

Developing a Civic Journalism Social Medium on the Web: Technological Methods and Constraints

Andreas P. Giannakoulopoulos
New Technologies Laboratory
Faculty of Communication and Media Studies - University of Athens
agsp96@media.uoa.gr

Iraklis Varlamis
Department of Informatics and Telematics
Harokopio University of Athens
varlamis@hua.gr

Abstract:

Several social media web sites and applications have appeared the last few years and attracted the attention of people world-wide. Online social media changed the news publishing paradigm: they facilitated web users in reporting events, enforced collaboration and content quality assessment and introduced a flexible crowd-sourcing model. In this work, we present a new web based social medium targeted to the Greek online media market. We focus on the technological methods employed in order to promote citizens journalism and in the same time control the published content and examine the contribution of citizens to the new medium under the prism of local or international events in different disciplines. We present the people-based mechanism for content quality assessment, compare it to text based techniques for filtering offensive content and suggest a combined approach. Finally, we present a trust and profile aware mechanism that will be incorporated to the content recommendation service which is under development.

Résumé

Plusieurs sites de médias sociaux web et les applications sont apparues ces dernières années et a attiré l'attention de la population du monde entier. Médias sociaux en ligne a changé le paradigme de publier des nouvelles: ils facilité d'utilisateurs web en rendre compte d'événements, la contrainte à la collaboration et l'évaluation de la qualité du contenu et introduit une foule souples-sourcing modèle. Dans ce travail, nous présentons un nouveau site Web milieu à base sociale ciblée sur le marché grec médias en ligne. Nous mettons l'accent sur les méthodes technologiques utilisées, afin de promouvoir le journalisme citoyen et dans le même temps, le contenu du contrôle publiés et examiner la contribution des citoyens au moyen de nouveau sous le prisme des événements locaux ou internationaux dans différentes disciplines. Nous présentons au peuple mécanisme basé sur l'évaluation de la qualité du contenu, de le comparer au texte de base des techniques de filtrage du contenu offensant et de suggérer une approche combinée. Enfin, nous présentons une confiance et que le profil de mécanisme conscient qui sera intégré au service de recommandation de contenu, qui est en cours d'élaboration.

Keywords:

Civic journalism, social media, web development, information architecture, content sharing

1. Introduction

Specific and carefully designed procedures, along with thoughtful economic planning and decision-making are essential in order for any newly developed social medium to be positioned in the online market-place. The launching of a new social medium, named Television without Frontiers, in November 2008, has been a risky attempt in an immature market like the Greek online media one. The attempt can be thought of as successful, in terms of visitors, participation and media coverage, and the final outcome can help us draw useful conclusions regarding the complex correlations between the rapid changes in web-technologies, and the blurring of boundaries separating traditional roles of media-owners, producers and consumers. Large scale web-services, such as free-hosting of streaming-video, RSS feed delivery services etc., reduced the cost for content creation and facilitated content dissemination and sharing. Together with the ability to re-distribute third-party advertisements, they created a new technical and marketing solution, which appears to be the only viable one, for small to medium scale businesses that want to meet the standards established by their competitors, but cannot afford the high costs of technological infrastructure.

In this paper, the launching of a civic journalism social medium is presented, from the developers' point of view. The web-medium under discussion has been operating for almost 1 year at the time of writing and enough statistical data has been collected, via reputable resources, in order to analyze the effectiveness and the tenability of the adoption of technological methods. The authors, being the main developers of the project, provide a step-by-step analysis of the various challenges and constraints posed by the technological factor in those modern web based media that involve heavy user-participation and fall under the social-media category. Issues like financial viability, infrastructure and running costs, as well as the interdependence between the medium and its users are being examined and analyzed both from the purely technological perspective and the socio-economic one.

An important argument rising of this paper, is that the viability of such media, which are established in local economies and target limited audiences, is strongly connected to the participation of citizens. As a result, they are transformed to hybrid types of media, in which the participatory characteristics of online communities co-exist with traditional models of management and operation. As part of the discussion statistical data are presented, which clearly reveal an almost canonical relation between social upheaval and civic journalism engagement. Issues concerning the content contributors' anonymity, the reliability of sources and the connection between local events and the popularity of civic journalism are examined through an analysis of the numerous users' comments.

