

The Influence of Social Media: Twitter Usage Pattern during the 2014 Super Bowl Game

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Abstract

In recent years, with the increasing popularity of diverse online social network sites, such as Facebook, Twitter, Blogger, YouTube, LinkedIn, and MySpace, a massive amount of data has become available. Applying data mining techniques to social media can yield interesting perspectives to understanding individual and human behavior, detecting hot issues and topics, or discovering a group and community. This study aims to address the question of how people use Twitter and to assess the power of Twitter in terms of creating consumer interest in commercials based on an analysis of Twitter messages about various Super Bowl ads. Instead of relying on the audience's responses, this study adopts a hybrid approach, combining a data-mining approach to collect, filter and analyze a massive amount of tweets with manual content analysis.

Keywords: *social networks; twitter; data-mining; super bowl*

1. Introduction

In recent years, online social network sites, such as Facebook, Twitter, Blogger, LinkedIn, and MySpace, have changed the way people communicate each other. People share information, report news, express opinions and update their real-time status on the online social network sites. With the increasing popularity of the online social network sites, a huge amount of data is being generated from them in real time. Analyzing the data in social media can yield interesting perspectives to understanding individual and human behavior, detecting hot topics, and identifying influential people, or discovering a group or community [2, 3]. However, it is difficult to discover useful information from social data without automated information processing because of three main characteristics of social media data sets: the data is large, noisy, and dynamic. In order to overcome these challenges of social media, data-mining techniques can be used by data seekers to discover a diversity of perspectives that would otherwise not be possible. Data mining techniques are widely used to handle large sets of data and to discover new knowledge and useful information in a data set that is not readily obtainable and not always easily detectable. Applying data mining techniques to online social media benefits many groups, such as market researchers, psychologists, sociologists, businesses, and politicians, fascinating insights into human behavior, marketing, business or political views.

Among modern social media sites, particularly, Twitter has become one of the fastest growing social media sites since its launch. Developed in 2006, Twitter is an online social network site based on text message of up to 140 characters, which generates 340 million tweets per day as of 2013. According to the Pew Research Center's Internet & American

Life Project, 15% of online adults in the U.S. used Twitter in 2012. It also provides Application Programming Interface (API) to allow researchers and data analyzers to access a variety of data in Twitter. Numerous researchers have paid attention on gathering and analyzing the data to detect issues, such as detecting earthquakes [4] and influenza using Twitter or recommending tags to users [1]. However, it is impossible to collect enough data to apply data analysis techniques and filter unnecessary data, such as spam messages without an automated data collecting and filtering system. In order to overcome these data access problems, some of researchers shed light on collecting and storing data from Twitter [7-10]. This allows us, as well as other researchers, to build their own Twitter database.

The Super Bowl game has become a major advertising venue due to its ability to draw viewers and create buzz about commercials. The 2014 Super Bowl game is marked as the convergence of social media and television broadcast that was able to draw and hold viewers' interests. According to Nielsen measures, the 2014 Super Bowl game earned an average overnight household of 46.4, meaning that 46.3% of households with TVs were watching this program. As well as 25.3 million tweets were posted during the game by 5.6 million unique authors. This suggests that the value of social media as a marketing tool has further intensified as we enjoy more technology in our daily lives.

The main objective of this study is to find the relationship between Twitter and Super Bowl ads by analyzing data on Twitter. In section 3, therefore, this study will provide more in-depth insights about Twitter use and guide the advertising and marketing world to further facilitate brand engagement and relationships with their target audiences instead of providing one-piece meal data (*e.g.*, the number of tweets for each commercial). The case study aims to address the question of how people use Twitter and to assess the power of Twitter in creating consumer interest in brands and commercials.

The remainder of this paper is constructed as follows: In Section 2, the related work done so far is summarized. In Section 3, presents result of data collection and analysis for Super Bowl 2014. The last part, Section 4, concludes the work by summarizing this paper and suggesting future research directions.

2. Literature Review

In this section, we introduce the key concepts, terminology, and methodologies that are used in this research.

2.1. Uses and Gratification

As an influential theory in media research, the "Uses and Gratification" (U&G) perspective assumes that different people can use the same medium for different purposes. The theory holds that multiple media compete for users' attention, and audiences select the medium that meets their needs, such as the desire for information, emotional connection, and status [11, 12]. Accordingly, the concept of an active audience is at the core of this theory by assuming that the audience's communication behavior is goal-directed and purposeful in that people choose certain media based on their needs, wants, or expectations. McQuail summarized four common reasons and gratifications for media use: information, personal identity, integration and social interaction, and entertainment [13]. As opposed to effect-oriented research traditions that take the view of the communicator, U&G examines media effects from the individual user's perspective by focusing on how and why people use media, not on what the media do to people. The U&G approach will guide this study as the theoretical framework for understanding consumers' Twitter usage.

