presents a dynamic model to establish opinion formation by considering the relationships and these parameters amongst the participating entites. The proposed model is presented in the next section.

IV. Proposed SNA Model to Establish Parameters Effecting Opinion Formation

This work proposes a two phased collaborative model where the first phase identifies influential nodes using SNA centrality measures. Opinion of each of the participant is also established through the relationship parameters discussed above. The output of the first phase is then provided as an input to the second phase which predicts the most influential opinion propagator through a distinct opinion metric.

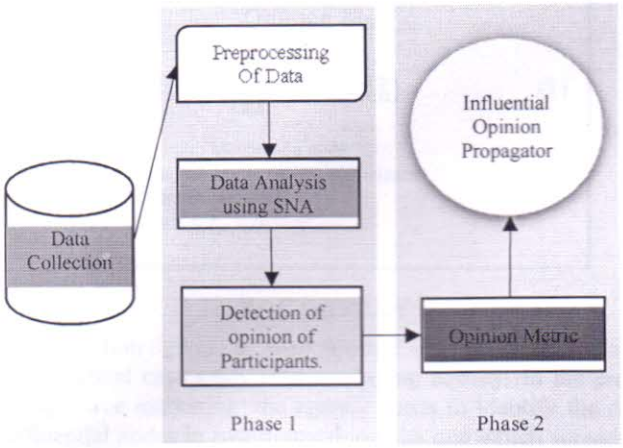

Fig. 2 : Collaborative Model to establish Parameters effecting Opinion Formation

Fig. 2 depicts the various stages of the model. Each of the stage is elaborated upon with the help of a hypothetical case study of a marketing agency. The study monitors the opinions of each individual (node) and its effect on other nodes of the network. A network of 10 nodes is considered and the effect of dissemination of opinion in the network is studied. Opinions of the same product with the same specification were considered. The process begins with the first stage that is the data Collection stage.

Data Collection: This stage gathers the data of the individual nodes of the network. This data could be in the form of discussions, comments amongst the nodes. For the case study in hand simulated data is collected for a group of 10 people. Discussions of these nodes among preferred friendship network of all these 10 people was considered.

Once the data is gathered, it passes through two phases.

PHASE I

This phase is responsible for data collection, modeling and analysis. It takes as input the gathered data and produces as output the opinion generated from the user.

Preprocessing of Data: The data collected in the initial phase needs to be represented in a social network matrix form so as to enable quantitative analysis by any SNA software like Gephi by modeling these matrices as social network graphs.

Data analysis using SNA: The graphs generated in the previous stage are analyzed using the centrality Measures such as in degree, out degree, betweenness and page rank. This analysis will help in finding the most influential participant according to interaction in network.

Detection of opinion of participants: The final stage of the first phase establishes the opinion of each node, taking in consideration the relationship parameters discussed in section III. Opinions are categorized into four types neutral, positive, motivating negative and negative. Every opinion is assigned a unique color code to enable visualization of the established relationship between the nodes. The following rules are formulated to judge the opinions. Table 1 list down the rules.

- Rule1: Absence of any communication amongst two nodes (Neutral communication) => No relationship p=> No opinion(Neutral);
- Rule 2: Directed communication and positive content exchanged from both the participants,=> Positive opinion;
- Rule 3: Negative communication from one participant and positive/ neutral communication from other => opinion is motivating negative as the negative opinion participant can motivate the positive opinion participant thus can change the later opinion;
- Rule 4: Neutral communication from one participant and positive/ neutral communication from other then opinion is Neutral;
- Rule 5: Negative communication from both the participants =>Negative opinion ;

Table 1: Opinion Rules based on content and direction

User 1	User 2	Opinion
Neutral	Neutral, Positive	Neutral
Positive	Positive	Positive
Negative	Neutral, Positive	Motivating Negative
Negative	Negative	Negative

A high negative opinion indicates an emergency situation as there is a threat of propagation of negative opinions from that participant and hence immediate remedial measures required to be taken.

PHASE II

The second phase of the model calculates the proposed distinct measure of the opinion. It subsequently identifies the most influential participant capable of propagating negative opinion among others in the network.

Opinion Metric: The existing research has mainly focused on centrality metrics to find out the influential participants in the network but their opinions are not considered [18][19]. The studies which considered the opinions were limited to content and were unable to detect the influential propagators [20][21]. Therefore there is a need of combined metric to detect influential participants to propagate specific opinion.

This contribution propose a distinct opinion metric which takes into consideration all the relationship parameters that is both centrality metrics (direction and strength) as well as content which will help in effectively detecting the participants in a network who are more responsible for propagating specific opinion. The opinion metric given in equation 1 below aggregates the overall opinion of a particular participant (formed using rules in phase I and shown in Table 1 and 5) averaged by the number of participants, the value is then weighted by the appropriate page rank.

Opinion Metric

$$O_m = \frac{\sum_{i=1}^{N} O_p \times P_r}{N} \quad (1)$$

Where:
O_m = Opinion Metric of a node
N = Total No. of interacting participants
O_p = Opinion parameter
P_r = Page Rank

V. CASE STUDY

This section gives a walkthrough of the model for a hypothetical case study of a marketing agency. In the era of competitive marketing, the agency needs to identify the most influential nodes in two dimensions; the one which spread the positive opinions (to improve sales) and the one capable of damaging its reputation by spreading negative opinion about it. A two way policy to handle both aspects can provide a niche in the market.

The first phase of the model focuses on understanding relationships and recording interactions amongst people participating in a discussion regarding a product. 10 Participants were selected to produce the adjacency matrix, which shows the level of participation in the group discussion as done in [22]. Apart from recording the number of information exchanges, polarity of exchanges i.e. Neutral, Positive, Motivating Negative and Negative are also recorded so as to enable content specific relationship analysis. Adjacancy matrix representing the discussion of 10 participants for a specific product is shown in table 2. The data shows frequency of interactions between two participants for example participant A interacted 3 times with participant B, 2 times with participant C, 2 and 3 times with participants J and E respectively. The blackened diagonal represents no interaction of the participant to himself or herself.

Table 2: Adjacency Matrix for Interaction among 10 participants

	A	B	C	D	E	F	G	H	I	J
A		3	2		3				1	2
B	1			2	2		1	4	1	1
C	1				2					3
D		1				1				
E	5	1	3			4		1		2
F	2	4	1	2	2					2
G	2	3								
H	2	2			1	3				3
I			1					1		2
J	2	2	4	1	1	3		2		

The pattern of interaction between the participants was analyzed and described by quantitative approach.

For the second stage of phase I, the data collected was analyzed by Gephi software for graph visualization and calculating other centrality measures for in degree, out degree, betweenness, closeness and page rank.

After analysis the directed weighted interaction graph is produced shown in Fig. 3. Edge weight signifies the total number of interactions (Strength) happening between two nodes throughout the discussion time which is shown by varied edge thickness in this graph. Thick edges show more interactions and light lines show less interaction.

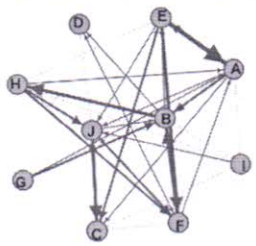

Fig. 3: Interaction graph among 10 participants

Various centrality measures are quantified for this graph to identify the activity level amidst the participants. In degree and out degree measures were applied for the same can be seen in Table 3. It is revealed from the table that the frequency of E, J, F and B is high in replying to other participants shown by higher outdegree. The indegree centrality measures show that the participants are getting more information whose indegree is high and can be said that they are more liked as more participants are communicating with them this can be shown in Table 3 that A,B and J are more liked among others. From both indegree and outdegree centrality measures it can be seen that participant B is most liked and active among other participants.

Table 3: In degree and Out degree Measures

Node	Weighted In - Degree	Weighted Out- Degree
A	15	11
B	16	12
C	11	6
D	5	3
E	11	16
F	12	13
G	1	5
H	8	11
I	2	4
J	15	15

Furthermore, the other centrality metrics are calculated ie closeness, betweenness and page rank for each participant as shown in Table 4. Clossness centrality means inverse of farness G is having the highest closeness. It shows that he or she can spread the information quickly as G is connected to highly active participant and can also be effected by the opinions of other important participants. B has got the highest betweenness which indicates that B is acting as Bridge participant.B also has page rank near to the highest which shows that B has high

importance in the network and is near to other important participants.

Table 4: Closeness Betweenness and PageRank Table

Node	Closeness Centrality	Betweenness Centrality	Page Rank
A	1.4444444	7	0.14031911
B	1.2222222	19.41666667	0.1440596
C	1.7777778	0.666666667	0.10468155
D	1.7777778	0.416666667	0.06372283
E	1.3333333	3.833333333	0.13171739
F	1.3333333	3.416666667	0.09319402
G	1.8888889	0	0.03250421
H	1.4444444	2.583333333	0.08512192
I	1.7777778	0.5	0.05635458
J	1.2222222	9.166666667	0.14832482

After analyzing the social network graph using SNA techniques, the next phase is to find out the opinions of user based on the rules formed according to rest of the two parameters of relationship i.e. content and direction as discussed in section II.

The rules in Table 2 are further categorized and assigned a numeric value for quantification purpose to denote an edge color, as shown in table 5. This helps in visualizing the polarity of the opinions in the network.

Table 5: Opinion Parameters

Opinion	Numeric Value	Color Code
Neutral	1	Blue
Positive	2	Green
Motivating Negative	3	Orange
Negative	4	Red

Fig. 4 depicts the Social network graph obtained after performing the analysis based on opinions and relationship parameters. The opinion of each of the participants is indicated through a unique edge color.

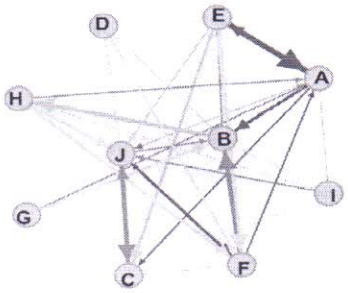

Fig. 4: Visualization of Opinions in a graph among 10 participants.

The opinion metric proposed in section IV is now used to calculate and find most influential propagator. For example A is interacting with 5 participants shown in Table 2. This value is then multiplied with participant's page rank value to generate opinion metric value.

The value of the opinion metric of the participant thus provides a quantitative measure to find the influential participant which can propagate the negative opinion among others. It can be observed that although J has the maximum page rank and B is the most popular node, yet the value of the opinion parameter of A reflects that A has the maximum potential of propagating negative opinion.

Table 6: Opinion Metric of Participants

Node	Page Rank	Opinion Parameter	Opinion Metric
A	0.14031911	4	0.561276
B	0.1440596	2	0.288119
C	0.10468155	3	0.314045
D	0.06372283	1	0.063723
E	0.13171739	2.333333	0.307341
F	0.09319402	2.333333	0.217453
G	0.03250421	1.5	0.048756
H	0.08512192	1.6	0.136195
I	0.05635458	2.333333	0.131494
J	0.14832482	2.428571	0.360217

This study can further be shown by graphical representation of the network in Fig. 5 which shows the range of color from blue to red showing blues (G, H, D and I) are the harmless participants who cannot effect negatively in the network, oranges (F, C, E and J) are in the middle range having mixed opinions and reds (A, B) are the negative opinion propagators in which A is the most significant Propagator.

