The Role of Smartphones in Mass Participation TV

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ABSTRACT
From the early days of television (TV) when viewers sat around one TV usually in their living room, it has always been considered a shared experience. Fast forward to the present day and this same shared experience is still key but viewers no longer have to be in the same room, and we are seeing the dawn of mass participation TV. Whilst many people predicted the demise of live TV viewing with the adoption of Personal Video Recorders (PVRs) it has not materialised. Shows that are watched live are often ones that have a greater social buzz. These shows regularly have viewers discussing what they are watching and what's happening in real-time. This paper focuses on the influence smartphones have on TV viewing, how people are interacting with TV, and considering approaches for extracting sentiment from this discussion to determine if people are enjoying what they are watching.

Categories and Subject Descriptors
H.5.1 Multimedia Information Systems

General Terms
Human Factors

Keywords
Mobile, second screen, interactive, television, Twitter, shared experience, mass participation, smartphone

1. INTRODUCTION
Dating back to the early 1950s, watching TV has always been a social experience, although limited to those in the same room (usually the living room). In 2012 the social experience of watching TV has potentially expanded to include anyone with a data connection, taking it beyond your living room into many other viewing areas.

In the early 1950s there weren't many channels to choose from as a viewer, and in some cases only one. TV shows that were being commissioned only had to be better than their counterparts being broadcast at the same time when competing for viewing figures. It wasn't until the 1960s that TV really took off worldwide, with the introduction of more channels, shows and greater emphasis was on ways to introduce TV to the mainstream. With the explosion of mainstream TV shows, TV guide producers were extending the number of pages to include extra information and advertise TV in a way that hadn't been done before. During this time people primarily discovered programmes through word of mouth (water cooler moments) and through the traditional TV guides. Now we have 100s of channels, 1000s of TV programmes. Broadcasters have to invest in new methods of engagement to attract viewers. Many are now engaging with the public through social media. We have seen the dramatic rise of social media services such as Facebook, Twitter and other services that link into existing social networks, being utilised to create forums for debate around a range of topics including TV shows. While Facebook is being used for its functionality of branding and approval systems - Twitter, with its ability to share topics through '*hashtags*' and '*re-tweets*' with anyone, TV audiences are now using such methods to communicate in almost real-time.

Furthermore PVR ownership has had a profound impact on the when/why/how we consume our entertainment. We discover programmes very differently these days, whether from social recommendations (water cool moments, an online advertisement or social media), browsing through the interactive TV guides (from set top boxes to mobile applications), to seeing a clip on TV of an up and coming programme, that invites us to schedule the recording/notification of the programme or the entire series (usually from viewer interaction by pressing the red button, which sets up the PVR to record or notify when the programme is broadcasted). The majority of people that use a PVR to time shift their entertainment, usually catch up later the same day (so they still have the ability to join in the water cooler moment at work the next day), some prefer to watch 10 minutes behind time to skip forward past the commercials and usually those programmes that aren't watched the same day are normally ones that don't have the requirement to be consumed right away, whether its from lack of interest to little social buzz, these are usually consumed later in the week [2, 5, 6].

Since the introduction of such time-shifting devices and their ever growing popularity within our households, the current trends seen in what shows are more likely to be time shifted are usually scripted for genres such as sci-fi, sitcoms and dramas, whereas we still see the need to watch live programmes such as sporting events and others alike, generally because the live audience wants to be part of something bigger, similar to a crowds participation in the stadium of a football match.

2. BACKGROUND TO STUDY
This constant emerging desire to converse, share and interact around TV shows isn't going away, we are seeing more shows attempt to integrate social media into the shows plot, narrative and format. Many social network platforms for instance Twitter allows social participation and discovery with the popularity of trending topics. Watching live broadcasted TV will always create a greater buzz than pre-recorded shows. It is these types of shows that the real-time advantages of social media (in particular Twitter) works well with, as these events are still generally viewed in real-time rather than on time-shifted devices [4, 5, 6].