Finally, it is argued that the financial restrictions are the most essential ones for the longevity of a social medium on the web, and their impact on the technological choices determines its success in the broader sense.

The basic conclusion of this work refers to the deficiency of the business-model of the new hybrid media, specifically in the case of civic journalism, and to the need of a more integrated operational model, which will overcome the contradictions between traditional and participatory media. Although, the technological solutions may be considered adequate, several issues intrinsic to online communities (e.g. administrative issues, building of trust etc.) remain to be further discussed. However, in the triptych of journalism-technology-economy, all indicators point to economy as the factor that influences the other two. However, this rather premature and over-simplistic conclusion needs further and deeper research, which goes beyond the limits of the current case study.

Overall, this paper focuses on the influence of the technological factor on the decisions made during the development and launching periods of a Greek, civic journalism social-medium. The conclusions stress the economic factor as the most decisive one for the viability of such projects, but on the other hand the spontaneous participation and user engagement lead to quite optimistic conclusions as far as the social-media and new forms of social interaction are concerned. The existing web technologies, as implemented in this particular case, have been proven quite reliable; therefore, it is the media community which needs to adapt to the new technological environment and exploit the numerous available possibilities.

2. Citizens journalism and social upheaval

The advent of weblogs and feed technologies has changed the news publishing paradigm and the sequence of reporting events. Before the weblog era, someone had to report an event to the newspapers or television and hope for the editor to assign a reporter to cover the event. Nowadays, anyone can report breaking news in his/her weblog thus creating a state of collective journalism, which precedes and influences newspapers' articles. The rapid growth of the blogosphere, which attained global attention and contribution, established a new and rich field of research for computer scientists and sociologists [Finin et al, 2007].

Several research works, focused on blog data, resulted into specialized search engines for blogs (Google Blog Search¹, BlogPulse², Technorati³), that search and organize popular blogs and posts, analyze blog contents and monitor the popularity of terms and topics over time, track conversations etc. Other research works focused on the discovery of popular (Kritikopoulos et al, 2006) or influential blogs and bloggers [Adar et al, 2004] [Java, 2007] and on the issues of trust and controversy in the blogosphere [Massa and Avesani, 2005]. Finally, a few works capitalize on blogs as carriers of the public opinion and show that they can be employed as alerter for real-world events that have not yet been covered by the press, or for local-scale events that never reach the newspapers [Varlamis et al 2008].

The development of 'Television without Frontiers' portal aimed to promote citizens journalism by allowing citizens to report on everyday events, get informed and provide

¹ <http://blogsearch.google.com>

² <http://blogpulse.com>

³ <http://technorati.com/>

feedback. However, as stated in related literature (Grubisich, 2005, George, 2005), the quantity and quality of citizens journalism is strongly connected to the effort made by the professional editors of the medium. Based on these facts, the contribution of citizens was limited to comments on the articles, which are published in an everyday basis by the board of editors. Moreover, users are able to denote their approval or disapproval to an article or another user's comment, thus creating a collaborative assessment mechanism for content. In the following, we present the results of a statistical analysis performed on the data of our social medium, which comprise both articles published by the professional journalists and comments provided by users. Results are examined under the prism of local and world-wide events and indicate a relation between social upheaval and citizens' engagement in journalism.

During the first year of operation of the "Television without Frontiers" portal, several events, such as riots, elections, natural disasters took place in Greece and world-wide. These events triggered the editors of the online medium to publish articles, which consequently activated portal users to provide feedback through their comments. For each article, we know the main topic, as defined by the editor and the day of creation. Moreover, we know the total number of views, the total number of (positive) votes and the number of times it has been emailed by users to their friends. Depending on the type of the event, the article's topic differs. Consequently, we expect a variation in the number of articles per day for each topic and we believe that variation is bigger when a local or global event takes place.

In order to validate our claim, we select five of the most popular topics: three of them (i.e. politics, international politics and society) are general topics that span the whole year of the portal's operation and two (i.e. national and European elections) have being quite popular but for a limited period of time.