As one of the "old" theories in media research, U&G has been recently revitalized for studying technologies and media consumption behavior. They include research on the web [14], on blogging [15, 16], and social-networking sites, such as Facebook and Twitter [17, 18]. Researchers found that interactivity, recreation, entertainment, diversion, information

involvement, connectedness, and personal relevance are major motivations for browsing or using the Internet and social media platforms. Particularly, Stafford, Stafford & Schkade have identified that users seek three types of gratifications: content gratification (the content carried by the medium, whether it's entertainment or information), process gratification (the experience of the media usage itself, such as Internet surfing or experiencing a new technology), and social gratification (the interpersonal communication and social networking opportunities on the Internet) [19]. Shao further argues that individuals use online media at three different stages/levels for their own needs: (1) consuming content for information, entertainment, and mood management needs; (2) participating through interacting with the content, as well as with other users, for social connections; and (3) producing their own content for self-expression and self-actualization. In other words, online users have various degrees of engagement with social media that range from simple and passive (e.g., simple consumption by reading) to active engagement (e.g., producing and posting contents) [20].

2.2. Analysis of the Super Bowl Advertising and Event

Lee's research aimed to address how people use Twitter during the Super Bowl game and to assess the power of Twitter in terms of creating consumer interests in brands and commercials by analyzing the tweets about Super Bowl 2012, particularly car-related commercials, and the relationships of users who are interested in those advertised brands [21]. Instead of relying on the audience's response (e.g., survey or experiment) or traditional content analysis, this study used a data-mining approach and tools that are widely used in the computer science field as well. Furthermore, the study has some implications for marketers and politicians. By analyzing Twitter usage patterns, the awareness level or even the preference level of newly released products among specific demographic groups could be assessed.

The 2013 Super Bowl game would provide good case material to examine multimedia experiences between television and Twitter. The 2013 Super Bowl XLVII was considered one of the most exciting games, yielding a final score of 34-31 with 7 touchdowns, 6 field goals, and one safety. Particularly, 2013 Super Bowl game kept the audience's attention to the last minute, making the time between 10:30 pm and 10:45 pm the most watched part of the game. In addition, the game yielded several NFL records, such as the touchdown by a 109-yard kick-return (4th touchdown), a touchdown by a quarterback, and a 34-minute blackout due to a power outage, marked the dynamic nature of the game. The analysis revealed that more exciting scoring moments generated a larger amount of tweets. For instance, seven-point touchdowns generated more tweets than three-point field goals. The study shows Tweets related to specific events or moments were exchanged almost instantly as those events occurred. Besides major scoring moments, Twitter usage also increased around interesting events or activities as well. This suggests a similar connection between the nature of the game and Twitter usage. One of major contributions of this study is that this study is based on all possible tweets about the Super Bowl game from individual users who used Twitter to engage with the game, not just Twitter feeds of high profile organizations, such as NFL [22].

3. Case Study

This exploratory study aims to address the question of how people use Twitter and to assess the power of Twitter in terms of creating consumer interest in brands and commercials.

3.1. Research Questions

This case study regards the Super Bowl game as innovation and considers that the dynamic nature of the game and contexts of the game might influence the process of communications in social media. As an exploratory study, this study tries to answer the following research questions:

- Research Question 1 (RQ 1): How does the overall number of tweets differ between a game day and non-game day?
- Research Question 2 (RQ 2): What major topics in commercial-related tweets were exchanged during the 2014 Super Bowl game?

3.2. Data Collection

Without automated information processing, it is difficult to discover useful information from social data because of three main characteristics of social media data sets: the data are large, noisy, and dynamic. In order to overcome these data access problems, we developed the Twitter Data Collecting Tool in a previous research [7]. To collect Twitter data about Super Bowl 2014, the Twitter Data Collecting Tool is selected and used in this research.

The Super Bowl 2014 was held on Sunday, Feb. 2, 2014. To gather the tweet data about the Super Bowl 2014, we decided to gather data one week before and one week after the Super Bowl game. This is necessary to track the trends of messages about Super Bowl advertising since marketers released their commercials to social media sites (*e.g.*, YouTube) prior to the actual broadcast of the game, hoping to create more buzz and interest from consumers.

