

Survey On Link Prediction In Facebook And Twitter

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ABSTRACT

Social media have gained increased usage rapidly for a discrepancy of reasons. Participants were asked to view one of six mock Twitter.com pages that varied both the number of followers and the ratio between followers and follows on the page and report their perceived source worthy of trust. This research examines mediocre factors and speculative relevant contextual variables that affect sensational formation and the willingness to initiate virtual friendship. In this paper [Network Analysis of Recurring YouTube Spam Campaigns] demonstrated tracking of spam campaigns over time using network motif profiling. Heterogeneous social network services, such as Facebook and Twitter, have emerged as popular, and often effective channels for Web users to capture updates from their friends. In this paper [Learning to blend vitality rankings from heterogeneous social networks], demonstrated the problem of blending vitality denotes all kinds of updates user receives in various social networks. It proposed variety of content, users, and users correlation features for this task. Since vitalities from different social networks are likely to have different sets of features, employed divide-and-conquer strategy in order to fully exploit all available features for vitalities from each social network respectively.

1. INTRODUCTION

Data mining is the extraction of hidden predictive information from large databases, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing business to make proactive, knowledge-driven decisions. Data mining is also known as knowledge-discovery in databases(KDD), is the practice of automatically searching large stores of data for patterns. The key properties of data mining are Automatic discovery of patterns, Prediction of likely outcomes, Creation of actionable information, Focus on large data sets and databases.

A social network is a social structure made up of a set of actors (such as individuals or organizations) and the dyadic ties between these actors. The social network perspective provides a clear way of analyzing the structure of whole social entities. The study of these structures uses social

network analysis to identify local and global patterns, locate influential entities, and examine network dynamics. In recent years, social networking online has literally exploded along with the growth of the internet and new internet technologies and capacities. MySpace hit the scene and was a smash providing people to the opportunity to create their own pages, invite friends, post content in the form of music, photos and virtually anything digital. YouTube has seen even wider acceptance and usage over the past few years providing anyone the opportunity to post home-made videos. Facebook, and more recently, Twitter have exploded on the scene providing two very popular portals with distinctly different approaches. Facebook is more of personal networking site as it promotes “reconnecting” with old high school, college, post graduate and former corporate friends and associates. Blogs is a form of social networking, is often linked through RSS (Really Simple Syndication) on Facebook pages so those within one’s personal network can view the blogposts on the home page of the Facebook user.

Social media have seen increased usage for the transmission of messages, and have seen an increase in usage as a news source (Pepitone , 2010). Social media use is also on the rise for sharing a variety of types of crisis and risk information. Users of social media may utilize specific components of a source’s profile, which are unavailable in traditional media, in order to make credibility judgments. The current study examines how characteristics of these “public displays of connection” (Donath & boyd, 2004) on Twitter.com impact reader’s judgments of source credibility about a perceived page owner.

1.1 Social media and source credibility

Twitter is a micro-blogging service that began in March of 2006 (twitter.com), where the restriction of user’s posts to 140 characters each has led to the development of a sort of shorthand and speed in creating messages. The Project for Excellence in Journalism (2009) reported that social networking is an important method for news distribution . For example, many news organization have started using Twitter. A great deal of work has attempted to identify the distinct dimensions of perceived source credibility. It includes three general dimensions of perceived source credibility

(McCrosky & Teven, 1999; O'Keefe, 2002): expertise/competence (i.e., the degree to which a perceiver believes a source to know the truth), trustworthiness (i.e., the degree to which a perceiver believes a source will tell the truth as he or she knows it), and goodwill (i.e., the degree to which a perceiver believes a source has the perceiver's best interest at heart).

In traditional media, gatekeeping is the process in which content maker persuade what information should deliberate out, and how that information should afford. Gatekeepers are fictitious to be verifying information for accuracy (Salcito, 2009). Information provided in strange, online channels often suffers from a relative lack of professional gatekeepers to monitor content, and thus , lacks some of the traditional markers used to determine source trustworthy. Indeed, online the gatekeeping function seems to shift from producers from content to consumers of content (Haas & Wearden, 2003; Metzger et al., 2003), leaving consumers responsible for making decisions about the perceived trustworthy of information they consume online.

