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Social Responsibility Management in a Collaborative Web Environment

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Abstract: Social responsibility is a characteristic which is very essential for every human being. We are living in a world which is full of events both good and bad and we are all being affected by them either directly or indirectly. The purpose of this research paper is to use technology especially internet and web to be used as a tool to record or monitor the events which are taking place around us, so as to act as a great informer to the community and using which to do some predictions on the consequences of certain events. The principal results which we got through an experimental study were quite encouraging. A community of internet users was used to record the happenings in a university environment. This improved the social behavior of students in a positive direction and also resulted in the responsible people to take the necessary steps at the right time. The conclusions we got from this project was if we can take this responsibility management into the public domain it would be a great help to the society. Here the methodology applied was Baye's theorem and Tree induction and attributes were evaluated for purity using Gini Index.It is pioneer application of classification theorems in social networks.

Key words: Social responsibility (SR) · Web environment (WE) · Collaborative Contribution (CC) · Social Behavior (SB)

INTRODUCTION

This system which we envisage can be put to use by any ordinary internet user in a collaborative manner to record the happenings around him and can be shared among the other internet users to take note of situation and act accordingly. Web being a public media can be observed by millions of eyes over each and every event and compels the concerned authorities to take a remedial measure then and there.This becomes a collaborative social activity akin to social e-commerce. The user of ecommerce websites started using collaborative online shopping for interacting with people around the globe. This is improved based on the theories of co-presence and flow [1].

The concept of collaborative working enhances shared information among users. The underlying premise of collaborative working is based upon an accord building through cooperation by group members and acceptance of responsibility among them for their actions. It is an instructional method involving cooperation and interaction among internet society, with software support. This kind of cooperation helps in making crucial decisions using historical data and experience similar to, the interactions of youth with autism spectrum disorders are captured and coded in a three-dimensional virtual learning environment (3D VLE). This helps in making data-driven decisions to improve the learning experience [2]. Web services are also used in the collaborative communication. A concept called Inclusive social tagging has been proposed for the usage of web services. This has been supported in Web 2.0 services [3]. we propose a methodology that promotes collaborative sharing that provides software support and facilitates communication between internet users. The participants are across various disciplines including computer science, sociology, linguistics and semiotics, speech communication and psychology or any other social activist. Our product Socialcollab strives to create a better understanding of collaborative information sharing.

Social Collaborative Platform: Social collaboration helps to achieve mutual exchange of information and relevant data that may help people to take certain important

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decisions. Socialcollab provides a platform where the social activities are monitored and immediately registered by the users. We also promote Computer Supported Collaborative Information Sharing (CSIS) to share and monitor the actions taken and their consequence actions to update the public periodically. Socialcollab ensures that internet users make an active participation in current affairs. Socialcollab records events in interdisciplinary fields and provide statistical analysis of the actions taken. It can also provide suggestions to each individual so as to improve their performance. Socialcollab helps general public achieve higher level of participation and commitment.

The various events in the environment and the prudent usage of the advantages in technology can help us to prevent many catastrophes like anybody falling inside an open drainage, inadvertently stepping on electrical connections, or help us to rescue the victims from accidents etc. Every user of the internet observes the things happening around him .This system could also be used by experts to focus on an individual field. The concerned persons can be monitored for the actions taken and can be taken to task by higher authorities if he/she fails in his duty. This system may of immense help to people in every walk of life as the data collected are used for prediction in a particular domain. There are many models used for collaborations. A human factors model of collaboration called CoSpaces Collaborative Working Model (CCWM) has been developed. A framework which incorporates seven categories of factors in collaboration forms a basis for this model [3].

Collaborative Social Network: Collaborative design is also possible in virtual networks.[4] presents three case studies of collaborative design in Virtual Worlds (Vws). Vws provide an interactive experience to users. They did not support intensive design activities. This paper emphasizes on exploiting Collaborative Traces in Collaborative Working Environment. Group collaborations help jobs to be developed incrementally in consultation with online members. A model and a framework are proposed to facilitate group collaboration [5].

