Mapping Cyber-Collective Action among Female Muslim Bloggers for the *Women to Drive* Movement

Serpil Yuce, Nitin Agarwal, and Rolf T. Wigand

Department of Information Science, University of Arkansas at Little Rock, USA
{sxtokdemir,nxagarwal,rtwigand}@ualr.edu

Abstract. Social media platforms have been lauded for their democratizing potential. They serve as facilitating platforms for activists seeking to replace or alter authoritarian regimes and to promote freedom and democracy. However, regardless of the prominent role of Twitter, Facebook, and other social media platforms in various recently observed social movements, there is a scarcity of rigorous studies that go beyond mere descriptive tendencies and suggest theoretical underpinnings for the manifestations of cyber-collective actions. In this study, we propose a methodology to gain deeper insights into online collective action by analyzing how decentralized online individual actions transform into cyber-collective actions. The proposed model is experimentally analyzed on the data collected for the Saudi women campaigns on driving prohibition. The data consists of female Muslim bloggers' postings from 23 different countries during 2007 and 2012, including various events organized through the Internet (primarily via social media), such as the *Saudi Arabian Women* campaign of September 2007, *International Women's Day* of March 2008, and *Women to Drive* campaign of June 2011. As conceptualized, utilized and illustrated in the study, our novel methodological approach highlights several key contributions to the fundamental research on online collective action as well as computational studies on social media. The tools and methodologies proposed here enable the study of collective actions in broader settings, such as digital/hashtag activism for equitable human rights and citizen engagement for better governance.

Keywords: Online collective action, *Women to Drive*, female Muslim bloggers, social movements.

1   Introduction

Social media provides an easy-to-use and almost ubiquitous platform for Internet users to voice opinions, share thoughts, and participate in discussions. Using various forms of social media, individuals can report first-hand accounts of various events and even organize mass protests and other types of collective actions that eventually may transform into social movements. The emergence of cyber-collective movements has driven much attention and frequently made headlines in the news. The *Saudi Arabian Women* campaign for the right to drive (September 2007 – January 2008), *Wajeha al-Huwaider*'s campaign (2008), and *Manal al-Sharif*'s Facebook campaign named *Teach me how to drive so I can protect myself* (2011), also known as *Women2Drive*

campaign, are a few examples. However, very little research is devoted to deepen our understanding of this phenomenon, especially those happening in the female Muslim population in Saudi Arabia. Using the global female Muslim blogosphere as an epitome, the proposed research aims to understand the complexity of cyber-collective movements and methodologically track their formations.

Overall these studies support that the Internet can empower political movements in these countries since it provides a suitable infrastructure for expressing alternative views and mobilizing voices for bottom-up actions. We study the female Muslim blogosphere because: First, while research shows that three of four females online are active social media users [1], there is very little research attempting to understand social, cultural and political roles of female bloggers and collectivity among female social groups. Second, the domain epitomizes an important contrast deserving attention between socio-political systems where women are frequently denied freedom of expression and active political uses of social media by female Internet users. Female Muslim bloggers find the blogosphere as a digital recourse to exercise their freedom of speech if compared to their physical and repressively controlled spaces.

2   *Women to Drive* Movement

Saudi women face some of the most inequitable laws and practices when compared to international standards, including the prohibition of driving motorized vehicles. On November 6, 1990 47 Riyadh women staged a remarkable protest against this prohibition. Protesters were imprisoned for a day, had their passports confiscated and some of them even lost their jobs. After more than a decade, in September 2007, Wajeha al-Huwaider and Fawzia al-Uyyouni submitted a 1,100-signature petition to King Abdullah asking for women's freedom to drive. On *International Women's Day* in 2008, Wajeha al-Huwaider filmed her driving and posted the video on YouTube, which garnered international media attention. As a follow up to those actions, in 2011, a group of women, including Manal al-Sharif, started the Facebook campaign supporting women's driving rights in Saudi Arabia. The following months of the campaign, al-Huwaidar filmed al-Sharif driving a car and posted the video on YouTube and Facebook. The consequences were inevitable; she was arrested the following day. Although she was released on bail, there were intolerant conditions, including a ban on driving or talking to media. During the following days, several Saudi women protesters posted their videos while they were driving in reaction to al-Sharif's arrest. In June 2012, to celebrate the anniversary of the June 2011 driving campaign, a member of the *My Right to Dignity* women's right campaign drove her car in Riyadh. Figure 1 illustrates the timeline of the *Women to Drive* campaign depicting various events during the movement.