As a data collection result, 1,092,537 tweets are collected through Twitter API, and 939 out of 1,092,537 tweets are commercial-related tweets. Table 1 shows the frequencies of Tweets about commercial-related and non-commercial-related Tweets by date.

Table 1. Frequencies of Tweets About Commercial-related and Non-Commercial-related Tweets by Date

Date	overall (n = 1092537)		commercial-related (n = 939)	
	Freq.	%	Freq.	%
01/26/2014	67,074	6.14	6	0.64
01/27/2014	62,778	5.75	25	2.66
01/28/2014	67,316	6.16	17	1.81
01/29/2014	66,784	6.11	228	24.28
01/30/2014	66,221	6.06	35	3.73
01/31/2014	64,192	5.88	32	3.41
02/01/2014	65,807	6.02	17	1.81
02/02/2014	81,329	7.44	313	33.33
02/03/2014	71,137	6.51	74	7.88
02/04/2014	70,369	6.44	33	3.51
02/05/2014	79,532	7.28	25	2.66
02/06/2014	79,946	7.32	11	1.17
02/07/2014	76,163	6.97	7	0.75
02/08/2014	81,601	7.47	27	2.88
02/09/2014	92,288	8.45	89	9.48
Total	1,092,537	100	939	100

3.3. Experimental Results

RQ 1 asked how the overall twitter usage differed between a game day and non-game days. Collected twitter data is visualized again as shown in Figure. 1. The number of tweets that are related to commercials at the Super Bowl is higher than other days, which means the Super Bowl commercials created buzz on Twitter, and many Twitter users were interested in them.

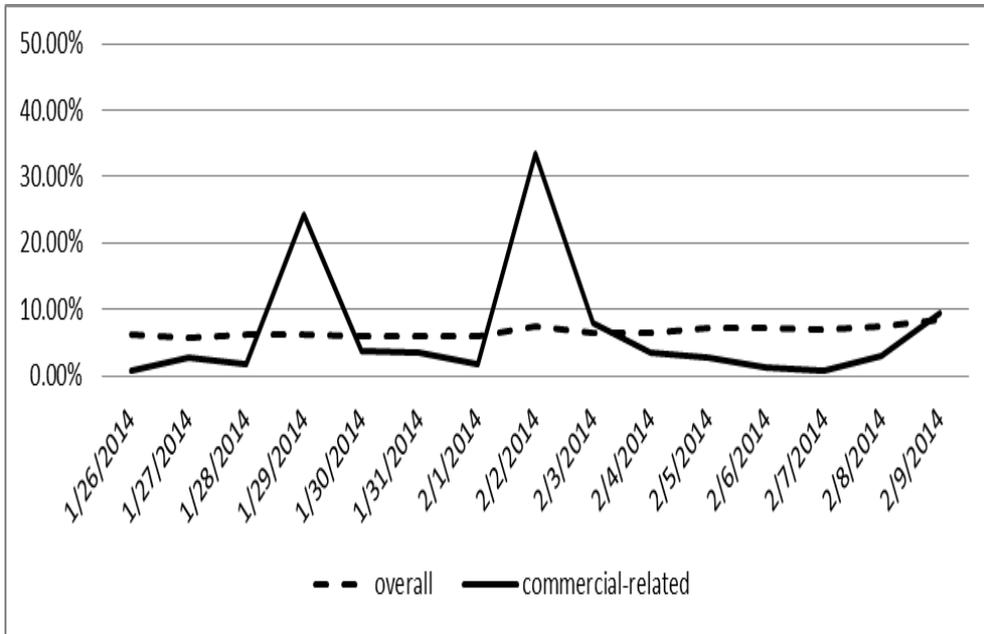


Figure 1. The Increased Number of Overall and Commercial-related Tweets during the Super Bowl 2014 Period