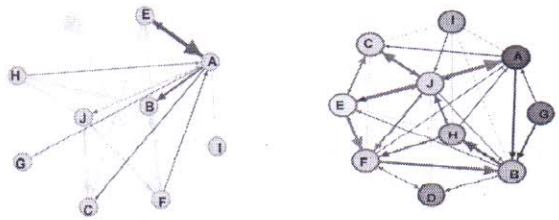

Fig. 5: Negative Opinion Propagation

It can thus be concluded that relationships play an important role in formulating opinions in social network. The proposed relationship based social Network Analysis is thus able to

identify the most negative influence propagator which was not significantly visible by employing standard social network analytic techniques.

VI. Conclusion

This paper proposes a collaborative model to mine opinions and predict influential users using social interaction network. The proposed model considers direction, strength of edges and content in order to mine positive, neutral, motivating negative and negative opinions of each node. This paper also proposes a distinct measure named opinion metric which uses the opinions and pagerank centrality of respective nodes to quantify the strength of node's negative influence. Such Metric can be useful in predicting most influential nodes active in negative or positive influence spread thus identifying nodes with potential threat to the network. Simulated study of the proposed model is done on a hypothetical scenario on a sample 10 participant network using Gephi software. The results generated supports the efficacy of the proposed model in analyzing opinions and deriving better intuitions for negative influence spreaders which were not highlighted by centrality measure of standard social network analysis techniques. The model has crucial applicability, in the areas of Marketing, Defense, Stock markets, IT industry and many more.

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Hybrid Intelligence for Social Networks

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- Mario Köppen

Book

- Chapters
- About

Table of contents

About this book

Introduction

This book explains aspects of social networks, varying from development and application of new artificial intelligence and computational intelligence techniques for social networks to understanding the impact of social networks. Chapters 1 and 2 deal with the basic strategies towards social networks such as mining text from such networks and applying social network metrics using a hybrid approach; Chaps. 3 to 8 focus on the prime research areas in social networks: community detection, influence maximization and opinion mining. Chapter 9 to 13 concentrate on studying the impact and use of social networks in society, primarily in education, commerce, and crowd sourcing.

The contributions provide a multidimensional approach, and the book will serve graduate students and researchers as a reference in computer science, electronics engineering, communications, and

information technology.

Keywords

Social networks Soft computing Data mining Nature-inspired computing Community detection Complex networks Network partition

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Contents

Opinion Dynamics Through Natural Phenomenon of Grain Growth and Population Migration

Puja Munjal, Sandeep Kumar, Lalit Kumar, and Aashish Banati

Abstract Opinion dynamics has witnessed a colossal interest in research and development activity aimed at the realization of intelligent systems facilitating the understanding and prediction of these. Many nature-inspired phenomena have been used for modelling and investigation of opinion formation. One of the prominent models based on the concept of ferromagnetism is the Ising model in statistical mechanics. The model represents magnetic dipole moments of atomic spins, which can exist in any one of two states, +1 or −1. We have used NetLogo to simulate the Ising model and correlated the results with opinion dynamics within its purview. For the first time, the grain growth phenomenon has been investigated to analyze opinion dynamics. We have also modelled natural phenomena of population growth using rigorous mathematics and corroborated the results with opinion dynamics. The results substantiate the potential use of such nature-inspired phenomena that encompass an ensemble large enough to be investigated and correlated with the real world, in terms of the involvement of numerous actors/agents participating in the process of opinion formation.

Keywords Grain growth • Ising model • Nature-inspired algorithms • Net Logo • Opinion dynamics • Population model

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1 Introduction

In recent times, opinion dynamics based social network analysis have intrigued not only social scientists [3, 7, 22], but also physicists [4, 11, 16, 19, 27, 29, 32, 35, 39, 40, 43, 44], mathematicians [14, 20, 23, 28, 34] and computer scientists [1, 2, 5, 9, 12, 13, 15, 18, 24], resulting in large-scale activity in the emerging interdisciplinary field of complex system science. Most real-world networks, including the World Wide Web, the Internet, basic cellular networks and many others, are complex. Opinion formation is a complex process affected by the interaction of various components, including individual inclination, the influence of positive and negative peer interaction, the information each individual is exposed to and many others.

The vast area of opinion dynamics deals with the formation of various possible responses to the same issue within a given period of time. Emergence of opinions is a huge category within the social spreading phenomenon, which is facilitated by the diffusion of information. At times, information diffusion is a word-of-mouth-like phenomenon and recently this has been facilitated by online social networks. Although considering opinion dynamics using online social networks, the core issue is the factors influencing the rate of opinion formation. The online social networks consist of several complex, mutually influencing and interconnected entities. For such complex systems, computer simulation becomes a beneficial tool for analysis. Several models inspired from those in use in biology, physics, mathematics etc., have been developed understanding and identifying the mechanisms involved in the opinion formation process. The models range from binary simple models, such as the Ising model, the voter model, to multi-dimensional continuous approaches. In the real world, the formation of an individual's opinion is largely affected by his/her nearest neighbours (social group). As the social group with one type of opinion becomes prominent in the vicinity, it largely influences the opinion of an individual. A group of neighbouring agents with the same opinion try to influence and convince all their neighbours to adapt to their opinion. Such collective phenomena are common in nature from macroscopic (flocks of birds) to macroscopic levels (grain growth phenomenon) [6, 8, 25, 38, 41]. External factors such as information in the form of mass media, can play a key role in driving opinion formation at the population level and in online social communities. Thus, study of the effect of multiple external information sources could greatly benefit studies on opinion dynamics.

Computer simulations a play crucial role in the study of social dynamics and one of the most effective practices employed in social dynamics is agent-based modelling. The basic idea is to simulate agents analogous to the real-world phenomena. NetLogo is an integrated multi-agent modelling environment. It includes a graphical user interface for exploring, experimenting with and visualizing models, in addition to a multi-agent modelling language (MAML) used for authoring models. Such

languages enable users easily to create and operate numerous graphical agents and define simple rules that govern the agents' behaviour. The NetLogo agents can perform simple rule-based behaviours, such as seeking or avoiding being surrounded by other agents. Such simple agent rules, however, give rise to complex emergent aggregate phenomena, many of which are congruent with their traditional macroscopic formula-based descriptions.

The outline of this chapter is as follows. In Sect. 2 we provide a review of the existing models of opinion dynamics. In Sect. 3 the Ising model is simulated through NetLogo. Section 4 correlates grain growth phenomenon with real world opinion formation and have done computer simulation using NetLogo. In Sect. 5 we have developed a model for population dynamics based on the Ising model and simulated the opinion formation. The chapter concludes by highlighting the simulation results and the contribution of the work.

2 Existing Models of Opinion Dynamics

2.1 Ising Model

One of the oldest, most prominent models and extremely simplified agent-based model applied to opinion dynamics from physics is the Ising model [10, 17, 30, 33, 36]. The main attribute of the models based on agent is that individuals are assumed to be independent whose communication with each other results in update of their opinions according to constraints imposed by fixed rules. The agents' interactions may occur either in groups or pair wise, usually between nearest neighbours and are connected by a primary graph defining the topology of the system. In the Ising model, a spin represents the opinion of each agent; based on two opinions, it can be upward or downward. In this model, the peer interaction is represented by spin coupling and the magnetic field corresponds to the external information. In spite of being a very simple model, it is of huge relevance because of its anticipation of a phase transition from an ordered to a disordered phase, associated with the strength of the spin's interaction.

2.2 Voter Model

This model was originally considered for analyzing the competition of species [9, 26]. In this model, the agents do not explicitly imitate their neighbours, but in an average sense. The relevance of this model lies in the fact that it can be solved precisely in any dimension.

2.3 *Majority Rule Model*

In this model, all agents are supposed to communicate with each other, to represent the social network as a complete graph. It is based on a simple concept of selecting a group of agents in which all agents take the majority opinion inside the group [21].

2.4 *Sznajd Model*

The concept of the Sznajd model is that the opinion of an individual is influenced more by a group rather than another individual [37]. This model basically describes how the opinion spreads in society.

3 Simulation of the Ising Model Using NetLogo

The models described above are an extension of the Ising model, in one form or another. Therefore, we first performed simulations for the Ising model. We have simulated the Ising model using NetLogo[42] and tried to establish that this model is relevant even today for studying opinion dynamics. The NetLogo model used for the two-dimensional Ising model uses the Monte Carlo simulation based on the Metropolis algorithm. The Metropolis algorithm originates from a paper dating back to 1953, by Nicholas Metropolis et al. [31].

Let two numbers $+1$ and -1 denote the state of spins. The $+1$ spins are represented by a light blue colour and -1 spins are represented by a dark blue colour. Each spin has energy, which is defined as a negative summation of products of the positive spin with each of its four neighbouring spins. If there exist four opposing spins around a spin, then the energy is 4-positive, which is the maximum possible. However, the minimum possible energy, which is 4-negative, occurs when the spin is surrounded by four liking spins. Here, the energy is a measure of how many similar or opposite neighbours the spin has. A spin decides whether to "flip" to its opposite in the following way. For the spins, a low-energy state is favourable thus, a spin always tends to flip if flipping results decrease its energy. However, at times, the spins also flip into a higher-energy state.

The probability of flipping can be calculated through the Metropolis algorithm, which works as follows.

- Flipping probability: e-Ediff/temperature, where Ediff is the potential gain in energy.
- With an increase in the temperature, the probability of flipping to a higher-energy state becomes more likely; however, as the energy to be gained through flipping increases the probability of flipping decreases.

- To run the model, we recurrently pick a single random spin and give it the chance to flip.

Now, let us try correlate the Ising model with opinion formation by assuming that any person (spin) can take just two values, "yes" or "no" (up or down) and temperature is analogous to external information influencing opinion formation.

Figure 1a depicts that if flipping up or down, the probability is equal and the temperature is 0, then a state is reached where spins are equally aligned up and down. Comparing the same agents with evolving opinions, where no external agency is present to influence opinion formation, we find that with time, a state is reached in a population where an equally probable proportion of opinions exists. Figure 1b shows that increasing the temperature to 2 favours a spin-up state; this is similar to the scenario, whereby the existence of an external agency propagating some information shifts the opinions to either side, out of two available options. However, increasing the temperature to 5 depicts a more chaotic scenario in the case of spins, which is analogous to the prominent presence of some information-propagating agency. In this scenario, a state of mixed opinions is witnessed. Despite its simplistic and interesting approach, the Ising model is very simple to actually account for the complexity of each individual position and of individuals' interactions.