The campaigns discussed above demonstrate the important role of social media in facilitating cyber-collective actions. They further afford studying how individual sentiment diffuses within the social media network, shapes into collective sentiment, and transforms into collective action. The overarching question is: How are decentralized online individual actions transformed into cyber-collective actions? To follow up on these questions we will provide a theoretical background in Section 3.
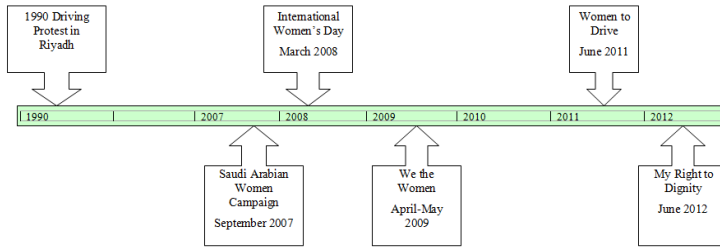
Fig. 1. Timeline for *Women to Drive* campaign ([2-5])

3 Literature Review

Considering the novelty of social media, only few studies have attempted to map collective social dynamics in cyberspace. The first one is the map of the American political blogosphere of the 2004 U.S. elections [6]. The authors studied linking patterns and discussion topics of political bloggers to measure the degree of interaction between liberal and conservative blogs and to uncover differences in the structure of the two communities. The American blogosphere reflected the polarization theory [7]. Similarly the Iranian blogosphere was observed to be clustered along ideological lines [8]. Both studies show that most bloggers tend to read, write about and link to similar things, usually sources that reinforce their own views. This supports the view that homophily [9] has a strong influence on the organization of social networks. However, the homophily principle alone, while useful, does not help in fully explaining how and why a cyber-collective action comes into being. In order to build a strong theoretical framework for the proposed research, in the following section we will revisit two relevant theoretical domains – collective action and social network analysis.

3.1 Collective Action in the Age of Internet

Collective action can be defined as all activity involving two or more individuals contributing to a collective effort on the basis of mutual interests and the possibility of benefits from coordinated action [10]. Theories of collective action are integral to explanations of human behavior. Perspectives on collective action have been useful in explaining diverse phenomena, including social movements [11], membership in interest groups [12, 13], the operation of the international alliance [14], establishment of electronic communities [15], formation of inter-organizational relationships [16], formation of standards-setting organizations [17, 18], and even bidding behaviors [19]. This range of actions accounted by collective action perspectives illustrates the centrality of this body of theory to social science. Traditional collective action theory dates back to 1937, when Ronald Coase sought to explain how some groups mobilize to address free market failures. Yet even when Mancur Olson began updating the theory in 1965 to explain "free-riding" the high-speed, low-cost communications now enjoyed were not imaginable [20]. New information and communication technologies (ICTs), especially the Internet, have completely transformed the landscape of collective action. Lupia and Sin (2003) explain that the burden of internal communication is no longer a hindrance to collective actions, so larger groups are no longer more

successful than smaller ones (at least not by virtue of their size). E-mail, chat rooms, blogs, and bulletin boards enable efficient communication, organization, and even deliberation within collective actions of any size [21].