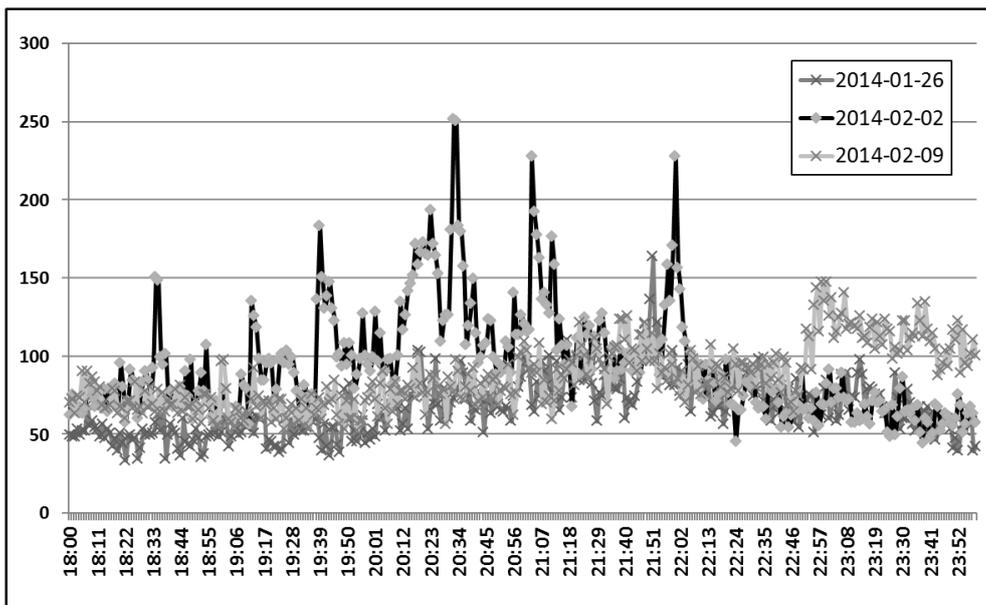


Figure 2. The Pattern of All Tweets Exchanged on Three Sundays

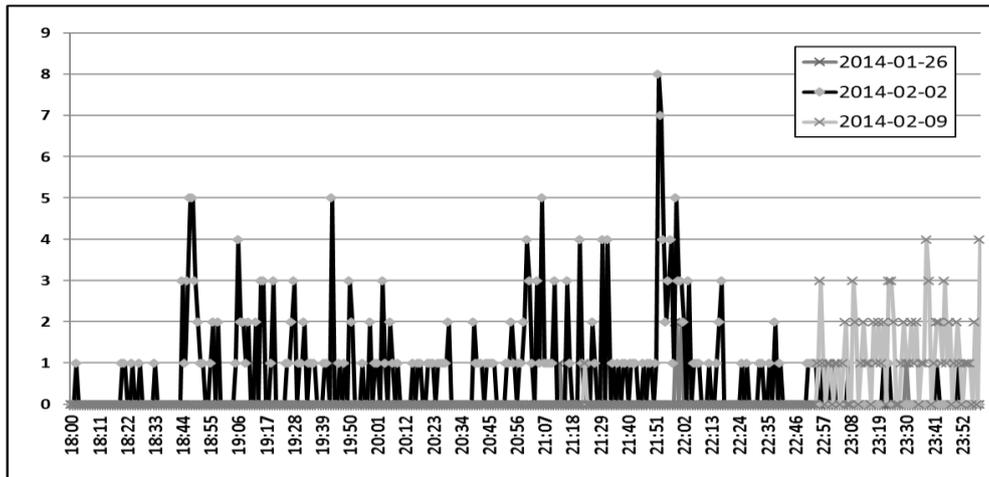


Figure 3. Number of Commercials-related Tweets Exchanged on Three Sundays

When comparing the number of tweets from each Sunday, Feb. 2 generated a larger number of tweets than both other Sundays in terms of total number of tweets, as well as, Super Bowl commercials-related tweets. The total number of tweets for Feb. 2 was 81,329, while 67,074 on Jan. 26 and 92,288 on Feb. 9. As Table 1 shows, Super Bowl-commercial-related tweets accounted for 33.33% of total commercial-related tweets exchanged on Feb. 2, while they accounted for 0.64% and 9.48% on Jan. 26 and Feb. 9, respectively. This indicates that the overall tweet amount peaked on game day and the portion of Super Bowl-commercial-related tweets increased as well. Figure 2 and Figure 3 show the twitter usage trend by one minute span from 6:00 pm to 11:59 pm for each Sunday.

RQ 2 asked what major topics in commercial-related tweets were exchanged during the 2014 Super Bowl game. Specifically, number of commercial-related tweets is dramatically increased between 21:50 and 22:10 on the game day as shown in Figure 3. By looking at the contents of tweets posted during the Twitter activity incremental period, more than half of tweets mentioned the Budweiser’s commercial. As shown in Figure 4, 37 out of 49 tweets are about the Budweiser or it’s commercial. Table 2 shows sample tweets related to the Budweiser and it’s commercial. It implies that the users of Twitter post tweet about current active topics or events, as well as they tend to reflect their opinion on the subject.