We correlated a grain growth phenomenon occurring at a microscopic level with real-world opinion formation and have performed computer simulation using NetLogo.

4 Grain Growth Phenomenon Simulations

Grain growth is an extensively investigated phenomenon in materials science: bigger grains grow at the expense of small grains (the overall volume is maintained). In the real world, opinion formation exhibits the similar phenomenon of the influence of the majority opinion over the minority one.

The agent-based simulation of grain evolution considered here is based on the principle of thermodynamics of atomic interactions. Initially, the material is represented as a hexagonal matrix or a square, in which each site resembles an atom and is assigned a value representative of its crystallographic orientation. The same orientation sections (contiguous regions) represent the grains. The grain boundaries are fictional surfaces separating the volumes with different orientations. The simulation is based on a simple basic algorithm: each atom continuously tries to be as stable as possible. The stability of atom is facilitated by the number of neighbours with similar orientations: the more similar the neighbours, the more stable it is. The presence of a few similar neighbours makes the atom to a more stable position.

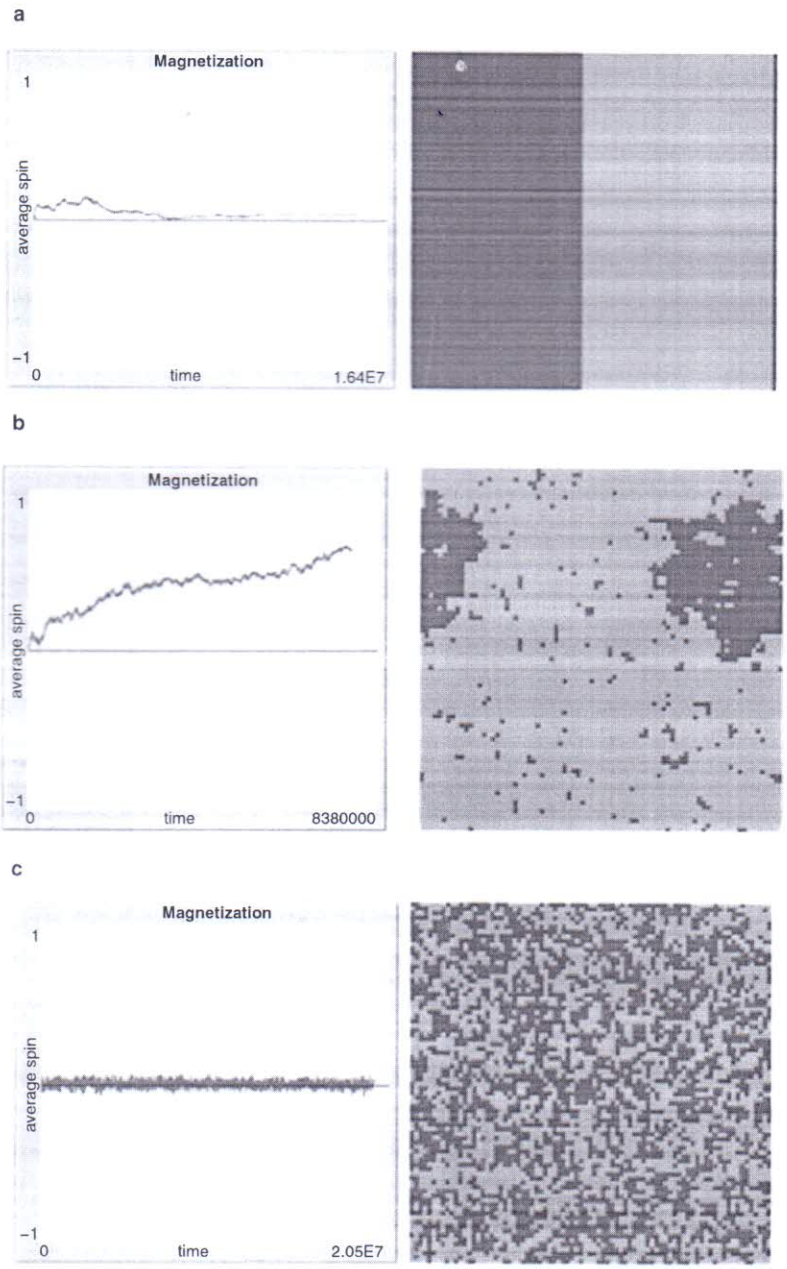

Fig. 1 Simulations of the Ising model using NetLogo with the probability of spin of up to 50% at temperature (**a**) 0, (**b**) 2 and (**c**) 5

An external factor such as annealing temperature is also a crucial factor in achieving the stable state. A high annealing temperature makes some atoms randomly jump to the next grain. When it is zero, only energetically favourable jumps will happen. Temperature here is represented as a relative value: a percentage of random jumps out of the possible jumps (100% means that all the jumps are random; Fig. 2).

- For 0% annealing temperature, there is no external energy to the atoms so they attain a stable state naturally by encountering the neighbouring atoms of the same orientation. Similarly, in the absence of any external agency, in the on-line social network, the members interact with neighbours of a similar nature and a majority stable state of opinion is reached naturally.
- For 5% annealing temperature the atoms become perturbed and jump to the next grain; this delays the achievement of the stable state. Likewise, even the small presence of an external information propagating agency starts to delay opinion formation.
- An increase in annealing temperature to 10 and 20% further increases the perturbation due to which the atom tends to make more random jumps to grains. This further delays the time to achieve the stable state compared with 0 and 5% annealing temperature. A similar phenomenon is observed in an on-line social network when the presence of any strong external agency influences the individual's opinion formation to such an extent that the presence of immediate neighbours becomes ineffective.
- Interestingly, for 100% annealing temperature, the attainment of a stable state is relatively fast compared with the case of 10 and 20% annealing temperature. This is similar to a situation where an online social network is under the presence of a very strong external agency, which accelerates opinion formation.

In this section, we have correlated the grain boundary crossing behaviour of atoms with the dynamics of opinion formation in an online social network.

In the next section, we used a demographic problem based on the Ising model to develop a model of opinion dynamics. Here, we considered two online communities with variable growth rates. We then examined the probability of either of the two populations or respective opinions dominating at different times, taking into account the probabilities of mixing, the new member joining rate etc.

5 Model Based on Population Dynamics

We consider two communities denoted by A and B. Community A holds opinion 1 and community B holds opinion -1. Let community A be larger than community B. The system under consideration is composed of N nodes; hence, each community has N/2 nodes. Every node is occupied by one agent i with opinion $O_i = 1$ (agree) or $O_i = -1$ (disagree), and the link between the two nodes in the same

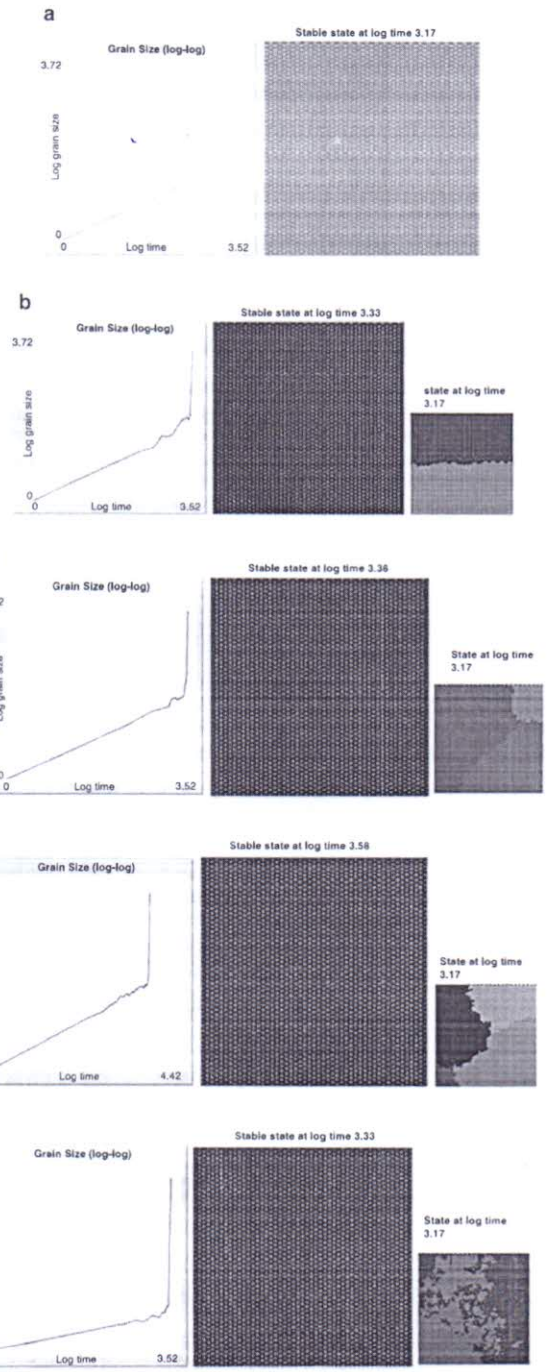

Fig. 2 Simulations of grain growth using NetLogo at different annealing temperatures. (**a**) Annealing temperature 0% (**b**) Annealing temperature 5% (**c**) Annealing temperature 10% (**d**) Annealing temperature 20% (**e**) Annealing temperature 100%

community represents the frequency of contact between them. Let community A, be characterized by its number $n_a(t)$, where t is the instantaneous time and the new member joining rate is a_n. The community B is characterized by $n_b(t)$ and the new member joining rate is b_n.

Our model is described by the following parameters:

1. The initial population of the two communities A and B in numbers are represented as $n_a(0)$, $n_b(0)$ respectively and their ratio:

$$R = \frac{n_a(0)}{n_b(0)} \tag{1}$$

2. The individual joining rates (or inflow into them) of the communities A and B are a_n and b_n respectively and their ratio:

$$J = \frac{a_n}{b_n} \tag{2}$$

3. The rate of joining by a new member in either of the communities depends on the total number of individuals in that community, for example, for community B it is:

$$b_n^{(1)} = b_n + (a_n - b_n) \times (1 - V(t)) \tag{3}$$

Where $V_i(t) = 1 - J \times \frac{n_a(t)+n_b(t)}{N}$.