3.2   Social Network Analysis

With the rise of collective action facilitated by online social network media, it is natural for social scientists to embrace the concept of social network in collective action analysis. In analyzing collective actions, social networks can be presented as networks of individuals. Social networks thus contribute extensively and substantially to individual participation. Here, prior social ties operate as a basis for recruitment and established social settings are the locus of movements' emergence. Social network analysis (SNA) has emerged as a set of methods geared towards an analysis of social structures and investigation of their relational aspects [22, 23]. SNA studies social relations among a set of actors assuming a varying degree of importance of relationships among interacting nodes representing individuals, groups, organizations, etc.. Growing interest and increased use of SNA has formed a consensus about the central principles underlying the network perspective. In addition to the use of relational concepts, we note the following as being important [24]: (a) actors and their actions are viewed as interdependent rather than independent autonomous units; (b) relational ties (linkages) between actors are channels for transfer or flow of resources (either material or non-material); (c) network models focusing on individuals and view network structural environments as providing opportunities or constraints on individual actions, and (d) network models conceptualize structure (social, economic, cultural, political) as lasting patterns among actors. Computational SNA (CSNA) helps in the utilization of SNA concepts by providing a rich set of methodologies to examine and summarize large information networks to observe and explain characteristic patterns including: community extraction, expert identification, information diffusion, preferential attachment, and the small-world phenomenon.

4   Methodology

The web, including blogs, could be mined to track information and data about emerging trends and behaviors in almost any area (e.g., political trends and opinions, drug use, racial tension, new films, new products, etc.). Moreover, such data may also demonstrate and reveal information about precisely how ideas diffuse and how trends develop and take hold. We will delve into evolving individual opinions and their development into cyber collective movements, and in so doing delineate the challenges and propose research methodologies. The objective of this paper is to analyze the female Muslim blogosphere data and identify individual blogger sentiments for a specific event, i.e. *Women to Drive*; observe the polarity of sentiments and analyze conflicting views; and study and model the propagation of sentiment in a socially and culturally diverse setting. Specifically, by following the research methodology in Figure 2, we try to answer – do the sentiments of individual bloggers converge to a collective sentiment as time progresses?
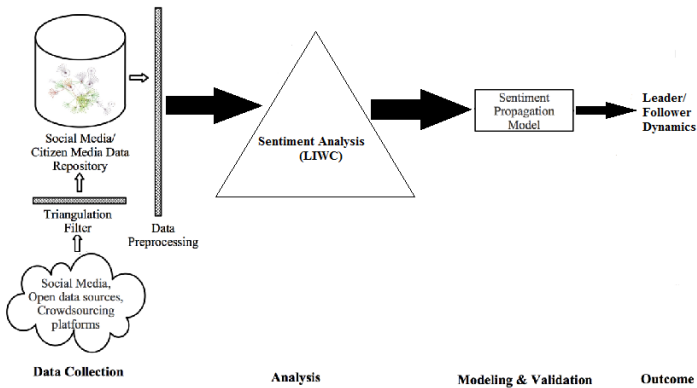
Fig. 2. Research methodology to study collective action for *Women to Drive* campaign

Data Collection for the *Women to Drive* Movement

The content from around 300 blog sites from 23 different countries were collected. Bloggers are included based on three shared characteristics: they are women over the age of 18, they are Muslim, and they primarily blog in English. Other available demographic information, such as nationality, current residence, and name is also included. Since these blogs are updated with frequencies varying between two to three blog posts per day to one blog post per month, a crawler (viz., Web Content Extractor, www.newprosoft.com/) was configured with the above mentioned nuances running constantly to automatically collect, parse, and index the data.

Blog Crawling with Web Content Extractor

The crawler allows us to store the extracted data in a variety of formats, including CSV, TXT, HTML, XML, or directly to an ODBC data source. Collected data includes the title of the blog post, blog post content, the timestamp when the blog post was created, followers' reactions in the form of comments, and the category/tags of the blog post, which can be system-defined or user-defined. We preferred a relational database to store the data due to reliability, scalability, platform independence, and most importantly fast indexing to handle millions of records. From the crawled blog sites, 45 blog sites consisting of 300 blog posts were talking about *Women to Drive* movement at different time periods.