1.2. Theoretical predictions of source trustworthy judgments online

As Hollan and Stornetta (1992) suggested, online channels can provide affordances to accomplishing one's goals by allowing for things that are not possible in face-to-face communication. The MAIN module (Sundar, 2008) is a model that discusses the technological affordance which allow for the heuristic processing of cues in an online setting to make judgments about the trustworthiness of an online source. The machine heuristic suggests that people assign greater trustworthiness to information that is clarified or chosen by a machine or computer. It concludes that, if the machine heuristic operates to inform how consumers of online information parse messages, one would expect the trustworthiness of messages that are paired with system-generated cues to be parsed, at least in part, on the basis of the "testimonial" that a system-generated cue makes about the message, and may influence trustworthy judgments more strongly than the content of a message. Social media site (such as a Twitter page) allows a user to get information about the source's network, and this information can be used to make judgments about the source, such as their trustworthiness, popularity, and attractiveness. Specific to trustworthy inferences. Twitter provides at least two relevant pieces of information about a source's network: the number of followers a source has and the number of people the source follows.

1.2.1. Number of followers

The curvilinear pattern was found for Facebook, a site designed around maintaining a network of "friends". Twitter and Facebook perform

various techniques for collecting social connections. A Facebook maintain two-way connection between dyadic tie. However, Twitter maintain one-way connection i.e., one might choose to follow whoever one wishes-whether the person being followed is aware of it or not. Consequently, any attractions attributed to this system-generated cue might be most indicative of the trustworthiness of the person who has been followed other than any negative implications of simply being a "follower aggregator".

People follows a Twitter is to ensure send messages that potential followers find it as confidential, meaningful, and/or trustworthy. In this case, one would expect a linear pattern between number of followers and perception of source trustworthy, leading to the first investigation of the paper. When the Twitter page became intensify, it results greater number of followers in terms of (a) reliable (b) competence and (c) acquiescence

1.2.2. Followers vs. follows

The Twitter user has amassed based on the number of followers, the ratio between this number and how many others they follow has a latent influence on the trustworthiness of a Twitter page owner. People with high cluster are able to bridge structural holes in a network (Burt, 2000) and are able to scatter information across many people. There are clearly perceptible types of having great power on others, and make up two of the three important components of being an estimation leader or "super-diffuser" (Boster, Kotowski, Andrews, & Serota, 2011).

2. Related Work

2.1. Structural and spam analysis

The network structure of YouTube has been analyzed in a number of separate studies based on the friendship relationship, focusing on the degree distribution. YouTube is a social core exists between authors of videos. Cheng et al. (2008) investigated the resulting networks were not strongly connected, attention was reserved for the largest strongly connected components. These components were found to exhibit small-world characteristics (Watts and Strogatz 1998), with large clustering coefficients and short characteristics path lengths, indicating the presence of dense cluster of related videos.

Benevenuto et al. (2008a) created a directed network based on videos and their associated responses. They found that using the largest strongly connected components was more desirable due to the large clustering coefficient involved. This was a precursor to subsequent work concerned with the detection of spammers and content promoters within YouTube (Benevenuto et al. 2008b; 2009)

2.2. Network motif analysis

Network motifs (Milo et al. 2002; Shen-Orr et al. 2002) are structural patterns in the form of

interconnected n-node subgraphs that are considered to be inherent in many varieties of network such as biological, technological, and sociological networks. The domain of spam detection has also profited from the use of network motifs or subgraphs. Becchetti et al. (2008) made use of the number of triangles and clustering coefficients as features in the detection of web spam. Network motifs have also been used to characterize network traffic (Allan, Turkett, and Fulp 2009).

2.3. Retrieval process

The YouTube Data API is used for retrieving the data. This API grants access permission to video and user profile information. API also provides access to standard feeds such as *Most Viewed* videos, *Top Related* videos etc. These feeds are updated periodically in order to detect recurring spam campaigns, as it enables the retrieval of popular videos on a continual basis. Hence, the retrieval process is executed periodically as follows:

1. The current video is retrieved from the most viewed standard feed for the US region (the API provides upto 100 videos).

2. The list in each video:

- (a) In the earlier feed list if this video is absent, its meta-data has been retrieved such as upload time, description etc.

- (b) In order to retrieve last twenty four hours comments and associated meta-data. The API limits the returned comments to a maximum of 1,000.