4. The switch-over rate of opinion m is equally probable in both communities,

$$\begin{aligned} dn_a(t) &= a_n n_a(t)dt - mn_a(t)dt + mn_b(t)dt \\ &= a_n n_a(t)dt\left(1 - \frac{m}{a_n}\left(\frac{n_a(t) - n_b(t)}{n_a(t)}\right)\right) \end{aligned} \tag{4}$$

$$\begin{aligned} dn_b(t) &= b_n n_b(t)dt - mn_b(t)dt + mn_a(t)dt \\ &= b_n n_b(t)dt\left(1 - \frac{m}{b_n}\left(\frac{n_b(t) - n_a(t)}{n_b(t)}\right)\right) \end{aligned} \tag{5}$$

5. The switch-over rate of opinions from community A to community B is signified by m and that from community B to community A is signified by m':

$$\begin{aligned} dn_a(t) &= a_n n_a(t)dt - mn_a(t)dt + m'n_b(t)dt \\ &= a_n n_a(t)dt\left(1 - \frac{m}{a_n}\left(1 - \frac{m'n_b}{mn_a}\right)\right) \end{aligned} \tag{6}$$

$$\begin{aligned} dn_b(t) &= b_n n_b(t)dt - mn_b(t)dt + m'n_a(t)dt \\ &= b_n n_b(t)dt\left(1 - \frac{m}{b_n}\left(1 - \frac{mn_a}{m'n_b}\right)\right) \end{aligned} \tag{7}$$

6. The parameters required for the analysis of opinions are:

$$r = \frac{m}{a_n}$$

$$\frac{m}{b_n} = J \times \frac{m}{a_n}$$

$$p = \frac{n_a}{n_b}$$

$$\alpha = \frac{m}{m'}$$

7. The final equations of the rate of joining with the mixing parameter, m, for both the communities are:

$$\frac{dn_a(t)}{dt} = a_n n_a(t)\left(1 - r \times \left(1 - \frac{1}{p}\right)\right) \tag{8}$$

$$\frac{dn_b(t)}{dt} = b_n n_b(t)(1 - J \times r \times (1 - p)) \tag{9}$$

The final equations of the rate of joining with mixing parameters, m and m' are:

$$\frac{dn_a(t)}{dt} = a_n n_a(t)\left(1 - r \times \left(1 - \frac{1}{\alpha p}\right)\right) \tag{10}$$

$$\frac{dn_b(t)}{dt} = b_n n_b(t)\left(1 - J \times \frac{r}{\alpha} \times (1 - p\alpha)\right) \tag{11}$$

Assume that the intercommunity interaction is absent and hence the two communities do not influence the opinions of each other as shown by Fig. 3. However, the factor J now plays a crucial role. If the rate of new members joining community B is very high compared with joining community A, there exists a disordered state. Hence, the densities of the two opinions are equal and no opinion dominates.

Now consider the case in which the rates of joining community A (a_n) and community B (b_n) are the same, as shown by Fig. 4. The probability of an individual from community A migrating to community B (m) is also taken to be same in this scenario. We observe that with time, the population of community A increases rapidly in the case when no migration ($m = 0$) from A to B takes place. The initial population of A is higher; thus, the individuals migrating from A to B ($m \times n_a$) are more than individually migrating from B to A ($m' \times n_b$). Therefore, the gain in population takes place over time if migration does not occur.

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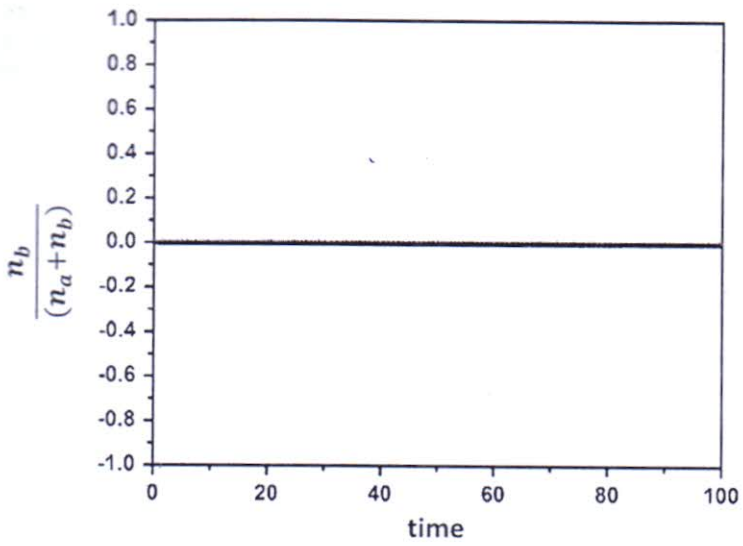

Fig. 3 Case of absence of intercommunity interactions

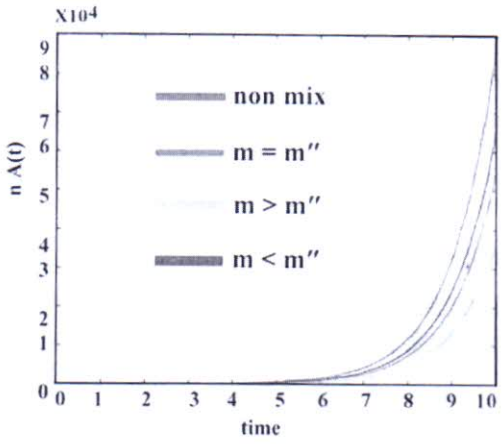

Fig. 4 The evolution of the growth of opinion in community A, with parameters is as follows: $a_n = 1, b_n = 1, m = 1, n_a(0) = 4$ and $n_b(0) = 1$

Comparing this with opinion dynamics, in this case, the interchange of opinion (termed as mixing) is not allowed i.e. an individual cannot change his/her opinion, the opinion of A dominates, but as the size of increase of opinions is the same, opinion A is always greater than opinion B. If mixing is allowed, the opinion of B increases as the change of opinion from A to B ($m \times N_a$) is greater than that from B to A ($m' \times N_b$) (Fig. 5).

For the parameters: $a_n = 1, b_n = 0.4, m = 1, n_a(0) = 4$ and $n_b(0) = 1$, the rate of joining community A is higher than the rate of joining community B and

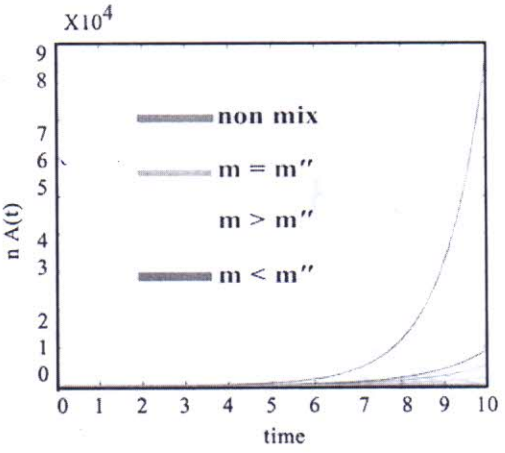

Fig. 5 The evolution of the growth of opinion in community A, with parameters is as follows: $a_n = 1, b_n = 0.4, m = 1, n_a(0) = 4$ and $n_b(0) = 1$

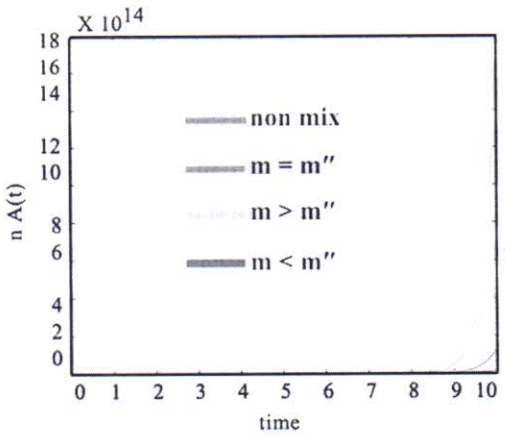

Fig. 6 The evolution of the growth of opinion in community A, with parameters is as follows: $a_n = 1, b_n = 4, m = 1, n_a(0) = 4$ and $n_b(0) = 1$

the probability of mixing is the same as the rate of joining community A. This case is similar to the above-described case; the trend is almost the same. However, the impacts of the rates are different. The same is corroborated by the evolution of opinions (Fig. 6).

With parameters such as $a_n = 1, b_n = 4, m = 1, n_a(0) = 4$ and $n_b(0) = 1$, the probability of joining community B is higher than that of joining community A and that of mixing is the same as the probability of joining community A. In this case, community A increases if there is an increase in community B. If the size of community B increases enormously, then the probability of members from B shifting to A increases. However, the joining rate remains constant. When the rate

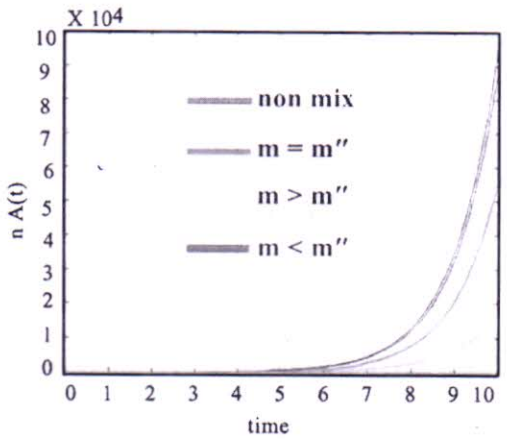

Fig. 7 The evolution of the growth of opinion in community A, with parameters is as follows: $a_n = 1, b_n = 4, m = 0.2, n_a(0) = 4$ and $n_b(0) = 1$

of mixing is higher or lower than the rate of joining community B, the same trend is followed as for the rate of joining community A. The impact thus observed is different and the curves (opinion of A) reach different values, but overall the trend remains the same, except for the case in which $m < a_n$ and $a_n = b_n$.

Here, the density of opinion of A will be less than that of B with evolution of time, as the number of people accepting opinion B is higher than those accepting opinion A. However, analysis depicts the opinions of A (minority opinion) still being at a maximum, facilitated by maximum probability of people changing their opinion from B to A (Fig. 7).

In this case, the maximal increase in the population of community A is a result of the higher probability of B mixing with A compared with A mixing with B.

From the above "two-population model," we are able to analyze the opinion dynamics of two opinions over time and see the opinion at a particular time. There may be more than two populations in a region; thus, we can extend the same arguments and analyze the opinion dynamics of a system in which there are a variety of opinions.

6 Conclusion

We have demonstrated the models concerning opinion dynamics that incorporated the simulations based on the grain growth phenomenon of atoms and also the two population growth dynamics. Grain growth simulations clearly indicated how the presence of external factors such as temperature in the case of atoms and mass media in the case of online communities affect the process of grain growth in the case of atoms and opinion formation in the case of online communities. The proposed model based on population dynamics establishes a firm confirmation of the fact that it is compatible with opinion dynamics. Also, the concept of birth rate is correctly

extended to the addition of opinions in a particular community. The segregation of opinions into two communities provided a brilliant insight into how the masses are affected by the turn of events (in this model, the events are well replicated by parameters m and m') and how this opinion is dictated by the factors of inflow and outflow. Furthermore, this model is accurate when the binary opinion system is converted to the (n) opinion model.