Sentiment Extraction with Linguistic Inquiry and Word Count (LIWC)

After we had collected the blog posts, sentiments were extracted using LIWC (www.liwc.net) software, in order to study the transformation of individual opinions to collective sentiments. LIWC provides an efficient and effective method for studying various emotional cognitive and structural components present in individuals' verbal and written speech samples. LIWC outputs approximately 80 variables. The variables include 4 general descriptor categories, 22 standard linguistic dimensions (e.g., percentage of words in the text that are pronouns, articles, auxiliary verbs, etc.), 32 word categories tapping psychological constructs (e.g., affect, cognition, biological processes), 7 personal concern categories (e.g., work, home, leisure activities), 3

paralinguistic dimensions (assents, fillers, nonfluencies), and 12 punctuation catego-
ries (periods, commas, etc.). We have mainly focused on affective processes embed-
ded within psychological processes. The affective processes include 406 positive
emotion words (e.g., love, nice, sweet) and 499 negative emotion words (e.g., hurt,
ugly, nasty). Negative emotions are further categorized into anxiety, anger, and sad-
ness feelings. Scores for positive and negative emotions were obtained from LIWC
for the blog posts and the associated comments.

Towards Online Collective Movements

Existing knowledge on online collective actions mostly relies on quick, short-term,
often journalistic observations; indicating a lack of in-depth studies in this area. The
proposed methodology suggests a computational model advancing our understanding
of the transformation of individual opinions to collective sentiment, a precursor to the
manifestation of collective action as collective movement. Our methodology contin-
ues to embrace conventional collective action theories and helps reshape them further
to better understand the implication of new forms of communication.

5   Experiments and Results

For our experiments, we focused on the events occurred during 2007 and 2011. Figure
3 shows the distribution of blog entries and follower comments related to the *Women
to Drive* movement events that occurred between 2007 and 2011. We apply the LIWC
on both blog entries and follower comments to observe how bloggers' sentiments
diffuse into the community, transform into collective sentiment and, eventually, into
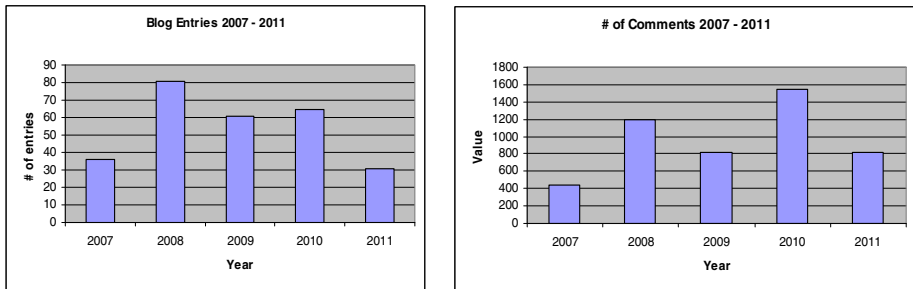collective action.

Fig. 3. Volume of blog posts (left) and comments (right) for *Women to Drive* campaign

5.1   Al-Huwaider's Protest in 2008

Figure 3 indicates that the highest traffic of the blog entries was observed in 2008. In
2008, women's driving ban in Saudi Arabia was protested by al-Huwaider on the
International Women's Day by driving her car, although the protest was in March
2008, al-Huwaider posted her video to YouTube in September 2008. Many female
Muslim bloggers expressed their thoughts about the *Women to Drive* movement in
2008. As shown in Figure 4, several blog posts were submitted to create awareness of

the protest in January and February 2008. The reactions of the community are depicted by the increasing number of comments in the following months. We ran LIWC on the 2008 data to identify individual blogger sentiments for this specific event. The results are shown in Figure 5.
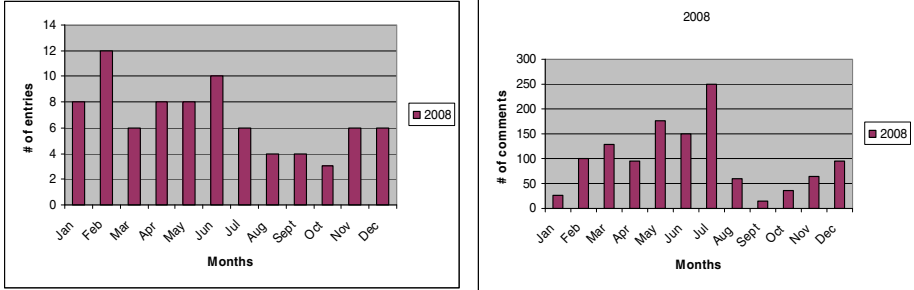