In Issue of Privacy in Social Network Sites, it provides information about commercial companies for advertising and to promote their products, sociologists for determining the behavior and features of various societies, intelligence organizations for preventing and predicting criminal activities for promoting their goals, and employers for acquiring information about job seekers. It also provides certain restriction to view user's private information for public access.

In Communities of participation, examined comparison access between two major social networking platforms i.e., the access participation of people with disabilities as well as aging users. Actual participation (as indicated by group activity) was revealed to be low as a proportional activity of groups. The results of the platform analysis show that regardless of the underlying infrastructure or ethos of the initial platform, the needs of people will be met through unique and innovative adaptations as long as the technology is flexible and responsive enough to permit it.

In Link prediction heuristics, examined two common empirical observations:

- (1) The simple heuristic of counting common neighbors often outperforms more complicated heuristics
- (2) A variant that weights common neighbors by the inverse of the logarithm of their

degrees often performs a better. It shows that the bounds obtained from longer paths can be made significantly tighter if even a single short path is known to exist.

In survey of Link prediction in complex network, it examined a big challenge is the link prediction in multi-dimensional networks, where links might have diverse meanings. For example, a social network may consist of merits and demerits about links, respectively pointing to friends and foes, or trusted and distrusted peers. A more complicated kind of multi-dimensional network results in which ones consist of diverse classes of nodes. Different for the tripartite networks, nodes in the same class can also be connected. It results Hybrid algorithm improves the prediction accuracy. It also results that ensemble learning method can obtain better prediction performance than another individual algorithm. Tylenda et al. developed a graph-based link prediction method that incorporate the temporal information. It found that the performance can be improved by either time-based weighting of edges (i.e., giving the older events smaller weights or even neglecting them) or weighting of edges according to the connecting strength.

In Social networking and risk to companies and institution, it examines many advantages of comprising SNS and other social media communication channels. From a technology perspective, corporate IT needs to verify that employee profiles use appropriate privacy settings, and phishing attacks and other suspicious behavior can be automatically detected and/or easily reported. SNS operator addresses the business needs ranging from offering more stable terms and conditions that provides highly authentication mechanisms and proper access control tools. In threats in social networking, it examines social networking exploits and activities, it recognize the most of the undesirable behavior that has plagued society over the years will re-appear as it is reenabled by new communication technologies, especially in contexts where the average user may be innocent and unsuspecting of the threats posed by social networking. The effect of system generated reports of connectedness on credibility on Twitter, it examines few limitations. First, it does not completely satisfied the number of followers and the number of follows. Future studies should be designed to be completely satisfying the potential indicators of connectivity and maven-ness (i.e., provide mock Twitter pages showing a ratio of 200% follows compared to the number of followers). Another limitation in the current study is the all effect sizes found. This is not too surprising, as there are many other things that impact source credibility. However, these findings are still important for two reasons. First, small changes in the mock twitter pages led to patterns of source credibility that are also consistent with past research on social media

cues and judgments (Tong et al., 2008), suggesting the possibility of an “unbelievability”. In Twitter vs. Facebook and the personality predictors of social media usage, it examined to identify some of the personality characteristics associated with the social and informational use of Facebook and Twitter. It found that a number of personality factors were significantly correlated with SNS use. Different traits were influential in explaining social and informational use and personality differences between the use of Facebook and Twitter were also identified. Further, significant differences in personality were observed between those who preferred Facebook and those who preferred Twitter. The current study investigated whether the personality traits of the Big-Five, NFC and Sociability were related to socializing and information exchange in the online environment of SNS. Results showed that personality was related, that these correlations were not straightforward or as influential as some previous research has suggested. In addition, the results reveal differential relationships between behavior on Facebook and Twitter and show personality differences between those who have a preference for Facebook or Twitter, suggesting that different people use the same sites for different purposes.