Figure 1 presents the number of articles published per day in each of the five topics. As we can see from the annotations in Figure 1, when events of national interest take place (such as the elections, the earthquake or the riots) the number of articles raises immediately. The effect is stronger for topics that span a narrow period in time and weaker in the general topics. However, special mention should be made to the peak in the politics curve on the 6th of December 2008. This peak was due to a local event (a student being shot to death by a policeman), which however created a large scale social upheaval in Greece, with riots, fires and protests for almost a month.

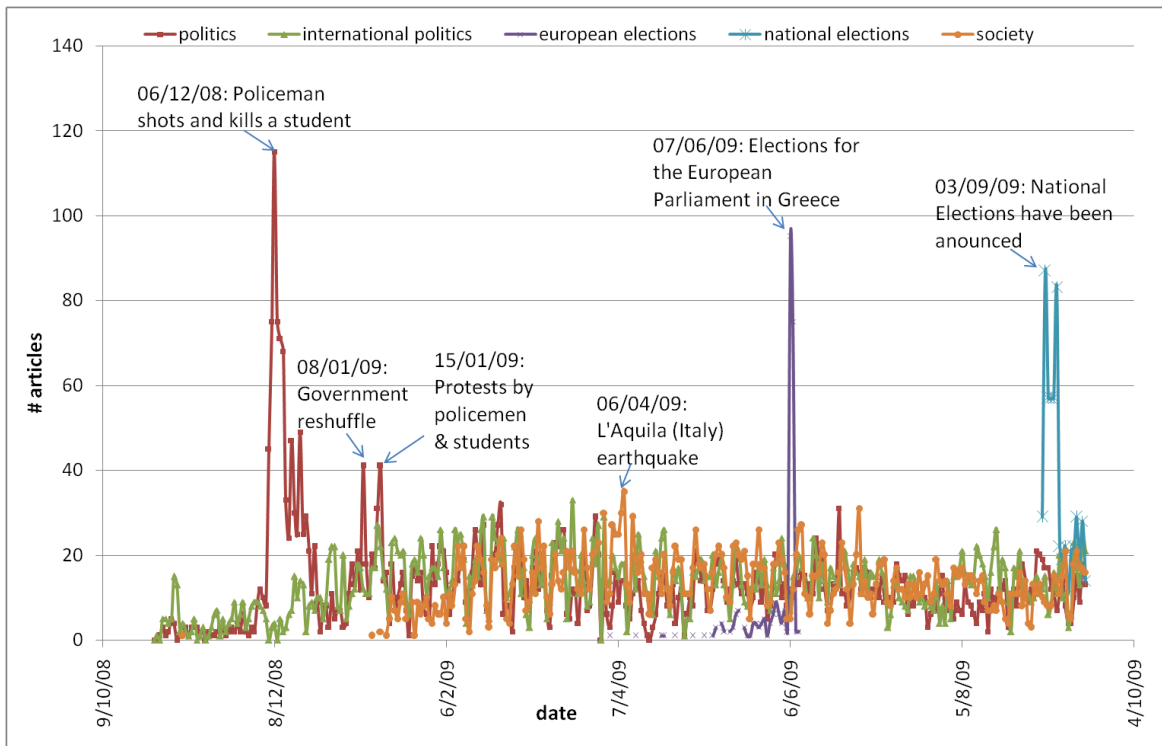


Figure 1. Topics' popularity in relation to local and global events

Following the analysis of topic popularity, we decided to measure the impact of the same events to the portal users. Users have several ways to denote their interest on a subject: a) they read the article, b) they give a vote to it or c) they send it by email to a friend, finally d) they are able to comment on an article. The latter option offers a means of free expression to the members of the portal, thus transforming our online medium to a social collaborative medium.

In order to quantify users' interest on a topic and we combine the four aforementioned factors in a single metric. We normalize each factor to avoid bias and assign equal weights (=1) to all factors. The resulting formula that quantifies the users' interest for an article a ($usersInterest(a)$) follows:

$$usersInterest(a) = views_ratio(a) + vote_ratio(a) + email_ratio(a) + comments_ratio(a) \quad (1)$$

where $views_ratio(a)$ is the number of views for article a divided by the total number of views for all articles, $vote_ratio(a)$ is the number of votes for article a divided by the total number of votes for all articles, $email_ratio(a)$ is the number of times article a has been emailed divided by the total number of emails created, and $comments_ratio(a)$ is the number of comments for article a divided by the total number of comments for all articles.