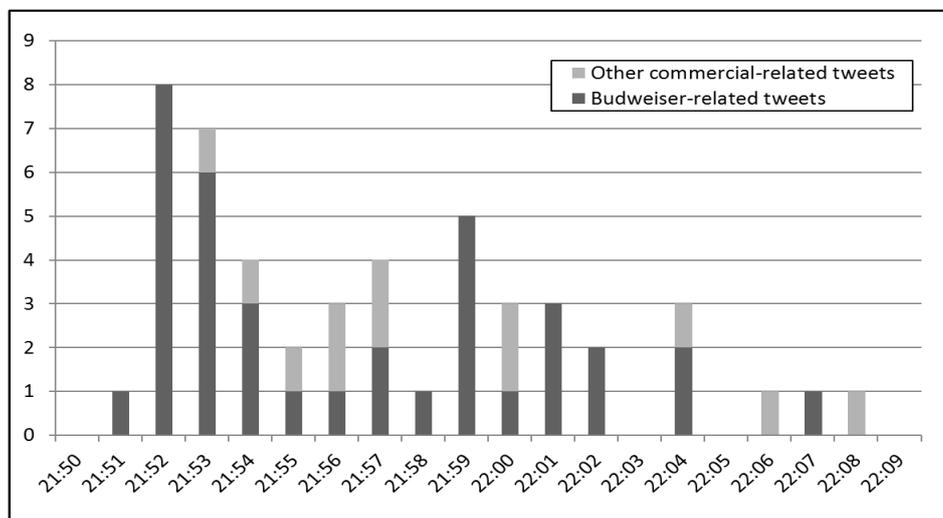


Figure 4. Two Types of Number of Commercials-related Tweets Posted between 21:50 and 22:10 on the Game Day

Table 2. Sample Tweets about Budweiser and it's Commercials

Contents of Tweet Message	Time Posted
Great commercial Budweiser. Cutest puppy #bestbuds	21:52:17
This Budweiser commercial with the Dog and Horse is too funny lol	21:52:19
This is the commercial I've been waiting for #Budweiser	21:52:31
Best commercial by far #Budweiser	21:52:55
That Budweiser commercial was so cute??	21:53:26
Awww loved the @Budweiser commercial with the puppy and horse!!!! #bestbuds	21:53:48
Budweiser Super Bowl XLVIII Commercial -- ""Puppy Love"" http://t.co/mTqjimCNbn	21:54:44
Budweiser just had a Awesome commercial!	21:54:44
I just cried while watching that Budweiser commercial with the puppy and the horsy. #budweiser	21:56:05
RT @RommyRome_: That Budweiser with the dog was the best commercial yet ..	21:58:35

4. Conclusions

The purpose of this study was to examine Twitter usage during a sports broadcasting and to provide an understanding of the connection between a broadcast and new social media. Instead of relying on the audience's response, this study adopted a data-mining approach and utilized massive existing Twitter data.

When comparing the fifteen dates, the Super Bowl game day had a larger portion of Super Bowl-related tweets (33.33%) than the other days, respectively. This indicates that the overall number of Super Bowl-related tweets peaked on the game day. Even if this study didn't analyze specific motivations behinds such Twitter usage, we speculate that as the audience got excited about the game, they became more engaged and exchanged information and opinions on Twitter. Additionally, by looking at the contents of tweets posted during the Twitter activity incremental period, more than half of tweets mentioned one specific advertisement aired at that time, and the contents of tweets contain topics about the commercial and authors' opinions. This finding shows that the users of Twitter post tweet about current active topics or events, as well as they tend to reflect their opinion on the subject.

Applying data-mining techniques to the social network data has so much potential. For example, applying natural language processing techniques or text mining to the Twitter data can be used to analyze or detect social opinions [5, 6]. Future studies could consider limitations to enhance a better understanding of Twitter and Twitter usage. One suggestion is to compare tweets and retweets in terms of their contents, motivations, and user relationships. One of the unique characteristics of Twitter as a social media platform is the capability of retweeting. The analysis of differences in tweets and retweets might allow us to explore underlying motivations for retweets. This would further provide implications for various organizations and business communities to develop effective communication through Twitter. In addition, we can apply this analysis to other major events and Twitter usage during their broadcast. For instance, the broadcast of major events such as the Academy Awards ceremony (The Oscars), the President Inauguration Ceremony, natural disasters, or serious crimes would be good study areas.

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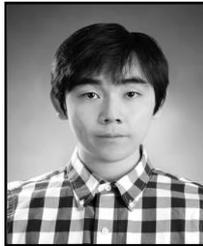
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