In Discovering cohesive subgroups from social networks for targeted advertising, the main goal is to filter out information that is not pertinent or uninteresting to a given user. Recommender systems have been shown to be appropriate for mentioning a wide range of products and services, such as books, restaurants, dry cleaners, plumbers, physicians, lawyers, financial institutions, and real estates brokers (Ansari, Essegai, & Kohli, 2000). Wei, Shaw, and Easley (2002) Huang, Chung, and Chen (2004) have provided more inclusive surveys of the various recommendation techniques. The recommendation approaches invokes two board classes that are commonly used by current recommender systems are content-based filtering and collaborative filtering. In Content based filtering, it is typically applied to recommend items that have parsable content or description. In Collaborative based filtering, it recommends items to a user by analyzing narrative preferences of other users. By combining other users known ratings can foretell the preferences of a user for items that s/he has not rated. Due to the simplicity and effectiveness of collaborative filtering, as indicated in empirical studies (Mooney & Roy, 2002; Pazzani, 1999), it is the most popular approach used in current recommender system. The application of data mining techniques for recommendations has evolved as another approach (Herlocker & Konstan, 2001; Lin, Alvarez, & Ruiz, 2002; Mobasher, Dai, Nakagawa, & Luo, 2000; Sarwar, Karypis, Konstan, & Riedl, 2000). Lin et al (2002) proposed a basic

idea to identify association rules between product items and succeedingly use them during recommendations made to a given customer for his/her transactions. Such an approach was advocated by Herlocker and Konstan (2001) for task-focused recommendation; that is, expedient items to meet the instant needs of users. Mobasher et al. (2000) outstretched this approach to recommending Web pages by further partitioning product items into set of combined usage profiles based on the associations of Web pages present in Web usage logs. The recommendations are made based on the similarity between the recently accessed Web pages of an active user and the collected aggregate usage profiles. In earlier recommender system, it is based only on the preference ratings or purchase records associated to existing customers and products, a few recent systems have extended the recommendation scope by incorporating social network information. The method of Kautz, Selman, and Shah (1997) examined the social network, and developed the Referral Web system to provide a chain of personal referrals from the searcher to the expert. Lam (2004) framed the SNACK system, which provides the performance of the traditional collaborative filtering technique for users with a close relationship to the targeted user .

3. Methodology

3.1. Overview

A mock Twitter page was created to represent a user whose page was devoted to the dissemination of information regarding H1N1 (swine flu). Participants viewed the Twitter page, and then responded to a measure of source trustworthy (McCroskey & Teven, 1999) and several items regarding behavioral intentions associated with H1N1.

3.2. Participants

The 289 participants in this study came from introductory communication classes at two classes at two large universities; one in the Mid-Atlantic region, and one in the Midwest. Course credit was given for participation.

3.3. Materials

3.3.1. Stimuli

Participants were randomly assigned to view one of six mock Twitter pages in order to know about the profile owner's trustworthy. It is done based on number of followers the profile owner had and the number of people the profile owner followed. The six pages represented a full cross of conditions with different numbers of followers (few, ~70; moderate, ~7000; many, ~70000) and different ratios of follows to followers (narrow gap: the number of follows equals ~90% of followers, wide

gap: the number of follows equal ~10% of followers).

3.3.2. Instrumentation

McCroskey and Teven's measured source trustworthy with three separate constructs: competence, goodwill, and trustworthiness (i.e., moral-immoral, intelligent-unintelligent and untrustworthy-trustworthy).

3.4. Relationship between ratio of followers and follows on source credibility

In MANOVA (multivariate analysis of variance) procedure is used to identify the gap between followers and follows based on trust, adequacy, and goodwill. In previous two hypotheses, it is identified that only adequacy and trust results sensitive to the system-generated number-of-followers and number-of-follows cues, whereas good-will results positively. One-way analyses of variance (ANOVAS) confirmed that adequacy judgments are done by analyzing Twitter profile owner with a narrow gap between the number of followers they had and number of people they followed. The current study demonstrates that the impact judgments of the person's source trustworthy are examined in number of ways. First, the degree to which an observer believes that a target knows the truth (competence) and the degree to which an observer believes that a target will tell them the truth as he or she knows it (trustworthiness) are curvilinear related to the number of people following the Twitter profile owner.

3.5. Comment processing and network generation

It requires the generation of a network to represent the comment posting activity of users to a set of videos. Spammers try to obfuscate the text of comments from a particular campaign in order to bypass their detection by any filters. Obfuscation techniques include the use of varying amounts of additional characters (e.g. whitespace, Unicode newlines, etc.) within the comment text, or different textual formations (e.g. additional words, misspellings) of the same fundamental message.