More recently Twitter introduced new ways to discover and engage with current trending topics, in particular on mobile devices, through its "Twitter Discovery" service. Twitter is seeing how people interact with information differently from desktop to mobile devices. One way in which Twitter is improving its mobile experience is through ways in which people connect (follow) and interact. This is achieved by displaying prepopulate tweet

windows for *hashtags* and *retweets.* Twitter has also focussed on the discovery of information, by displaying real-time trends with hash information and an external article (that the trend refers to). Studies from Twitter [7] suggest that when broadcasters combine the real-time elements of Twitter, there is a direct and immediate increase of viewer engagement, anywhere from two to ten times more the amount of *mentions, follows* and *hashtags* used whilst the show airs. This is highlighted when you consider the 2010 Grammy Awards, which saw a 35% increase on viewing figures from 2009, one of the reasons for this increase, is suggested to be the integration of social media in the 2010 event.

It is becoming apparent that social media is having a significant impact on what and how we watch TV. Studies in social TV trends for the UK show that 17% of viewers will watch a TV programme based on influences from social media, this number rising to 39% when considering the main demographic (18-24 year olds) that are likely to adopt such technology[1]. The insights already seen in social TV has provided Channel 4 (UK free to view channel) the opportunity to launch a new social media based catch up TV channel. The channel aims to rebroadcast programmes over the last seven days based around their social buzz [2]. In the past, TV shows rating and viewing figure were obtained from television measurement organisations such as Neilson (US) and Barb (UK) using electronic metering technologies and census data. Recent studies by Neilson show a direct connection between traditional TV rating and social buzz.

Like television measurement organisations, TV shows can take advantage of social media buzz to predict and analyse viewer engagement through gaining sentiment from users interactions. Although the ability to derive sentiment analysis from Facebook statuses and Tweets is possible, its accuracy is open for debate, for example; studies into average lengths of tweets by Isaac Hepworth, indicated that users who tweet from the 'desktop' web client are more likely to write more content and use the full 140 characters, whereas those who tweet on their mobile client average around 30 characters per tweets. Therefore obtaining sentiment analysis in particular tweets from mobile devices is inaccurate [1, 3]. Twitter's API does provide a simple approach to this by using Emoticons (happy/sad faces depicted by punctuations i.e. ☺ ☹), however this method for detecting emotion in *tweets* is limited, as the majority of *tweets* composed do not contain such, this is confirmed in the *tweets* captured in this study.

In view of these limitations and to gain better understanding of how people use social media whilst watching TV a system was developed to record and analyse in real-time all the tweets associated with popular TV shows. The TV shows that we analysed included a range of show genres including panel shows (X-Factor, Strictly Come Dancing, etc.), reality shows (The Apprentice), award ceremonies (The Oscars and The Grammys), sporting events (Super Bowl 2010 & 2011, World Cup 2010, Wimbledon 2011, etc.), live news events (The Royal Wedding), scripted dramas (Homeland) and also the introduction of a new channel (Sky Sports F1).

For the purpose of this paper we will focus on the 2012 Super Bowl. The Super Bowl more than doubled its previous years social buzz, reaching a record breaking 12,200,000 *tweets* during broadcast. With this need to discuss, search for contextual information, engage and gain a better experience, we are seeing an enormous increase in traffic toward "social TV". When we consider a live sporting event such as the Super Bowl and compare it to something more globally watched like the Grammys, there is only a 6% difference in the number of *tweets* recorded at the time of broadcast. Whereas dedicated second screen apps for both events saw the Super Bowl doubling the amount of unique users the Grammy app had, this is more likely due to the fact that sports fans want more real-time statistics and in play tactics, formations and player ratings.

3. THE STUDY

To enable us to perform this study on each show we needed to capture and analyse people's public *tweet* data. The process involved capturing tweets from twitter.com, using its Streaming API. The system can stream all tweets that contain a certain *hashtag* in its raw form. The *tweet* data is then parsed, split and sorted into different tables (tweet data, mentions, tags, urls and users). This allows a subsequent deeper analysis of the *tweets* content, including its source (to determine if the tweet was sent from a mobile device), the tags used and who tweeted it.