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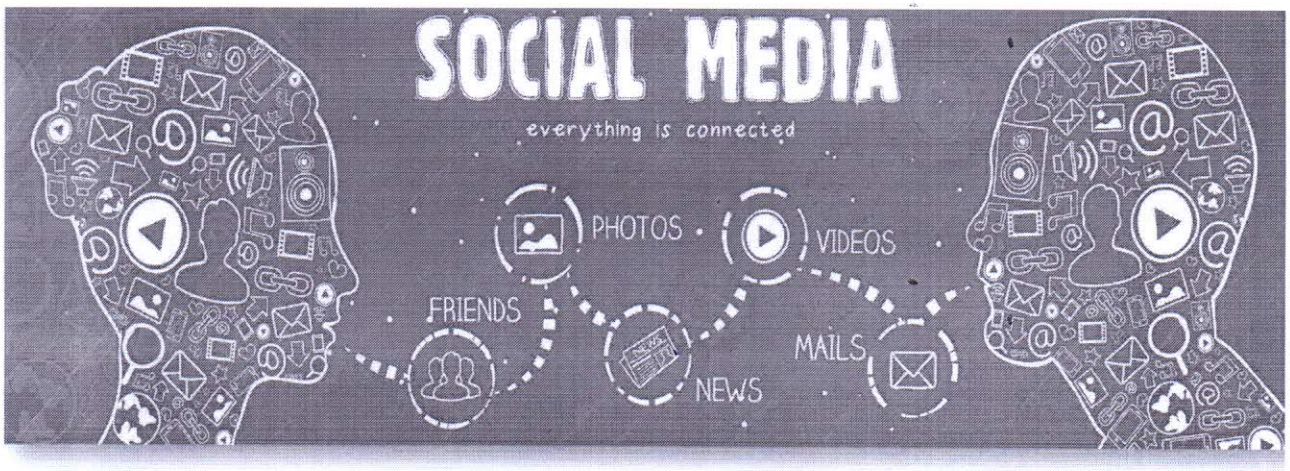

TRANSFORMING INDIA THROUGH DIGITIZATION: ISSUES AND CHALLENGES

Editors

Prof. (Dr.) Rachita Rana • Prof. (Dr.) Sheela Bhargava
• Dr. Ramandeep Kaur • Dr. Neha Gahlawat

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Preface

With increase in use of Information & Communication Technology, the world is heading towards more localization and decentralization which is possible through collaborations both at domestic and international levels. In light of this, the major task for developing countries is to embrace this rapid transformation. In particular, the task is to build an ecosystem where digitization, connectivity and improving business environment continue to dominate. Further, the need of the hour is to bring people together on a platform enabling them to work, live, and operate from anywhere across the world.The policy makers, leaders, entrepreneurs and organizations all have caught up in exploring and experimenting with novel ways and means to cope up with this digital disruption. However, our theoretical understanding of the implications of the digitization lags behind its rate of adoption and adaption in practice. Current research has focused largely on describing the evolution in arena of commercial technologies and their applications. It is acknowledged that there is significant impact and implications of digitization on people and organizations. This impact and implications need to be further understood and analyzed.

This book leverages a platform for the so-called transformation with thehelp of associated creativity disciplines, especially, Management and IT. The book is a compendium of fifteen chapters focusing on various parts of digitization where the distinguished authors have explained how the digital technology has altered the way organizations operate in order to attain strategic advantage. This book will be beneficial to the academic professionals, researcher scholars,and studentslooking for the issues and challenges faced by the people and organizations in context of fast-growing digitization. Moreover, it will generate insights and assist executives concerned with the management of current work structures through digitalization.

Prof. (Dr.) Rachita Rana
Editor

Contents

Changing India through Art of Data Science

*Dr. Harsha Ratnani**

Abstract: *In recent times, the extreme popularity of internet, smart phones technology and social media is rising at an exponential rate all over the world as well as in India giving rise to unstructured data or BIG Data. Also after demonetization drive in India, more and more businesses have started to adopt digitalization process by choice, by force or on demand of clients. This has raised the availability and usability of digital data all across the economy. All this data needs to exploited, understood and utilized intelligently for the better survival of the business and economy as a whole. This abundance data available all across the digital platforms can help businesses make more data driven decisions. This requires urgent need of attention towards emerging data science discipline. Hence, we may say now is the era of birth of data science in India as a new discipline driven by the torrents of available data. This chapter discusses the data science discipline and its effect on Indian economy along with futuristic changes.*

Keywords: *Data Science; Big Data, Analytics,Third Platform, Data Driven Decision*

1. Introduction

In current Indian scenario one can strongly believe that so far year 2017 has been the year of complete digitization of maximum data across all public and private sector organizations, not only in urban cities but rural sectors as well. The data gathered in this process along with already existing abundance data in many sectors today will give rise to the urgent need of attention towards storage, usage and analysis of this data. One can easily use this data if analyzed properly for creating more and more business opportunities and economic growth of country.

The field of Data Science as already known to many now is a multi-disciplinary area of IT industry which is related to data and information collection, management, analysis, visualization, and preservation for generating value from the data itself using specific scientific methods for extracting knowledge or insights from data in various forms, either structured or unstructured similar to data mining(Cao, 2017). It requires integration of data across heterogeneous, interdependent complex data resources for real-time decision making, streaming data, collaboration and

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Digitalization or digital transformation in other words is the integration of digital technologies into everyday life by the digitization of everything that can be digitized. The literal meaning of digitalization gives an apparent idea of development and technology dependent world. In this chapter, digitalization means computerization of systems and jobs for better ease and accessibility. The aim of digitalization is to create digital infrastructure by converting information into digital format and delivering services digitally (4). Digitization is creating a digital (bits and bytes) version of analog/physical things such as paper documents, microfilm images, photographs, sounds and more. So, it's simply converting and/or representing something non-digital (other examples include signals, health records, location data, identity cards, etc.) into a digital format which then can be used by a computing system for numerous possible reasons (5). Hence digitalization of an economy is the next stage after digitization on the way to not just digital society but also towards creating the capabilities and conditions, among others in the ways various business operates and how they leverage knowledge and insights, which are needed for enterprise-wide digital transformation and the nascent digital transformation economy where digital transformation moves to the core of the business. Everywhere in the economy across the globe digitization and other technological development have always significant positive impact on the overall production process , due to rise in Information Technology (IT) and IT-enabled services (ITES) which helps in making many non-tradable service become tradable. As a prominent emerging nations India's contribution to IT and ITES in past few decades has been exceptional (6) . As it was clearly found in a study that (6) digitization has resulted in significant rise in growth of service sector and MSME since 2000 onwards with more potential for growth. Also it has already been suggested by The World Bank to urgently enhance the Information and Communication Technology skills in all sectors because a 10% increase in internet connectivity was found to boost GDP growth by 1.38% which rises upto 2% with high internet access rates (7).Hence one can say that digitization of various services directly impacts on total trade volume of an economy as it helps in increasing the efficiency of any business. The challenges in comparison to benefits and profits are incomparable.

The process of digitalization in coming years will be by choice or by force adopted by all business sectors in an economy. It's well predicted that over the next three years, digital transformation will reshape the entire macro-economy, as the majority of global business revenue centers around digital or digitally-enhanced products and services. The Enterprises will be forced to facilitate digital transformation through their use of **3rd Platform** technologies as shown below to create value and competitive advantage through new offerings, new business models, and new relationships.

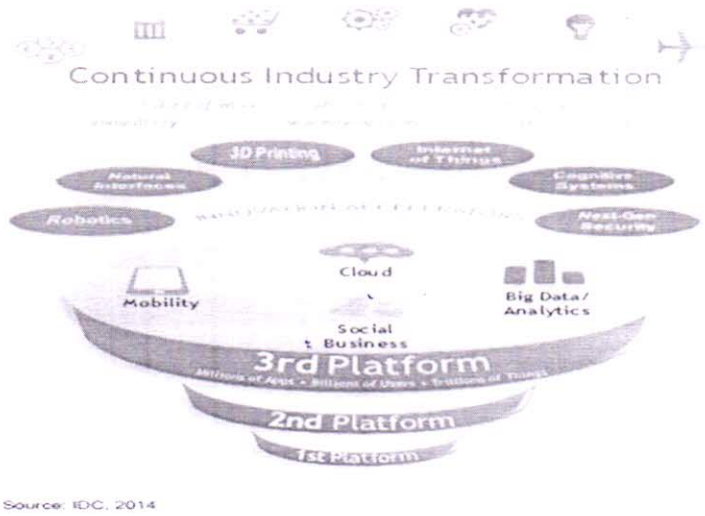

Fig1: 3rd Platform Pillars (Source: IDC)

The 3rd platform consists of four pillars Social, Mobile, Analytics and Cloud (SMAC) with IoT as one of its main accelerators. It is a term initially coined by marketing firm International Data Corporation (IDC) (8). The third platform environment is based on the online computing "cloud" and its interaction with all manner of devices, including wirelessly connected ones such as smartphones, machinery and sensors (known collectively as the "internet of things"). The four pillars mentioned above contribute to field of Data Science in one way or another. In recent time to come due to social technologies promotion, companies both big and small, will continue to inject a social element into every product and service. This social technology will be mostly accessible by mobile devices by which most people receive the data.The cloud provides the infrastructure that makes the information accessible to the social technology through mobile devices. The concept behind big data is to maximise the utility of all data big data utilises and collects all forms of data, gathered from both traditional and digital sources, in order to complement a company's decision-making processes (9). The role of third platform would be to allow companies IT solutions to be available through the cloud, accessible via a variety of mobile devices on various social platforms. It helps an executive at a company that streamlines its business functions with the third platform through easy access to all of the data, including sales figures, personnel information, accounting data, financials and so on. This data can then be used to inform more areas of the business and plan strategies as per the trend. So in order to achieve higher profits, most of businesses had already started to adopt the 3rd Platform tools to transform their decision making and profit gain. All this in turn had started to through more n more attention towards Data Science field from all prospects. In next section we would try to understand the process in detail.

Data Science Key Terms and Process

It is very well known that better data creates better opportunities to make better business decisions. Digitalization has vastly increased the scale and scope of data available for data driven decision making. The available data may or may not be in ready to use and understandable form.

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As we may get electronic data in many different forms, ranging from unstructured data in systems to highly structured in relational database systems. Structured format data in the form relational database tables is easy to handle and understand. Whereas the unstructured and raw data in form of sound, frequency , images, calling records, website clicks etc. or semi-structured data which may not be totally in raw form neither it is as well organized the structured data (10). The data in all these forms must be integrated for business usability purpose which requires applying data science process which may get complicated from business to business. The simplistic Data Science process consists of following steps:

- The data is first collected from sensors all across in the environment, as represented by the globe in the fig.1 below. These sources include data from all pillars of 3rd platform.
- It is then visualized or stored in the form of raw data.
- This raw data is then cleaned or processed to produce a data set or data table usable for further data processing.
- These datasets are then used with exploratory data analysis and statistical modeling techniques.
- A "data product" is a program which provides actionable information without exposing decision makers to the underlying data or analytics. It can also create data and feed it back into the environment. Data product examples include: Movie Recommendations, Weather Forecasts, Stock Market Predictions, Production Process Improvements, Health Diagnosis, Flu Trend Predictions, and Targeted Advertising etc.