The users' interest for a topic, for a certain time period, is the aggregated total of $usersInterest(a)$ for all articles published in this period that fall under this topic. Figure 2, presents the interest of users for the same topics, in the same period, while keeping the same events as a point of reference. Several points of interests can be noted in the results presented in Figure 2.

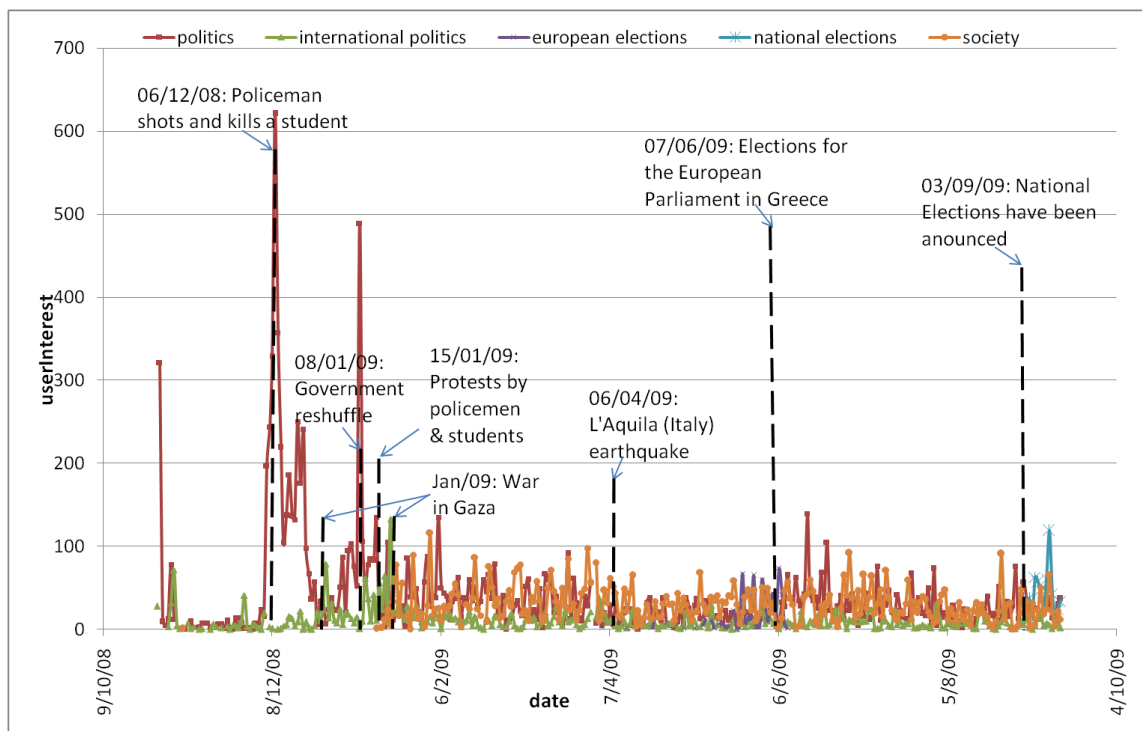


Figure 2. Users' interest and contribution on topics in relation to local and global events

First of all, the contribution of users in the politics topic is stronger during the social uprising period of December 2008 than during the European or national elections. As a result, the peak in the politics curve is bigger when compared to both the election related peaks. Moreover, the difference between the two peaks is bigger when users' interest is considered than when we compare the editors' contribution. This indicates that the interests of professional reporters and editors do not always align to the interests of the public. As a consequence, several news that attain the interest of reporters (i.e. an earthquake or an election) are not always of interest to the public.

Another important fact, arising from the result in Figure 2, is the immediate response of users in the case of the December events. A shocking event, like the shooting of a student, directly triggered the public interest and created a large buzz on the social medium. On the other side the contribution to the national or European elections needed a few days in order to reach its peak.