To counteract these efforts, each comment is converted to as set of tokens. During this process, stopwords are removed, along with any non-Latin-based words as the focus of this evaluation is English-language spam comments. Punctuation characters are also removed, and letters are converted to lowercase. As initial analysis found that spam comments can often be longer than regular comments, any texts shorter than a minimum length (currently 25 characters) are removed at this point. To capture the relationship between the users involved in a particular spam campaign, undirected and unweighted edges are created between user

nodes based on the similarity of their associated comments.

3.6. Network motif profiles

Once the network has been generated, a set of egocentric networks can be extracted. In this context, given that the focus is on user activity, an ego is a user node, where its egocentric network is the induced k-neighborhood network consisting of those user and video nodes whose distance from the ego is at most k.

3.7. Instant Messaging

IM is a near-synchronous communication tool. Stands for "Instant messaging, or "IMing", it has become a popular way to communicate over the Internet. Two people with the same IM client software can type messages back in forth in a private online chat session. IM software allows users to build a list of friends, or "buddies" and displays other users are online. After viewing the online users, the user can open up chat sessions with as many other people as he or she wants.

Instant messaging can be a much more efficient way to communicate with others than sending multiple e-mails back and forth. IMing has become a useful tool among friends and co-workers. Instant messaging offers an instantaneous transmission of text-based messages from sender to receiver. In push mode between two or more people using personal computers or other devices, along with shared clients, instant messaging basically offers real-time direct written language-based online chat. It may address point-to-point communication as well as multicast communications from one sender to many receivers.

The two types of models are applied in "Predicting customer churn through interpersonal influence". They are classification model and proposed propagation model. In proposed propagation model, it combines a dissemination process and customer's personalized characters.

3.8. Classification Model

In classification model, it verifies whether the interpersonal influence (i.e., network attributes) can improve prediction accuracy, which is based on statistical or machine learning methods. It devise three types of classification models. The first (CM1), it focuses exclusively on the customs attributes, the second (CM2), it focuses exclusively on the network attributes, and the third (CM3), it focuses on the combination of customs and network attributes. Three acquainted methods are assent for each model, including logistic regression (LR), decision tree (DT) and neural network (NN) methods.

4. Conclusion

YouTube spam campaigns typically involve a number of spam bot user accounts controlled by a

single spammer targeting popular videos with similar comments overtime. It shown that dynamic network analysis methods are effective for identifying the recurring nature of different spam campaign strategies, along with the associated user accounts. People are said to bond with people alike (so called homophile). This paper investigates about the personality traits of the Big-Five, NFC and Sociability was associated with socializing and information exchange in the online environment of SNS. The results divulge differential relationships between behaviors on Facebook and Twitter and show personality differences between those have a preference for Facebook or Twitter, suggesting that different people use the same sites for different purposes.