This diagram is based on a similar diagram in "Doing Data Science" by O'Neill and Schutt (2014).

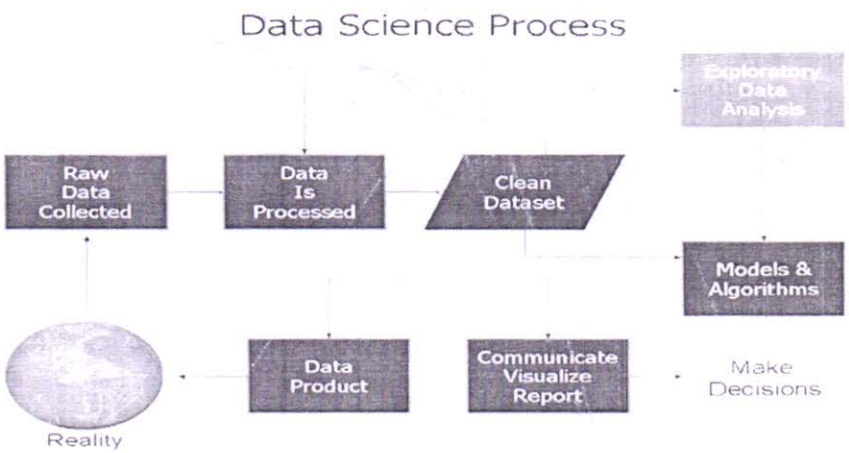

Fig2: Data Science Process (Source: springboard)

The process of data science seems easily understandable but once the data is captured it requires lot of detailed analysis before the decisions could be made. These data science analytic techniques require knowledge from past, present and future to help making smart, safe and

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profitable decisions. The various analysis terms and techniques used under the umbrella of data science are as given below in table1:

Key Terms	*Description*
Advanced analytics	Refers to theories, technologies , processes and tools that can enable an in-depth understanding and discovery of actionable insights in big data which is otherwise not achievable by traditional data analysis and processing techniques. Applications of advanced analytics include healthcare, marketing and risk management.
Big Data	Refers to data that are too large and complex to be handled using traditional data processing application software. Every data produced through digital process and exchange adds to big data.
Data Analysis	Traditional way of data processing with legendary statistical, mathematical and logical data processing techniques for obtaining useful information from structured data mostly.
Data Analytics	Refers to new theories, tools and techniques for understanding of data and finding the actionable insights from this data. Data analytics consists of sub-branches of predictive, prescriptive and descriptive analysis.
Descriptive Analytics	Refers to the type of data analytics technique that uses statistics, data aggregation and data mining to describe the data and look into the past records for gaining suitable information.
Predictive Analytics	Refers to the type of data analytics that makes predictions about unknown future events and discloses the reasons behind them by using advanced analytics and forecasting techniques.
Prescriptive Analytics	Refers to the data analytics technique that optimizes indications and recommends actions for smart decision making using simulation algorithms.
Explicit Analytics	Focused mostly on descriptive analytics technique typically by reporting, alerting, forecasting with descriptive analysis of captured data.
Implicit Analytics	Focuses on deep analytics using predictive modeling, optimization, prescriptive analytics and actionable knowledge delivery.
Deep Analytics	Refers to data analytics that can capture an in-depth understanding of why and how things have happened, are happening or will happen which is generally not addressed by descriptive analytics.
Cloud Analytics	Refers to set of technological and analytical tools and techniques specifically designed to help clients extract information from massive data. Cloud analytics is designed to make official statistical data readily categorized and available via the users of web browser.
Location Intelligence	Refers to the process of deriving meaningful insight from geospatial data relationships to solve a particular problem. Also known as spatial intelligence as it involve map based as it involves as it involves the control of geographical information system (GIS) within business for making success strategies in global economy.
Data visualization	Refers to the techniques used to communicate data or information by encoding it as visual objects (e.g., points, lines or bars) contained in graphics. The goal is to communicate information clearly and efficiently to users. It is one of the steps in data analysis or data science.

Table 1: Data Science Key Terms

Impact of Data Science

In present data economy as discussed above in India as well as all over the world, we need data science knowledge for the winning within the competitive market or advantage for organizations i.e. more better decision making day by day. This is because decision making process has changed from gut instinct, loudest voice, and best argument to more organized and transparent business intelligence model. The rapid expansion of available data and the tools to access and make use of the data at large scale are enabling fundamental changes to the way organizations make decisions. Data Science is required to maintain competitiveness in the increasingly data-rich environment. In times to come organizations that embrace Data Science will be rewarded while others will struggle to keep pace. The table below shows the Business Impacts of Data Science, highlighting the values for organizations that embrace Data Science (2).

Business Impact of Data Science
17-49% increase in productivity when organizations increase data usability by 10%
11-42% Return on assets (ROA) when organizations increase data access by 10%
241% Increase in Return On Investments (ROI) when organizations use big data to improve competitiveness
1000%Increase in ROI when deploying analytics across most of the organization, aligning daily operations with senior management's goals, and incorporating big data
5-6%Performance improvement for organizations making data-driven decisions.

Table 2: Business Impact of Data Science (Source: Booz Allen Hamilton)

Application Areas of Data Science

Data science encompasses many areas in itself such as Statistics, Mathematics, Computer Science, Information Theory, Information Technology, Machine Learning and Optimization. (11)As a data scientist one must learn three important things *Knowledge of* ***How to Use the Right Machine Learning Algorithms, Extracting Good Features also known as Feature Engineering and Learning how to demonstrate the Valuable Results from any Real Life Business Data.*** Thus, to start making a career in field of data science knowledge of big data and data frameworks are essential. One must specifically look at Apache Hadoop, HDFS, Hbase, Spark, Storm, Solr, Kafka along with languages like Python, R, SQL to name the few as these were the few most in demand frameworks and skills required for Data Scientists for last year as shown in fig below:

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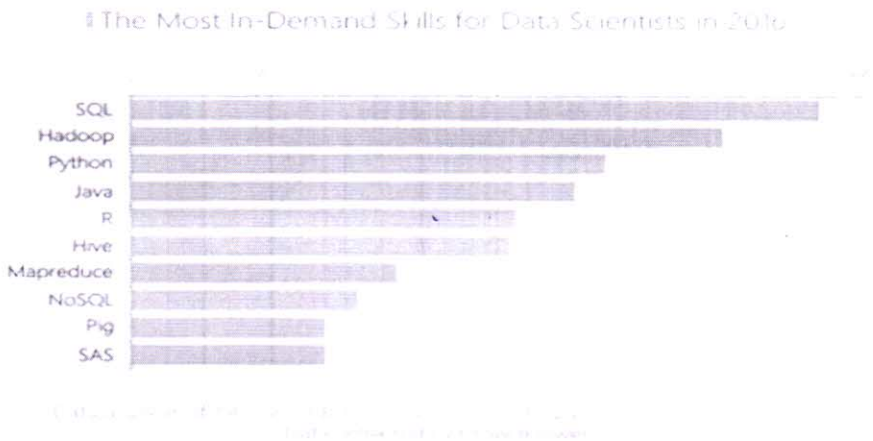

In general it has affected many areas like

- Healthcare
- Retail & Marketing
- Social Informatics
- Biotech
- Banking & Finance
- Government
- Internet
- Telecom
- Education
- Manufacturing
- Neuro-Informatics
- Energy
- Gaming
- Insurance
- Pharmaceutical
- Travel and transportation

Biggest Challenges of Data Scientists

It is becoming increasingly apparent that data scientists need to demonstrate skills necessary to convert data-based scientific inference into accessible, actionable insights for business and upper level management. Today's data scientists need to both straddle the worlds of business boardrooms and IT as well as become a hybrid of them. But does their software support them in achieving these lofty goals? A data scientist has to use applications that help him surmount the three key challenges to his job

- **Multiple Data Source**
- **More Customer Interaction**

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- **Communication with Real People**

Predictions for Data Science Fields

1. ***IOT and Data Science*** are often considered similar inspite of few key differences. It is predicted that two industries will come even closer together, with data scientists looking to access data from devices in real-time and to perform advanced analysis – or be used to make a decision.
2. In ***Health Care*** sector it's a real boom in this technology usage which will be quite prominent as with the rise of electronic healthcare records the amount of data at our disposal is at an all-time high. Thus, Helathcare sector will get more organized day by day with more efficient electronic health records systems. It will reduce readmissions, emerge better care, and earlier detection of diseases along with are on the horizon.
3. ***Deep Learning,*** a subfield of machine learning inspired by brain neural networks Becomes Smarter and Brings Us Closer to Artificial General Intelligence. The objective is to create artificial neural networks that can find patterns in vast amounts of data. Deep learning is becoming widely available now, because of the increased computing power and large data sets that are available to scientists around the globe. Therefore, in 2017 we will see many new deep learning applications that could significantly impact our lives.
4. ***Predictive Policing*** across the globe is a coming out to be big challenge. Many software like crime mapping analytics and predictive systems (CMAPS), CompStat, Predpol etc. which are currently taking real time data to identify and predict crime hot spots. There is a scope of developments for more-integrated systems to incorporate the locations of individual police officers, criminals, targeted victims etc. from Global Positioning System for in depth analysis and correct predictions.
5. More ***Augumented and Virtual Reality*** based apps and games just like Pokemon Go, which crossed the limit of over 100 million users in few weeks itself. Hence Mixed Reality concept not limited to games will also be explored as a concept for better decision making and services through applications and products developed using AR and VR.
6. ***Instrumenting urban cities*** with better sensors and new age data collecting technologies for better functioning of various facilities like water, electricity , transportation etc,. This understanding can then be used to propose remedies to poor air quality, overcrowded routes, and other longstanding city challenges.
7. It is going to be year of ***Big Budget*** for Big Data projects as most upcoming projects will be based on increasing use of Big Data Technology with slowly and steadily going to be widely accepted amongst most business sectors.
8. Boom in ***Conversational Interfaces*** or ***ChatBots*** services will accelerate. Many big giants like Facebook, Google, WeChat, Microsoft etc. have already initiated AI based conversational interface usage. In near future this may not become only a different navigational experience but also make marketing and sales more personalized.

While massive amounts of data have its benefits and drawbacks, there are many lucrative opportunities for scientists looking to decipher this data in 2017. If you're looking for an emerging market to work in, this is it.

In today's age and time the whole world is drenched in data. It is opening up new possibilities and new avenues of research and understanding. But we need appropriate tools that can manage such staggering volumes of data if we're to put it all to good use. As rightly said by National Statistical Commission Chairman Dr. R.B. Barman during 70th convocation ceremony of International Statistical Education Centre (ISEC) at the Indian Statistical Institute in may'2017 that "India is experiencing dearth in the number of expert Data Scientists, those who can combine expertise in statistics and software". Since its an emerging field using conventional tools, machine learning and artificial intelligence for deeper insight on the market micro-structure, hidden in voluminous transactional data of customers, the demand and availability of data scientist is having a big gap which needs immediate attention.