For the purpose of this paper we will highlight the findings of a live sporting event (Super Bowl 2012), for which the system collected the *tweet* data relating to the hashtag #SuperBowl and #SuperBowl46 in real-time. The tweet data presented in this paper was captured on Sunday, February 5, 2012 at 6:30 pm EST till 11:00pm.

The *tweet* source data was analysed and grouped by platform in order to determine if the *tweet* originated from a mobile device. During the collection period 1,802 different clients were used to compose a *tweet*. In order to establish the platform used to *tweet,* the data had to be reclassified. This was achieved by analysing each client and arranging into either mobile, non mobile or mixed. Due to limitations of Twitters metadata, which details the agent used rather than the exact client, a mixed category was adopted for clients that are on multiple platforms. For example, 'TweetDeck', as the agent has many versions available the *tweet* could have originated from either desktop, mobile, browser app or web, therefore it is classified as *MIXED.*

Figure 1 shows the most popular clients used to *tweet* during the 4.5-hour period. The majority of *tweets* were sent from Twitter's dedicated services such as their website, iPhone, Android and BlackBerry branded clients. These findings coincide with similar client usage studies. Sysomos [//sysomos.com], found that 58% of *tweets* originated from official Twitter clients, web being the most popular with 35.4%, iPhone, BlackBerry, m.twitter and Android following behind. In order to fully understand how people interact whilst watching TV, we first needed to analyse the average amount of characters being composed over all platforms.

[1] Dissfusion.com
http://www.diffusionpr.com

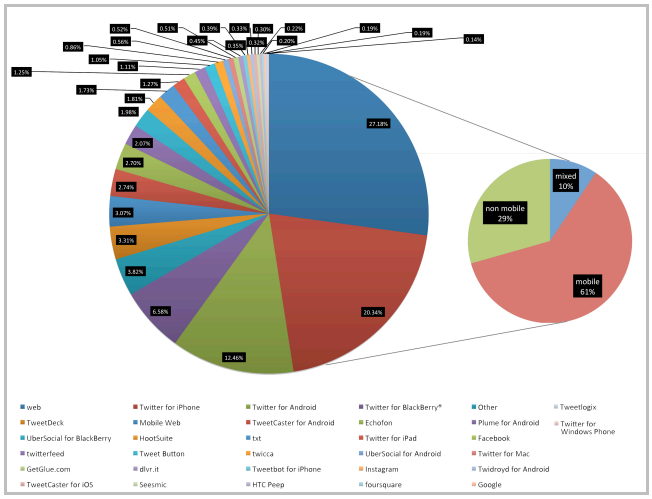

Figure 1. Tweet overview sources breakdown and platform classification, Super Bowl 05.02.2012 18:30 - 23:00

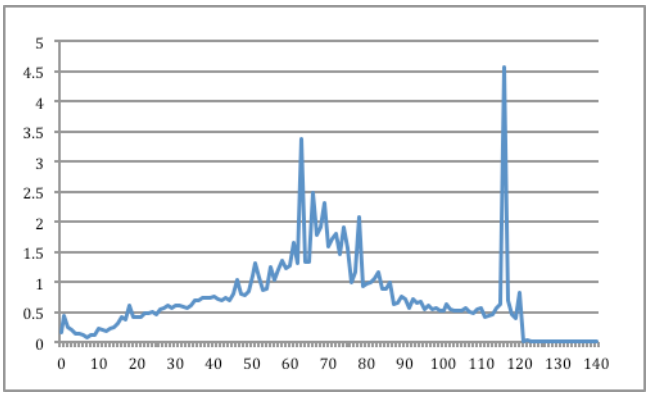

Figure 2. Percentage of characters per tweet for all sources, with no RT and URL removed, Super Bowl 05.02.2012 18:30 - 23:00

In the first instance it became apparent the majority of *tweets* 6.6% used the full limit of 140 characters. However when analysing *tweets* for sentiment its becomes obvious that the majority of *tweets* with 140 characters are filled up with URL's, *hashtags* and *RT*. When attempting to determine sentiment from *tweets*, we needed to establish how many characters are used in the majority of *tweets*. Figure 2 demonstrates the percentage of all tweets that haven't been *retweeted* and any URL removed. This time the trends have changed, it is apparent there is a shift in the amount of characters being used, the majority of these tweet contain anywhere between 60 – 120 characters. Also it is noticeable the number of 140 character *tweets* has decreased.