Finally, we should mention the reaction of the public to the Gaza War events. We remind the reader that the events began on December 27, 2008 and ended on January 18 with the one-week ceasefire by Hamas. The two peaks in the 'International Politics' curve appeared exactly on the aforementioned days, which shows that the war had instant impact on the interests of users. However, the impact was transient since the interest diminished right after the end of the war. This was also affected by the social upheaval in Greece (and Europe in general) during that period.

As a conclusion to this study on the evolution of users' and editors' interest over time, it is worthy to discuss several issues that should be considered in future researches. First, as far as it concerns users' anonymity, we decided to maintain aggregated statistics on the number of comments, votes, views etc. and not detailed information on what each user viewed or commented. The quality of information we employed is first subject to the editors' reliability, in terms of selecting the most appropriate topic for an article and second to the credibility of our members, who provide views, votes and comments to the

articles. We assume that spam is reduced to the minimum, grace to the administrator and moderators. A more detailed analysis on the user comments and the potential to eliminate spam is performed in the following section.

3. Comments as a means of civic journalism – Identify offensive comments

The basic idea behind users' comments in the 'Television without Frontiers' portal is to allow the editors to control the structure of the portal and the organization of content, while allowing users to express their opinion on everyday issues. Only registered members can publish comments. Each comment is attached to an article, has a *created* timestamp, and information on its author (*member_id*). It may contain text in greek or greeklish, which makes text mining tasks very difficult and hyperlinks, but neither code nor images. The comments mechanism firstly allows members to express their opinions on an article and secondly provides to other users a means for controlling the quality of messages. Using a simple rating scheme, with green, yellow and red flags allows members can rate the messages of other members depending on whether they like, dislike, or are offended by the message respectively. The total number of flags denotes the reputation of a message and its author respectively (see Figure 3). Finally, comments with many red flags are temporarily or permanently banned (see Figure 4).

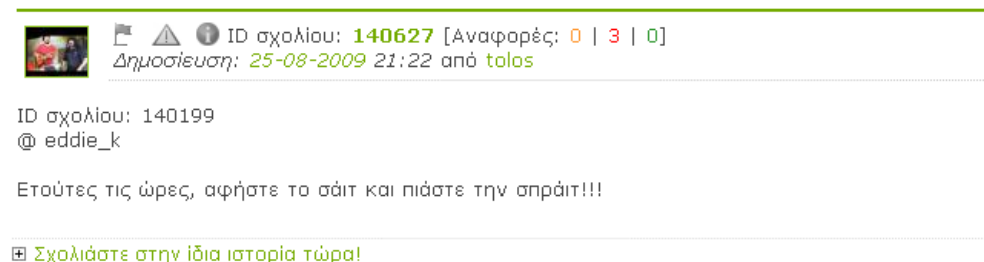


Figure 3. A comment and associated information

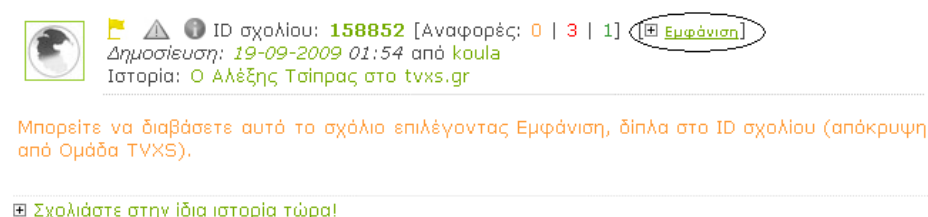


Figure 4. A temporary ban for comment 158852. The comment is still accessible.

In (Massa & Avessani, 2007) authors claim that the life of internet users in the "global village" is strongly connected to their reputation and their trust to others. They suggest that the most promising solution to this new situation is to create a decentralized collaborative assessment mechanism for users, which exploits every statement of trust from a user X to another user Y. Trust statements can be expressions of agreement or disagreement, like or dislike or simple reference hyperlinks. They can be employed by X or by the friends of X (propagation of trust) and all trust statements for a user Y can be aggregated to form a global trust value (or rating) for Y (Louta & Varlamis 2010).