Social network analysis has resulted due to an explosion in social networks. Social networks have become a perfect media for exchanging useful information. This is because of popularity of new social network sites (SNSs), or "web-based services that allow individuals to form a public or quasi-public profile within a constrained system, form a list of other users with whom they share a connection and view and navigate their list of connections and those made by others within the system" [6]. Social issues are manifold for an individual and for the community. Social dimension, social behavior and social life are analyzed for the individual and for the community using social travel generation model [7]. Social capital is another issue which gains great momentum nowadays. Social capital facilitates individual to participate in social networks to share resources like valuable information, employment opportunities and intimate relationships or to organize groups [8]. So far social network usage has been used more for information retrieval. Research has shown that people use these social networking tools for search and discovery of new information. Blogs, online bookmarking and wikis represent new repositories of information generated by people, so while part of using these tools is connecting with fellowmen for sharing information than social [9]. But not using a social network for the community advantage is a grave mistake. To build a psychologically healthy society made of young adults, usage of online social networking sites for their advantage to gain social capital is an important step. It describes the gain achieved in having a healthy relationship with other person [10]. Both online and offline communication can be developed using social media as a start up. Most of the social networking sites can be used to promote social interaction and strengthen offline relationships to support healthy connection [11].

Features of Socialcollab: In this model we propose to take the help of human beings and some intelligent devices at vital installations which are connected to the network and keep sending certain valuable information to the server. The following is the mathematical model to be used. A conceptual model has been proposed to manage sustainability in organizations using business intelligence systems. It incorporates socio-environmental indicators [12]. Here the following notational model describes the sequence of events generated by the actions of stakeholders. Using the following model the *simulated Data set* gets generated for the application of classification theorems.

Notational Model:

Knowledge base (K), Perception (P), Proper things (A), Improper things – B, Authorities - M, Goal – G, Public – U, Empty - E

Table 1: Simulated Sample Data for an real time event

S.no	Age	Drunken Yes/no	Disability Yes/no	Environment	Raining	Falling Class
1.	Y	No	No	D	No	Yes
2.	S	Yes	No	C	No	No
3.	Y	Yes	Yes	C	Yes	Yes
4.	M	No	No	C	No	Yes
5.	M	Yes	No	D	Yes	No
6.	S	Yes	Yes	C	No	Yes
7.	S	No	No	D	Yes	Yes
8.	Y	No	Yes	C	No	Yes
9.	Y	No	No	D	Yes	No
10.	S	No	No	C	No	Yes

Entity Sensor's Actions:

Proper things □ perception
Improper things □ perception
Knowledge Base ← proper things □ improper things.
Reported things ← Knowledge Base – improper things

Mathematically,

A □ P, B □ P, K = A □ B, R = K – B

Entity Software's Actions:

Reporting Area ← Reports / Complaints (from K)
Authorities ← Reporting Area
Reporting Area ← Clear

R = K, M= K, K = E

The observed events will be collected through the social media networks to create public awareness and also will be sent to the concerned authorities email address and Short message service will also used for this purpose for them to take actions.

The following events are supposed to happen

Public → awareness
Authorities → take actions
Responsibility Management → goal

Representing as symmetric matrix (i.e) Diagonal elements are same

Entity sensor's actions

A K
R B

A->Proper Things
B->Improper Things
R->Reporting Things=K-B
Here, K is transformed to Ra and C. Entity Software's Actions

A C
Ra-B B

A->Proper Things Ra-Reporting Area=K
M->Authorities=k
C->clear=k

Legend:

Y-Young; S-Senior; M-Middle;
D-Dusty; C-Clear;

Methodology I : Naïve Bayes Theore:m

m→ Number of classes, 1≤k≤m,n→ Number of attributes, 1≤i≤n
x→ Test set,For each k□ m, P(C_k)=Probability of the class k
=Number of tuples containing the class/total number of tuples
For each i □ n, P(C_{ki})=Probability of the class k in i.
=Number of tuples in i containing the class/total number tuples containing i

$$P(C/x)=\frac{P(C_k).P(C_k)}{P(x)} \quad (1.0)$$

$$P(x/C_k)=\prod_{i=1}^{n} P(C_{ki})P(C_k) \quad (1.1)$$

P(x)= Probability of x belonging to a class.

$$= P(x/C_k)\, P(C_k)+P(x/\sim c_k)\, P(x/\sim C_k)^n$$

Where

$$1 = k = m \quad (1.2)$$

Considering the training data involving pit,Total number of tuples=10; Number of classes=2{yes,no},Number of tuples containing yes=6;Number of tuples containing no=4