The results shown in Figure 2 do not consider *tweets* solely from a mobile device. Figure 3 demonstrates *tweet* with the URL removed and that weren't *retweeted* from the most popular mobile devices. It is clear from looking at Figure 2 and 3, that the percentage of characters differs dramatically depending on platform. The most popular mobile clients used during the Super Bowl 2012 were Twitter for; iPhone, iPad, Android, BlackBerry and Mobile Web, SMS, TweetCaster, Echofon, Plume for Android and UberSocial for; Android and BlackBerry. As you can see from Figure 3 the bulk of *tweets* composed were at the lower end of the spectrum, around 10 – 80 characters. *Tweets* that were less than 10 characters were statuses that referred to the URL, which was removed. The typing constraints on a mobile device and the nature of the show in question (people want to share their opinion, as its happening) have an impact on differences between mobile and desktop platforms. This is one issue when attempting to extract sentiment from tweets where the majority are sent from mobile devices (61% of Super Bowl related tweets originating from a mobile device, as shown in Figure 1), and this isn't decreasing any time soon, especially around TV shows with second screen experiences.

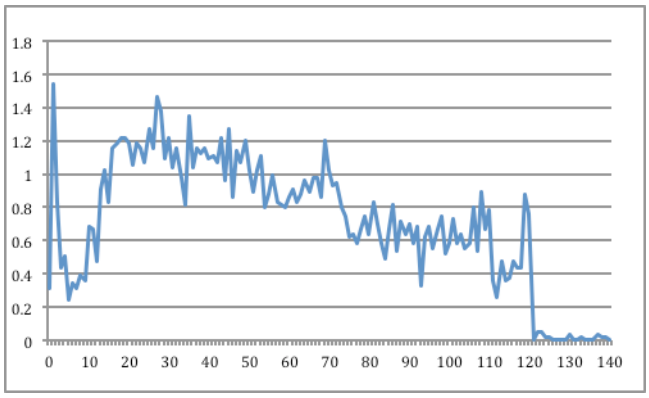

Figure 3. Percentage of characters per tweet for the most popular mobile clients that haven't been retweeted and had the URL removed, Super Bowl 05.02.2012 18:30 - 23:00

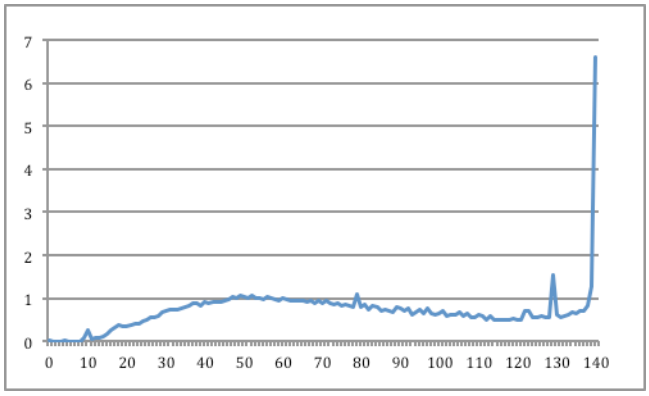

Figure 4. Percentage of characters per tweet for the most popular mobile clients, Super Bowl 05.02.2012 18:30 - 23:00

As the majority of *tweets* that contain the full 140 characters mainly contain URL's, *RT's* and *hashtags* it makes extracting sentiment from small pieces of information inaccurate (Figures 3 and 4). Nevertheless we are seeing TV shows like 'Homeland' involve viewers using *Twitter's hashtag* mechanism to gauge viewer consensus, by engaging with its audience to see if they are following the plot (this enables the show to fully understand if they deceiving viewers with their story). The show is achieving this by prompting the question "friend" or "foe" (#friendorfoe) at the end of each episode. This gives a clear and concise (Boolean like) understanding whether the viewers are following the story, therefore viewers that don't particularly watch or enjoy the show are unlikely to tweet the *hashtag*. Similarly on Facebook: 'Likes' used to gain sentiment with its Boolean value, users can 'Like' brands, shows, posts etc.