Reference

- [1] Allan, Jr., E. G.; Turkett, Jr., W.2009. Using network motifs to identify application protocols. In Proceedings of the 28th IEEE Conference on Global Telecommunications, GLOBECOM'09, 4266-4272. Piscataway, NJ, USA: IEEE Press.
- [2] Becchetti, L.; Boldi, P.; Castillo, C.; and Gionis, A. 2008. Efficient semi-streaming algorithms for local triangle counting in massive graphs. In Proceedings of the 14th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, KDD '08, 16-24. New York, NY, USA: ACM.
- [3] Benevenuto, F.; Durate, F.; Rodrigues, T.; Almeida, V.A.; Almeida, J.M.; and Ross, K.W. 2008a. Understanding Video Interaction in YouTube. In Proceedings of the 16th ACM International Conference on Multimedia, MM '08, 761-764. New York, NY, USA: ACM.
- [4] Benevenuto, F.; Rodrigues, T.; Almeida, V.; Almeida, J.; Zhang, C.; and Ross, K.2008b. Identifying video spammers in online social networks. In Proceedings of the 4th International Workshop on Adversarial Information Retrieval on the Web, AIRWEB '08, 45-52. New York, NY, USA: ACM.
- [5] Benevenuto, F.; Magno, G.; Rodrigues, T.; and Almeida, V.2010. Detecting Spammers on Twitter. In Proceedings of the 7th Annual Collaboration, Electronic Messaging, Anti-Abuse and Spam Conference (CEAS).
- [6] Boykin, P., and Roychowdhury, V. 2005. Leveraging social networks to fight spam. *Computer* 38(4):61 – 68.
- [7] Cheng, X.; Dale, C.; and Liu, J. 2008. Statistics and Social Network of YouTube Videos. In The 16th International Workshop on Quality of Service (IWQoS '08), 229–238.
- [8] Chhabra, S.; Aggarwal, A.; Benevenuto, F.; and Kumaraguru, P. 2011. Phi.sh/Social: The phishing landscape through short urls. In Proceedings of the 8th Annual Collaboration, Electronic Messaging, Anti-Abuse and Spam Conference, CEAS '11, 92–101. New York, NY, USA: ACM.
- [9] Donath, J., & boyd, d. (2004). Public displays of connection. *BT Technology Journal*, 22, 71-82 (October).
- [10] Feick, L, F., & Price L, L (1987). The market maven: A diffuser of marketplace information. *Journal of marketing*, 51, 83-97.
- [11] Fogg, B, J & Tseng, H (1999). The elements of computer credibility. In Proceedings of CHI'99 human factors and computing systems (pp 80-87).
- [12] Fogg, B. J., Marshall, J., Larakai, O., Osipovich, A., Varma, C., Fang, N., Paul, J.,
- [13] Rangnakar, A., Shon J, Swani P, & Trienem. M (2001). What makes Web sites credible? A report on a large quantitative study. In Proceedings of CHI'01, human factors in computing systems (pp. 61-68).
- [14] Gladwell M (2000). The tipping point: How little thing can make a big difference. New York, NY: Little, Brown, and Co.
- [15] Grossman, L. (June 17, 2009). Iran protests: Twitter, the medium of the movement. *Time* <[http://www.time.com/time/world/article/08599 1 905125 00 html](http://www.time.com/time/world/article/0,8599,1905125,00.html) > Retrieved 25, 10, 09.
- [16] Haas, C., & Wearden S, T. (2003). E-credibility: Building common ground in Web environments. *L1 Educational Studies in Language and Literature*, 3, 169-184.
- [17] Heath, R, L., & Gay C, D (1997). Risk communication: Involvement, uncertainty, and control's effect on information scanning and monitoring by expert stakeholders in SARA Title III. *Management Communication Quarterly*, 10, 342-372.
- [18] Heath, R., L, LIAO, s., & Douglas. W (1995). Effects of perceived economic harms and benefits on issue involvement, information use and action: A study in risk communication. *Journal of Public Relations Research*, 7, 89-109.
- [19] Hoolan, J., & Stornetta, S. (1992). Beyondbeing there. In P. Bauersfeld, J, Bennett, & G Lynch (Eds.), *CHI '92 conference proceedings: ACM conference on human factors in computing systems* (pp. 119-125). New York: Association for

- Computing Machinery, Johnson T, J., & Kaye. B. K (2002). Webelivability: A path model examining how convenience and reliance predict online credibility. *Journalism & Mass Communication Quarterly*, 79, 619-642.
- [20] Levinson, P. (2009). *New new media*. Boston, MA: Allyn and Bacon.
- [21] McCroskey J. C., & Teven, J. J. (1999) Goodwill: A reexamination of the construct and its measurement. *Communication Monographs*, 66, 90-103.
- [22] Metzger, M. J., Flanagin. A., J. Evel. K, Lemus. D. R & McCann, R. M. (2003). Credibility in the 21st century: Integrating perspective on source, message, and media credibility in the contemporary media environment. In P. Kalbfleisch (Ed), *Communication yearbook27* (pp 293-335).
- [23] Manwah, NJ: Lawrence Erlbaum.
- [24] Metzger, M, J Flanagin. A. J & Medders R. B (2010). Social and heuristic approaches to credibility evaluation online. *Journal of Communication*, 60, 413-439.
- [25] March, A .W. (1971). Public concern for environmental pollution. *Public Opinion Quarterly*, 35, 100-106.
- [26] O'Keefe. D. J (2002). *Persuasion: Theory & research* (2nd ed). Thousand Oaks, CA: Sage.
- [27] O'Reilly, T., & Battelle. J (2009). *Web squared: Web 2.0 Five years on* <http://assets.en.oreilly.com/1/event/28/web2009_websquared-whitepaper.pdf> Retrieved 01.02.10.
- [28] Palser, B. (2009). Hitting the tweet spot. *American Journalism Review*. 31. 54.
- [29] Pepitone, J. (March 10, 2010). Twitter users not so social after all. *CNNMoney.com*.