The concept of rating or tagging web resources has its origins in the social bookmarking systems and apart from organizing content it offers a collaborative way for detecting and isolating spammers. Text mining and machine learning algorithms are the

most frequently employed solutions for the detection of spam content in the web. These algorithms are first trained over a pre-annotated set of spam and non-spam texts and then are applied to new and unknown texts.

In this study, we consider that offending messages are a sort of spam content. The tagging of user provided comments is a first step towards detecting spam. However, in an attempt to automatically identify potentially spam content, we decide to apply the aforementioned anti-spam techniques in our portal. For this reason, we employ a text classifier, i.e. a program that is trained to distinguish between spam and not spam content. The program assigns a score to each new comment based on its textual similarity to the existing spam comments. Similarity is computed using the weighted vector representation of documents and the cosine similarity measure. If the score exceeds a certain threshold, the new comment is marked as potentially offending.

This method assumes that offending comments use the same vocabulary and trains the classifier to detect the use of this vocabulary. In order to fine tune the threshold of our method, we employ a set of user comments that have already verified as offending or not offending (in the same proportion) by the editors of our site. We randomly split the initial set into two subsets, namely *training* and *test*. We train our classifier on the first subset and evaluate results on the second. We repeat experiments with different threshold values in order to find a threshold that maximizes performance. Performance is measured based on the successful and unsuccessful classifications as spam or not spam. More specifically, the F1 measure and chi-squared statistics (van Rijsbergen, 1979) are employed, as defined in the following equations:

$$F_1 = \frac{2 \cdot tp}{2 \cdot tp + fp + fn} \quad (2)$$

$$\chi^2 = \frac{(tp \cdot tn - fp \cdot fn)^2 \cdot (tp + tn + fp + fn)}{(tp + fp) \cdot (tp + fn) \cdot (tn + fp) \cdot (tn + fn)} \quad (3)$$

Where tp stands for the true positives (i.e. comments which were correctly assigned as offending), tn stands for the true negatives (i.e. comments which were correctly assigned as not offending), fp stands for the false positives (i.e. comments which were falsely assigned as offending) and fn stands for the false negatives (i.e. comments which were falsely assigned as not offending). The F1 and χ^2 values for the different thresholds are depicted in Figure 5 and indicate that an ideal threshold value for the classifier is 0.3.

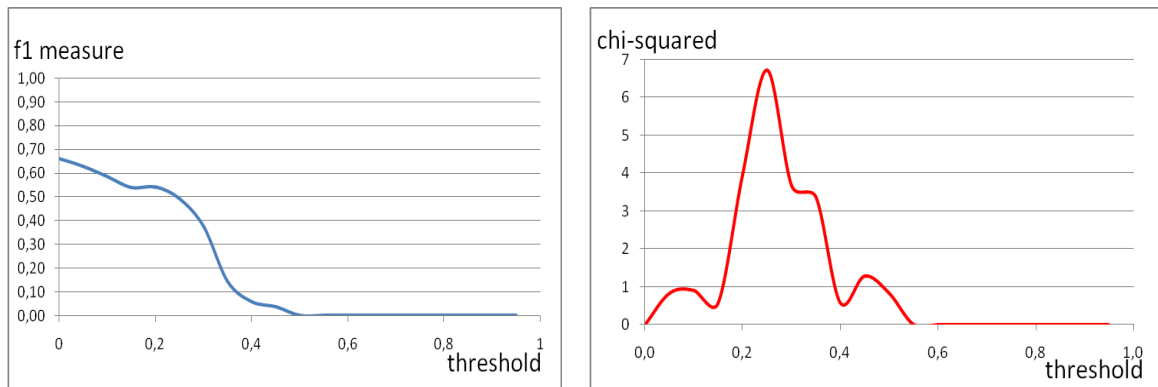


Figure 5. Choosing threshold using F_1 and χ^2 statistics

3.1. The rating mechanism for comments

The mechanism currently employed in the portal for deciding whether a comment has appropriate content is based on user provided feedback. A comment is automatically marked as offensive when it gets more than 30 red flags. Moreover, it is suggested for blockage when it exceeds the 10 red flags. In order to validate this mechanism, and check whether it can be automated, we apply the classifier on the red flagged comments. From the 255 comments in our test data, 48 comments are classified as offensive. We manually checked all these comments and found that 34 of the 48 contained offensive content (true positives), whereas the remaining 14 were wrongly classified (false positive). Similarly we found 70 false negatives and 137 true negatives, thus resulting in $F_1=0.45$.