Otherwise in order to fully analyse the emotion over small bursts of information, we first need to study the users behaviour over a period of time, to gain a better understand of the language they use this would provide an improved baseline into determining sentiment from short pieces of information. The problems with

this approach would the time it takes to perform such operation and the amount of data it would require.

4. THE FUTURE OF SECOND SCREENS BEYOND SIMPLE ANALYTICS

Already some shows are using second screens to get real-time data to integrate into the show. This is seen in Dancing on Ice 2012, where viewers can score the skaters on their performances, share their scores and opinions with their social network friends, rate the judges and catch-up on achieved video highlights. The applications data is integrated with the live show, as each judge scores the performances the presenters compare those scores from the judges with an average from the public consensus. Although the viewers' scores have no real impact on the actual scoreboard (who essentially is in the bottom two), this could soon be an integral part to shows alike where viewers are the n^{th} judge. Similarly seen on Homeland, Britain's Got Talent 2012 audition phase, are flashing *hashtags* for each act when the performer takes to the stage. This is a good way of engaging the audience with each act on a show like this, similarly to the way in which, where a shows format involves phone votes and SMS to determine a leaderboard.

There are many different types of second screen applications. Some are built for a specific show; others are for a more general watching of TV. Each year we are seeing a rise of specific second screen applications, typically for shows mentioned in this paper (panel and reality shows and sporting events). Zeebox [//zeebox.com] has taken a slightly different approach to the second screen market. Zeebox offers a white label second screen application that allows different TV shows to build upon the platform with specific show related functionalities.

5. CONCLUSIONS

The traditional viewing environment, where friends and family sit around, the one TV in the living room to consume their entertainment, has considerably changed over time. No more so than today, where we are witnessing broadcasters invent new ways to watch TV, from smartphones to tablets, laptops to TVs. As the traditional TV medium is essentially a shared experience, simply overlaying personal *tweets* on screen isn't a shared experience. Essentially this would mean users would have to opt in to share their social streams with everyone else in the living room. Not to mention this would require the viewer splitting their attention away from the core element, whereas utilising the ubiquitous smartphone/tablet allows viewers to focus their attention at once place at a time.

With recent high profile launches and decreasing prices, we are seeing tablets replace laptops in the home because of their ease of use, fast boot up, size, convenience, lightweight and mobility. What is clear is the ways in which we interact with these devices differ from smartphones. The tablet is a device in which we are more likely to share with others (43% share with others), mainly within families, whereas a smartphone is considered a more personal interaction. The other main difference is how the two devices are interacted with. Tablet users often interact and hold the devices differently (A tablet is usually held horizontal to the ground thus sharing the experience, whereas a smartphone is a more closed off experience as these devices are held vertical). All of which constitutes different approaches when designing social TV experience applications.

The real opportunity for second screen applications are when they fully integrate the viewer into the plot or narrative of the show, therefore connecting the viewer into the format of the show. When incorporating a second screen application into a shows format the linearity of the programme needs to be core. It is the growth in social network consumption, broadband availability, and the on going sales of smartphones and tablets that is driving social TV.

Whilst this study included *tweets* from a variety of mediums the information obtained about the clients used to compose the *tweets* indicates over 60% are from mobile, which is consistent with the figures reported by Twitter. Furthermore as reported, widely in the media, smartphone manufacturers are shipping more devices year after year outselling PC units worldwide. Not to mentioned Apple's iPad outselling their Mac series for the first time (June 2011). This trend is likely to continue throughout the industry amongst other manufacturers, thus the amount of connected devices to Internet services through some form of mobile is likely to increase dramatically in the near future.

Overall this study highlights that mobile phones are already becoming the second screen for TV but not through broadcaster provision of personalised services, or service providers enabling them to act as a new form of remote, but rather by audiences themselves creating their own forums for inter-audience interaction. It is therefore important for broadcaster and producers to be able to better understand the nature of this interaction otherwise TV itself may become the second screen.

6. ACKNOWLEDGMENTS

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