Table 2: Naïve Bayes Theorem

	Age			Drunken		Disability		Environment		Raining	
	Young	Senior	Middle	Yes	No	Yes	No	Clear	Dusty	Yes	No
C1	0.4974	0.75	0.4857	0.4974	0.6644	0.6644	0.5689	0.6644	0.4974	0.4974	0.6644
C2	0.50	0.25	0.51	0.5025	0.3355	0.3355	0.4310	0.3355	0.5025	0.5025	0.3355

Table3.Tree Induction

Age		Drunken		Disability		Environment		Raining	
Info	Gain	Info	Gain	Info	Gain	Info	Gain	Info	Gain
0.9245	0.0466	0.9509	0.0202	0.9657	0.0054	0.9509	0.0202	0.9509	0.0202

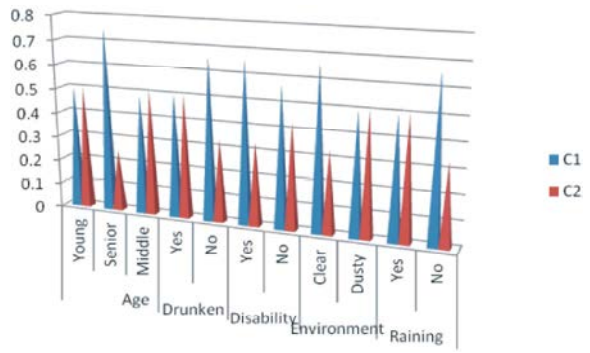

Chart 1: Naïve Bayes Theorem

Ultimate Class refers here as Raining Column:

C1->refers to Yes,C2->refers to No
C1=6/10=0.6 p (c1) =0.6
C2=4/10=0.4 p (c2) =0.4

Age: Young

C1-> 2/6=0.33,C2->2/4=0.5
P (c1/young) =p (young/c1) p (c1) / p (young/c1) p (c1) + p (young/c2) p (c2)
= (0.33) (0.6)/ (0.33) (0.6) + (0.5) (0.4)=0.198/0.398=**0.4974**
P (c2/young) = p (young/c2) p (c2)/p (young/c2) p (c2) + p (young/c1) p (c1)
= (0.5) (0.4)/ (0.5) (0.4) + (0.33) (0.6)=0.2/0.398=**0.50**

Other Columns and its sub classes are calculated using Baye's methodology and values are as follows

Chart 1 represents Naïve Bayes Theorem and the attribute values are taken from Table 2 to depict the above picture.

Problem Definition 1:

The Given Pattern is P(x)={Age(Middle), Drunken (Yes), Disability(No), Environment(Dusty),Raining(Yes)}

Proof:

C1-denote the person will fall
Age(Middle)(c1)*Drunken(Yes)(c1)*Disability(No)(c1)*
Environment(Dusty)(c1)*Raining(Yes)(c1)*c1(Ultimate Class),0.4857*0.4974*0.5689*0.4974*0.4974*0.6 =0.0204
C2-denote the person will not fall

Age(Middle)(c2)*Drunken(Yes)(c2)*Disability(No)(c2)* Environment(Dusty)(c2)* Raining(yes)(c2)*c2(Ultimate Class),0.51*0.5025*0.4310*0.5025*0.5025*0.4 =0.0111
C1=0.0204, C2=0.0111, C1>C2

Result :Therefore The Person Will Fall:
Methodology Used Formula is
$-p \log_e pi$

ENTROPY: C1_6(refers to Yes), C2_4(refers to No), Coverage_ 10
$- [6/10 \log_2 (6/10) + 4/10 \log_2 (4/10)]$
$- [6/10 \log_2 (6/10) + 4/10 \log_2 (4/10)] = - [-0.4423-0.5288] = 0.9711$

Entropy = 0.9711

AGE (Young):Coverage_ 4, C1_2,C2_2
$- [2/4 \log_2 (2/4) + 2/4 \log_2 (2/4)], - [2/4 \log_2 (2/4) + 2/4 \log_2 (2/4)] = - [-0.5-0.5] = 1$
INFO = 1*4/10, INFO = 0.4

It is similarly others subclasses also, Hence the results are adhered for different columns

Chart 2 represents Tree induction and the attribute values are taken from Table 3 to depict the above picture.