Finally, we compare the performance of our classifier, against a simple heuristic for deciding whether a comment should be blocked based on the number of flags. This simple heuristic assigns a block score as follows:

$$flagscore = 2*red_flags+yellow_flags-2*greenflags \quad (4)$$

When the *flagscore* exceeds a threshold value the comment is considered suspect. Using the average *flagscore* as threshold results in a value for $F_1=0.30$. Additional tuning of the *flagscore* heuristic may further improve performance. However, the text based classifier can be used in combination with flag information and facilitate the moderation of user comments.

4. Exploit user trust in order to provide recommendations

One of the services, we are currently designing in the ‘Television without Frontier’ portal aims in providing recommendations to users based on their ‘sphere of influence’. Inspired by the ideas of influence spreading and trust propagation (Ziegler and Lausen, 2004) that have been widely employed in social networks, and the item rating algorithms, which are used in collaborative filtering we are currently developing a collaborative rating framework that will provide a score of interestingness to a user for every article in the portal.

When building a collaborative rating framework for social networks, we should take into account the properties of the network and model all the implicit and explicit rating mechanisms. Massa and Avesani (2004) introduce the concept of ‘Web of trust’ in order to refer to the neighborhood of a user (u) in the social network. This Web of trust comprises u and all other users that u considers as reliable. Authors, present a trust aware system for collaborative filtering, which provides for every combination of user (u) and item (i) a score of interest(u,i) based on the interests of a user and indirectly on the interests of her neighborhood. On the counterpart of trusted users, there exists suspicious users, who receive negative references. Guha et al (2004) model the propagation of trust and distrust via positive and negative links, whereas the MoleTrust algorithm in (Massa and Avesani, 2005) considers that trustful users have a controversiality percentage, which is above 0.6. In the case of blogs, Kale et al (2007) introduce the concept of link polarity in order to distinguish between positive links that point to “like-minded” blogs, negative and neutral ones.

Based on the above, we claim that for every user X in our portal, we are able to provide a ranking of all other users. This ranking will be based on the trust(X,Y), which corresponds to the agreement (or disagreement) of X to the content provided by Y. The trust(X,Y) is subject to the flags assigned by X to the comments of Y and to the number of articles they both liked and is currently defined by the following formula:

$$trust(X,Y) = norm_flagscore(X,Y) + co-liked(X,Y) + co-emailed(X,Y)$$

where $\text{co-liked}(X,Y) = \frac{|\text{likes}(X) \cap \text{likes}(Y)|}{|\text{likes}(X) \cup \text{likes}(Y)|}$ and $\text{co-emailedd} = \frac{|\text{emailed}(X) \cap \text{emailed}(Y)|}{|\text{emailed}(X) \cup \text{emailed}(Y)|}$

measure the accordance between X and Y

and $\text{norm_flagscore}(X,Y) = \frac{\text{flagscore}(X,Y)}{\sum_{K=anyY} \text{flagscore}(X,K)}$ is the normalized flagscore assigned by

X to the comments of Y and can be computed using equation 4.

The trust aware model that we presented will allow our recommendation mechanism to suggest articles (or comments) of interest to our users. It is expected to increase the interest of readers and trigger them to contribute to the social medium.

5. Conclusions

The conclusions to be drawn from the above suggest that civic journalism as employed in news reporting oriented websites is becoming a major sector of contemporary media. The interactions which take place among participating users provide an indicator for the level of trust that is established between the medium and its users, but the medium as a brand still plays the main role.