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Social Media Based Opinion Mining Using Lexical Sentiment Analysis

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ABSTRACT

Social Networking Sites such as twitter and Facebook is growing in large number thus allowing general masses to share views amongst each other regarding social, entertainment, political, marketing issues. However this heap of data is in unstructured format and thus cannot be used for identifying public opinions. This paper presents a methodological approach to extract meaningful data from popular microblogging website like twitter. The majority opinion state is investigated and realized on the basis of polarity of the words shared in communication. The timely identification of the dominated opinion of people can be useful and employed indiverse areas such as marketing of product, entertainment promotions etc.

KEYWORDS: *Data Analytics, Social Media, Sentiment Analysis, Opinion Mining.*

INTRODUCTION

With the advancement in technology, communication has witnessed widened horizons. Thishas facilitated economical ways to communicate and connect with people across the world. The distance is no longer a factor for difficulties in communication, this is all attributed to social media and networking. Social media has provided a platform for exchange of ideas, views, and feelings around the world just by the help of internet hence decreasing the money spent on communication through letters, calls from landline, mobile phones etc. It has also made sharing of information, pictures, audios, videos effortless. Social networks provide individuals with an account to keep and manage. Nearly 10TB of data is generated and spread through these social networks which have attracted huge interests from the research community and industry and lots of useful information can be gathered from this huge data. The Sentiments that people express can be used for doing a lot of research in marketing, education and other famous industries due to which sentiment analysis came into existence. Sentiment analysis is a way of classifying the opinions that are mined using opinion mining in positive, negative and neutral statement of opinion holder. Sentiment analysis is developing exponentially with numerous emerging approaches targeting the recognition of sentiment, reflected in written language [1]. The main problem of data which is collected from social network is that it is in unstructured form which makes it difficult to identify public opinion.

To our knowledge the data gathered from social media and analyzed does not take dominated views into consideration In our paper we would be extracting useful data from a microblogging site like Twitter as it is open and people only use it to express their views only by the use of 140 characters per post then we would be finding out the sentiments of those opinions by the use of code developed in python and then provide the overall opinion of public about a topic.

Related Work

Social media has become a knowledge portal for researchers. Recently a new study has been done by Youyou Wu from the University of Cambridge which proved that people who have common personality traits are more likely to become friends or life partners by using Facebook app called My Personality to collect Facebook data and personality questionnaire scores from 295,320 participants, this research depicts that social media is very powerful and can be effectively used to prove psychological things also.

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As the information is increasing on various social media, blogs, forum etc. sentiment analysis became essential to handle this information [2]. Sentiment analysis is a part of natural language handling procedure which has been utilized by many researchers to analyze reviews about different topics like elections, stock markets, entertainment industry etc. [3]. Some researches only focused on market analysis [4]. Sentiment analysis is also used in entertainment industry for the prediction of movies. Even though sentiment analysis has few drawbacks [5] several studies [4, 6, 7] have been done in the area of social networking, opinion mining and sentiment analysis. The biggest problem in sentiment analysis is that the data collected from social media is in unstructured form. In contrast to formal and organized text in newspaper, the tweets are relatively informal, which made sentiment analysis in twitter a tricky and arduous task. Voluminous posts are posted each day covering an extremely wide range of topics, which noticeably surges the effort of tracking and measuring sentiment of each tweet [8].

In this paper we would be structuring the unstructured data with help of lexical analysis and then find out the dominated sentiment. That dominated sentiment of people can be used in the entertainment industry for prediction and promotions.

a) Natural Language Processing

Natural language processing (NLP) is a method which facilitates computers to analyze, understand and extracts formal meaning from the text written in the natural language. This technique enables programmers to organize the data and use in a wide range of applications like text recognition systems, paper reference recognizers etc. [9]. NLP is a part of artificial intelligence that has a number of important implications on the ways that human and computers interact with each other.

b) Opinion Mining

It is an extension of data mining that utilizes natural language processing techniques to extract opinion of different people from World Wide Web. The current trend in internet is the use of social media such as Twitter [10], Facebook [11] to inspire users to contribute their opinion and suggestions which resulted in creation of a huge collection of valuable information in the web. The opinion mining systematically analyze each text and realize which part contain opinionated word, which is being opinionated and who has written the opinion [12]. Opinion mining is an information recovery approach of extracting the opinion or feeling which is expressed in text. Using opinion mining, we can build a system that collects and categorizes opinions about a product. Opinion mining can be useful for a brand launch or advertisements as it may help build up a good reputation or image of the product among the target customers. Many people think that opinion mining and sentiment analysis are one and the same thing but actually they are different. Opinion mining is used for finding the opinion of the text. For e.g. Annu felt that the movie was not good however sentiment of this line is Negative, with this example we can say that sentiment analysis is a part of opinion mining.

c) Sentiment Analysis

Emotions, opinions and sentiments play an integralpart in human life. Sentiment analysis is a technique which determines the polarity of the sentiment or opinion thus providing the summarized opinion of a user. Sentiment analysis can be done at variety of documents, tweets, different languages however analysis and polarity classification is a difficult but exciting task as lots of unwanted data also comes in each tweet such as punctuation marks, emoticons, slangs etc.[13].

Methods of Sentiment Analysis:

i. **Machine Learning**

Machine learning is a branch of artificial intelligence which provide solutions to various problems with new learning rather than explicit programming. Learning is acquired based on previous solutions to the problems Machine learning has facilitated the solution to the new problems by inferring the old solutions. Many techniques such as Naive Bayes classifier, Support Vector machine are used to perform tasks. However due to large amount and different variety of data available on web, Machine learning techniques are becoming tough to perform as data sets need to be trained very frequently to provide accurate results

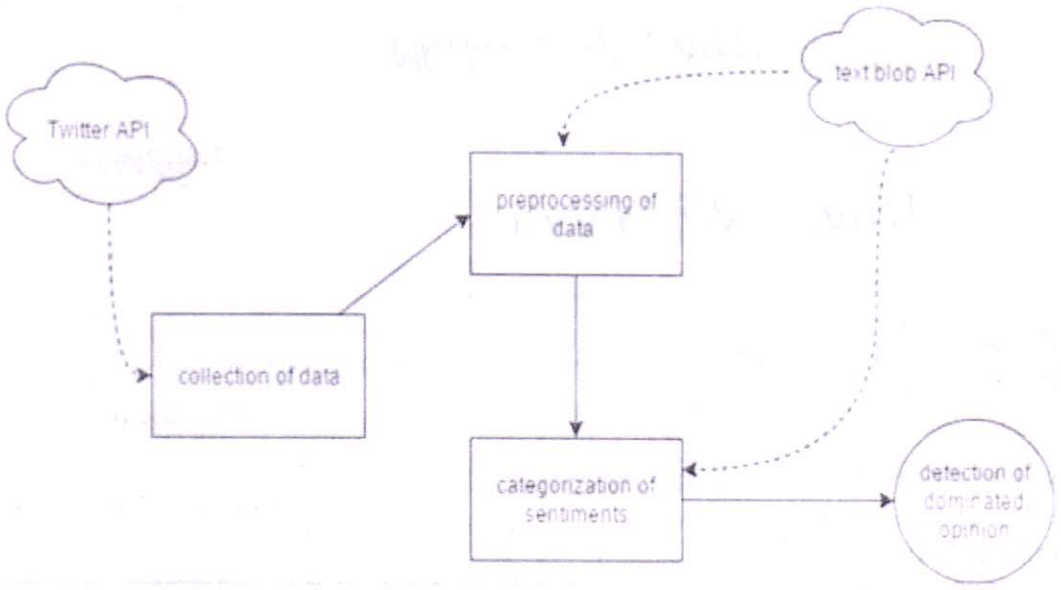
ii. Lexical Analysis

Lexical analysis is a process which converts a sentence to a series of tokens. Various applications like text editors, information retrieval system, pattern recognition programs and language compilers use Lexical Analyzer to extract meaningful tokens while removing unwanted white spaces, comments etc. [14]. We would be using this approach in this paper for sentiment analysis of posts from twitter.

PROPOSED FRAMEWORK TO FIND THE DOMINATED OPINION

This paper proposes a framework based on lexical analysis technique which will categorize the scattered opinion into positive, negative and neutral.

This framework firstly works on the topic discussed on twitter and using hash tag collects the tweets related to the topic using twitter API. The data is then processed and the tweets are categorized into 3 major opinions using sentiment analysis tool Text Blob. Then the maximum polarity is calculated to find the significant opinion.



Proposed Methodology

1) **Selection of domain**: A hash tag is selected regarding which data needs to be collected.
2) **Collection of data:** Data is collected using twitter API after passing an authentication system of twitter.
3) **Preprocessing of data**: Tweets come with lots of unwanted marks such as punctuation marks, emoticons, URLs, re-tweets from users etc, which is not desired for analysis of sentiment that this stage thus filtration is done to get meaningful data.
4) **Sentiment classification**: At this stage with the help of sentiment analysis tool TextBlob sentiment are classified into positive, negative and neutral using sentiment score.
5) **Dominated opinion:** These classified tweets are counted and thus found the dominated opinion of the scenario.

IMPLEMENTATION AND RESULTS

This Section provides implementation of the significant opinion detection framework proposed and used in this paper, on the data collected from the entertainment industry using hashtags (#)of 4 different genres of movie. Real time analysis has been done to establish the public opinion about each movie. More than 400 tweets were collected to perform the experiment. Table 1 shows the results depicting the sentiments as positive, negative and neutral. Like movie named Badrinath Ki Dulhaniya has 82% positive tweets about it thus dominated opinion is positive, whereas Logan and Jeena Isi Ka Naam Hai (JIKNH) is having significant neutral opinion i.e. 52% and 60% respectively and

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Phillauri has 68% negative opinion. Chart 1, shows the barchart with type of opinion against name of the movie. The results show that the methodology works successfully for finding 3 type of sentiments in a tweet.Themethodology used in this work can be useful in developing marketing strategies and promotional activities of movies however it can be equivalently used in the field of market products, election analysis and prediction etc.