Problem Definition II:

The Given Pattern is P(x)={Age(young), Drunken (Yes), Disability (Yes), Raining(Yes),Environment(Clear)}

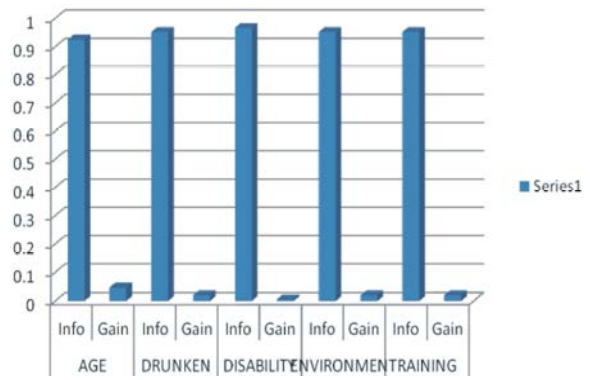

Chart 2: Tree induction

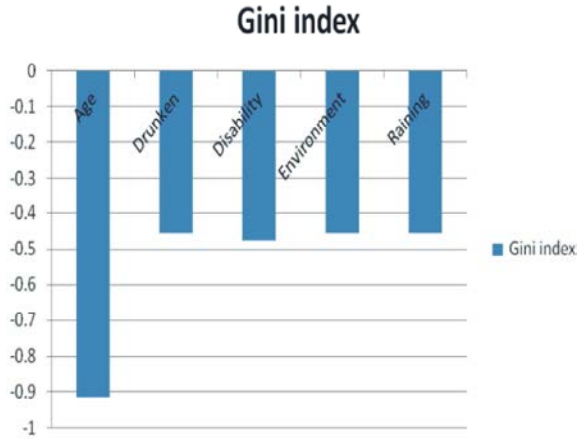

Chart 3: Gini Index

Table 4: Gini Index

Age	Drunken	Disability	Environment	Raining
-0.9142	-0.454	-0.4744	-0.454	-0.454

Proof: Through the tree induction table columns information and gains are taken into account for generating the following rules as follows.

Rule 1: If Age=Young and Drunken=No and Disability=No and Environment=Dusty and Rainy=No then Class=Yes

Rule 2: If Age=Middle and Drunken=Yes and Disability=No and Environment=Dusty and Rainy=Yes then Class=No

Rule 3: If Age=Senior and Drunken=Yes and Disability=No and Environment=Clear and Rainy=No then Class=No

Like this the rules are generated in plenty for the above said Table 1.

For the above said pattern the if Rule:2 is applied then the recommendation is that the person will fall

Gini Index: This is meant for finding the purity level of attributes. Though for finding a particular class, plenty number of attributes is available out of that choosing the right set of attributes to find the class nature is always much appreciated. According to the calculation in gini index, chosen attributes are having high weight than the others.

Class: C1=Yes=6/10, C2=No=4/10
Class=(1-0.36-0.16), Entropy=0.48

Age: Age=Young, 4/10(1-0.25-0.25)+6/10(1-0.443-0.110), 0.2+0.2682,0.4682

Age=Middle, 2/10(1-0.25-0.25)+8/10(1-0.390-0.140),0.1+0.376,0.476

Age=Senior,4/10(1-0.5625-0.0625)+6/10(1-0.25-0.25),0.15+0.3,0.45

Gini Index for Age=0.48-(0.4682+0.476+0.45) =-0.9142

The remaining attributes are calculated in the same manner
and tabulated as follows,

Chart 3 represents Gini Index and the attribute values are taken from Table 4 to depict the above picture.

Implementation Motivation: The idea for creation of Socialcollab came from Web 2.0 tools like Glogster (to share images), Edmodo (Social learning environment), Wallwisher (Online notice board maker), WordPress (content publishing system), etc., [1] The internet savvy public observe happenings in and around him/her can use any of these tools given above but not limited to, to upload any relevant information to the social media sites. He/she can also give valuable comments on the events to garner support for the cause. Our alpha release of Socialcollab was made as a web application connected to the internet. We informed the availability of this application through conventional mode of advertisement like bulletin board and also through email. The test application was fed with information about an open man hole inside our university campus with the details of that particular location and the pictures taken by a walker. The response was remarkable with the internet users

exchanging this valuable information with their fellow users and the authorities were at the spot to attend to that man hole and fixed that problem

CONCLUSION

The limitation of this kind of service is that a certain section of people may take this as an intrusion into their privacy. So implementation of this system should be done cautiously. Thus, for any given tuple we can find whether the person with the given pattern will fall into the pit or not. This information can be applied to incorporate changes in the environment accordingly.

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