What remained outside the scope of this study is the time factor and how it affects the popularity of content and the recommendations. In such a dynamic environment, as the social medium we study, the total number of views is not always the best criterion for measuring the article's popularity. Articles that constantly receive views and votes are probably of higher interest than articles that received a large amount of hits for a short period in the past. The issue of articles interestingness and quality is very important for the social medium and will be further explored in our future work.

Bibliographic References

1. Adar, E., Zhang, L., Adamic, L., Lukose, R., Implicit Structure and the Dynamics of Blogspace. In proceedings of the *Workshop on the Weblogging Ecosystem, 13th International World Wide Web Conference*, May 18th, 2004
2. Finin, T., Joshi, A., Kolari, P., Java, A., Kale, A., Karandikar, A. The information ecology of social media and online communities. In *AI Magazine*, 28(3), AAAI Press, 2007.
3. George, E. Guest Writer Liz George of Baristanet Reviews Backfence.com Seven Months After Launch. In *Pressthink*. November 30, 2005. Available from: <http://journalism.nyu.edu/pubzone/weblogs/pressthink/2005/11/30/lz_bfcf.html> [Accessed September, 22nd 2009].
4. Grubisich, T. Grassroots journalism: Actual content vs. shining ideal. In *Online Journalism Review*. October 6, 2005, USC Annenberg. Available from: <<http://www.ojr.org/ojr/stories/051006/>> [Accessed September, 22nd 2009].
5. Guha R., Kumar R., Raghavan P., Tomkins A. Propagation of trust and distrust. In proceedings of the *13th International World Wide Web Conference*, New York, NY, USA, May 2004. ACM Press, 2004.
6. Java, A. A Framework for Modeling Influence, Opinions and Structure in Social Media. In proceedings of the *22nd AAAI Conference on Artificial Intelligence* pp. 1933-1934, 2007
7. Kale, A. Kolari, P., Java, A., Finin, T., Joshi, A. Modeling Trust and Influence in the Blogosphere Using Link Polarity. In proceedings of the *International Conference on Weblogs and Social Media (ICWSM 2007)*.

8. Kritikopoulos, A., Sideri, M., and Varlamis, I. BlogRank: ranking weblogs based on connectivity and similarity features. In proceedings of the *2nd international Workshop on Advanced Architectures and Algorithms For internet Delivery and Applications* (Pisa, Italy, October 10 - 10, 2006). AAA-IDEA '06, vol. 198. ACM Press, New York, NY, 8.
 9. Louta, M., Varlamis, I. Blog rating as an iterative collaborative process. To appear in *Semantics in Adaptive and Personalised Services: Methods, Tools and Applications*, in Springer Series on Studies in Computational Intelligence, M. Wallace, I. Anagnostopoulos, Ph. Mylonas, M. Bielikova (eds.), 2010.
 10. Massa, P., Avesani, P. Trust-Aware Collaborative Filtering for Recommender Systems. In proceedings of the *International Conference on Cooperative Information Systems (CoopIS)*. pp. 492-508. 2004
 11. Massa, P., Avesani, P. Controversial Users Demand Local Trust Metrics: An Experimental Study on Epinions.com Community. In proceedings of the *20th National Conference on Artificial Intelligence and the Seventeenth Innovative Applications of Artificial Intelligence Conference*, July 9-13, 2005, Pittsburgh, Pennsylvania, USA
 12. Massa, P., Avesani, P. Trust metrics on controversial users: balancing between tyranny of the majority and echo chambers, in *Special Issue on Semantics of People and Culture, International Journal on Semantic Web and Information Systems (IJSWIS)*, IGI, 2007.
 13. van Rijsbergen, C. J. *Information Retrieval*. Butterworth-Heinemann, London, 2nd edition, 1979.
 14. Varlamis, I., Vassalos, V., Palaios, A. A tool for monitoring the evolution of interests in the blogosphere. In proceeding of the *ICDE workshop on Data Engineering for Blogs, Social Media, and Web 2.0*, Cancun, Mexico, April 2008
 15. Ziegler, C., Lausen, G. Spreading Activation Models for Trust Propagation. In Proceedings of the *IEEE international Conference on E-Technology, E-Commerce and E-Service (Eee'04)*, 2004. EEE. IEEE Computer Society, Washington, DC, 83-97.
-