Table 1: Opinion regarding movies

Name of movie	Positive	Negative	Neutral	Dominated Opinion
Badrinath ki Dulhaniya	70	5	10	Positive
Phillauri	28	68	4	Negative
logan	35	13	52	Neutral
JIKNH	24	16	60	Neutral

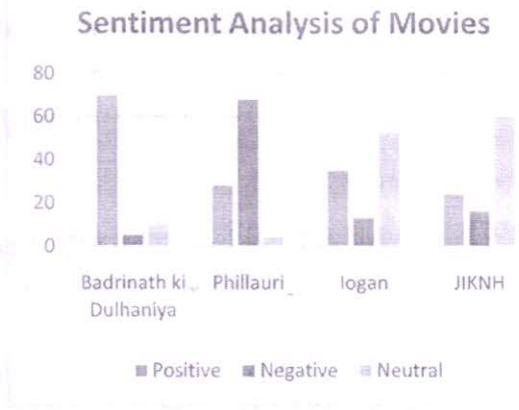

Chart 1

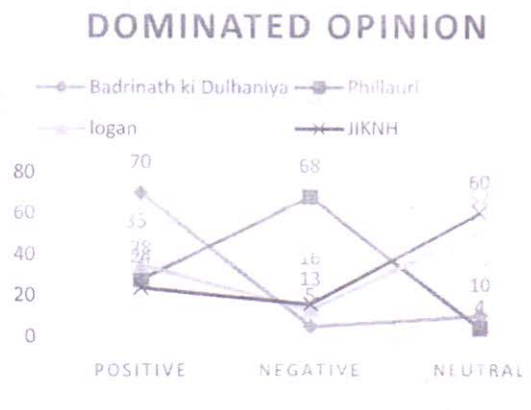

Chart 2

CONCLUSION AND FUTURE WORK

This paper proposed a framework to collect opinions from twitter microblogging website and then a real time analysis system to detect the polarity of opinion i.e. positive, negative and neutral in a particular domain. This framework is based on Lexical Analysis method of semantic analysis which uses a dictionary based analysis in which sentences are broken into tokens thus providing the core sentiment of the sentence. Entertainment domain was selected to test the framework in which 4 different genre movies were considered and their sentiment score was calculated thus detecting the dominated opinion about the movie in current scenario. The results shows the effectivity of the system.

In future we will combine this methodology with promotional activities which will be helpful for creating new marketing strategies based on current significant opinion of the users.

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URBAN SPACES

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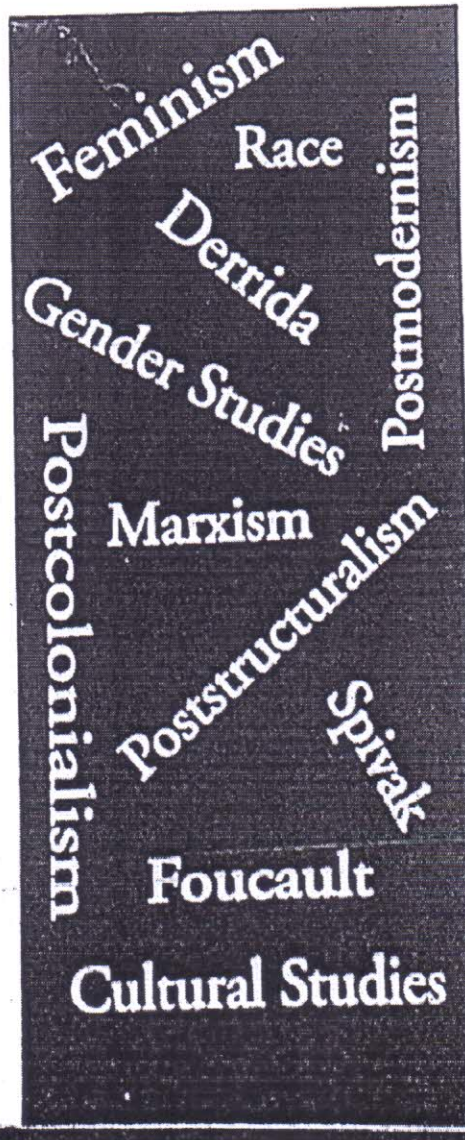

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Reclaiming the Streets through Protest: A Performative Study of December 2012 Anti-rape Movement

ABSTRACT

The city scape is constantly touted as a much used scenographic background, with enormous deployment of technological apparatus to stage everything from street theatres, to Queer pride parades etc. These spaces also open up the much required attention to the apparatus of surveillance which are officially then produced as "safe spaces" for the demonstration of identity politics which the "neo-liberal" state is supposed to promote. Amongst the state-sponsored neo-liberalism and surveillance, the anti-rape movement in 2012 in Delhi acted as conundrum for its level of participation by the law-abiding citizens who took over strategic locations.

This paper attempts to analyze the protest performances that happened during the anti-rape movement, and map the spaces where these performances took place. The movement which was initially contained at Jantar Mantar, one of the state assigned spaces of protest, spilled out to India gate and Raisina Hills as the protestors dissented and committed acts of arson against the state. It was during this period that various groups and individual performers who were usually confined to proscenium and institutional spaces after the incident after a long time brought such avant garde performers into streets, giving them an opportunity to engage and communicate with larger audiences. Performances by theater veterans like Maya Rao and various left oriented groups like Jana natya Manch generated unexpected political response. The sudden crowded streets would burst out in songs reminiscent of the second wave feminism, and other theatrical devices which were ready to capture the impulse of the moment. This paper seeks to analyze the performances by using theoretical frameworks of

Ashvamegh... the literary flight... ISSN: 2454-4574

PORTRAYAL OF CHILDREN IN RUSKIN BOND'S SHORT STORIES

POSTED BY THE ASHVAMEGH TEAM ON 14TH OCTOBER 2016

PORTRAYAL OF CHILDREN IN RUSKIN BOND'S SHORT STORIES

By – Prof. Ravi K Dhar & Dr. Soniya Verma

Published in Vol.II, Issue.XXI, October 2016

Introduction to the Authors:

Ravi K Dhar is a professor and director at Jagannath International Management School, Vasant Kunj, New Delhi.
Dr. Soniya Verma is an assistant professor, Raj Kumar Goel Institute of Technology, Ghaziabad.

The remarkable blending of the literary traditions of Indian and English literature is noticeable feature of Bond's creativity. He is living in Mussoorie for last 5 decades. Since then he has been ceaselessly jotting down with his pen the inexhaustible mysteries of life in a sizeable canon of his creative literature. In his writings, he focuses the individuality of children, their dreams and their adventures like English children's writing. He captures the innocence of children in his fiction like Indian authors.

The stories like *The Angry River* and *The Blue Umbrella* brilliantly amalgamate the traditions of Indian and English Children's literature. Sita, the young heroine of *The Angry River* bravely fights the destructive forces of nature. Binya, the vivacious girl of "The Blue Umbrella" successfully overcomes the self-seeking attitude towards life. The readers are motivated in witnessing the indomitable spirit of both the heroines, Sita and Binya, as they fight the external and internal forces of life.

The story *The Blue Umbrella* is a great example of Bond's ability to present the intricacies of life with much simplicity. With just an old man and little girl and a few minor characters, he reveals to us all the facets of emotions that make us human – joy, pain, anger, disappointment and hurt and all the tragedies and celebrations that make life what it is. Binya, the child heroine of a moving story *The Blue Umbrella* from Gharwal hills, is hardly ten-year-old. She willingly lends her pleasing smile to anyone who is unhappy. She possesses the heart of a young lady. On a childish impulse, she quickly gets ready to exchange her charmed pendant made up of a leopard's claw for a dainty, blue silk umbrella. The umbrella is owned by a wealthy woman who came for picnic in the hills. Binya's pendant created a stir in the heart of this lady. With a desire to possess the pendant she reluctantly gets ready to exchange her umbrella for it. Binya is very happy, on the seventh heaven, after receiving the blue umbrella. She gets enamoured by its beauty. Her passion sees no limit for her prize possession. She carries it wherever she goes and seldom closes it. It accompanies her everywhere protecting her from storms and snakes, as goes the description: "Whenever Binya went out – whether it was to graze the cows, or fetch water from the spring, or carry milk to the little tea shop on the Tehri road – she took the umbrella

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CONTENTS

ROLE OF THE MEDIA IN CULTIVATING PERCEPTIONS AND IMPACTING POWER EQUATIONS: CASE STUDY OF US PSYOPS

KRITI SINGH

To fight and conquer in all your battles is not supreme excellence; supreme excellence consists in breaking the enemy's resistance without fighting.

— Sun Tzu[1]

INTRODUCTION

The history of war is as old as mankind itself. This begs the question: why is it so difficult for men to live in peace? The reason is attributed to 'selfish genes'. As evolutionary psychologists suggest, "It's natural for human groups to wage war because we're made up of selfish genes which demand to be replicated. So it's natural for us to try to get hold of resources which help us to survive, and to fight over them with other groups."[2] Primatologist Richard Wrangham opines, "There has been selection for a

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1. S. T. (2015). Sun Tzu Quotes. Retrieved January 7, 2016, from http://www.brainyquote.com/quotes/quotes/s/suntzu133291.html
2. Steve Taylor. "The Psychology of War: Why Do Human Beings Find It so Difficult to Live in Peace?" *Psychologytoday*, March 5, 2014. Accessed on January 7, 2016. https://www.psychologytoday.com/blog/out-the-darkness/201403/the-psychology-war.

Apart from strategy, tactics, weaponry and infantry, 'human psychology' plays a crucial and decisive role in the battleground. It is often said that the decisive win in the battle is more attributable to the 'morale' of the soldiers rather than only war resources, such as weaponry or strategy.

male psyche that, in certain circumstances, seeks opportunities to carry out low-cost attacks on unsuspecting neighbours."[3] Therefore, wars become a part and parcel of human lives.

Therefore, apart from strategy, tactics, weaponry and infantry, 'human psychology' plays a crucial and decisive role in the battleground. It is often said that the decisive win in the battle is more attributable to the 'morale' of the soldiers rather than only war resources, such as weaponry or strategy. Clausewitz stresses the importance of 'morale' and 'will' for both the soldier and the commander. The soldier's first requirement is moral and physical courage, for both the acceptance of responsibility and the suppression of fear.[4]

The idea was reinforced by Napoleon's statement that "in war, morale forces are to physical as three to one, relative material strength accounts for only one quarter."[5] This notion was further reiterated in German Col Foerstch words, "The final word regarding victory and defeat rests not on arms and equipment, not on the way in which they are used, nor even on the principles of strategy and tactics, but on the morale of the troops."[6] These statements highlight the importance of 'morale' and how significant it is in battles. In order to bring the enemy down, it is critical to bring his 'morale' down.

This paper examines the use of psychological warfare against the enemy during war-time to manage perceptions, to confuse him and, ultimately, to

3. "The Psychology of Killing and the Origins of War," 2011. Accessed on January 12, 2016. http://smellslikescience.com/the-psychology-of-killing-and-the-origins-of-war/.
4. C. (n.d.). "Importance of Military Morale," retrieved January 7, 2016, from http://www.au.af.mil/au/awc/awcgate/clauswtz/clwt0013.htm
5. N. (1999). "Napoleon on War", retrieved on January 17, 2016, from http://www.napoleonguide.com/maxim_war.htm
6. Arthur Upham Pope, "The Importance of Morale", *The Journal of Educational Sociology*, 15 (4). (American Sociological Association, Sage Publications, Inc., 1941), pp.195–205. doi:10.2307/2262466.