Fig. 4. Data distribution of the blog posts (left) and follower comments (right) in 2008
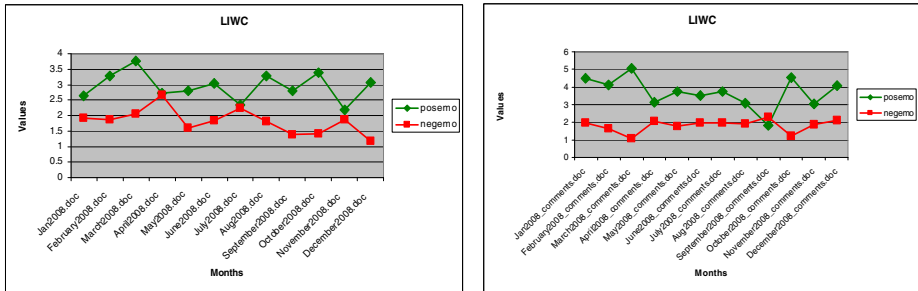

Fig. 5. LIWC results for 2008 data (blog posts on left and follower comments on right)

As seen in Figure 5, bloggers' sentiments about al-Huwaider's protest in March 2008 was largely positive, indicating support for the campaign. A similar sentiment distribution was observed in the comments, indicating sentiment diffusion among the followers. This indicates a sense of solidarity among female Muslim bloggers for al-Huwaider's protest. Again, when al-Huwaider uploaded her video to YouTube in September 2008, a similar reaction was triggered among the female Muslim bloggers as observed by an increase in positive emotions among the blogger and followers.

5.2 Anniversary of the March 2008 al-Huwaider's Protest and *We The Women* Campaign

March 2009 marked the one-year anniversary of the al-Huwaider's 2008 protest. In March 2009 there was a rise in positive emotions regarding the *Women to Drive* movement. Looking at the statistics in Figure 6, we see that there is a very high rise in the blog entries as well as the users' positive reactions regarding the *Women to Drive* movement. After March 2009, between April 2009 and May 2009, the *We the Women* campaign occurred. Again we observe an increase in the positive emotions among the bloggers as well as the followers. These observations indicate and clearly demonstrate

the transformation of individual opinions of blog leaders to collective sentiment among the followers via blog interactions.

5.3   The 2011 Facebook *Women2Drive* Campaign

A similar analysis was conducted for the 2011 Facebook campaign to see if the *Women to Drive* movement again led to an online collective action. This *Women2Drive* campaign started on June 17, 2011. A large number of blog posts as well as comments were observed during the months leading up to the June event (Figure 7), indicating the mobilization efforts of the bloggers to support the campaign. We conducted an LIWC sentiment analysis to identify individual blogger sentiments for this specific event and the results are depicted in Figure 8.
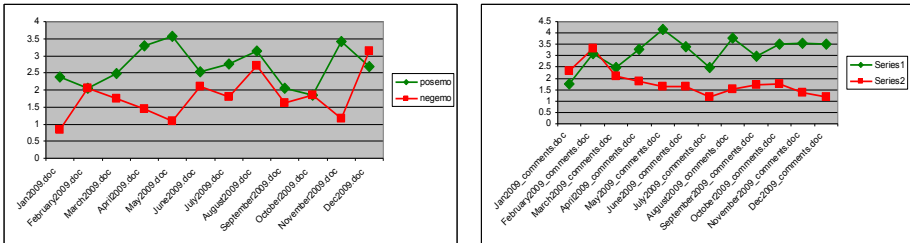

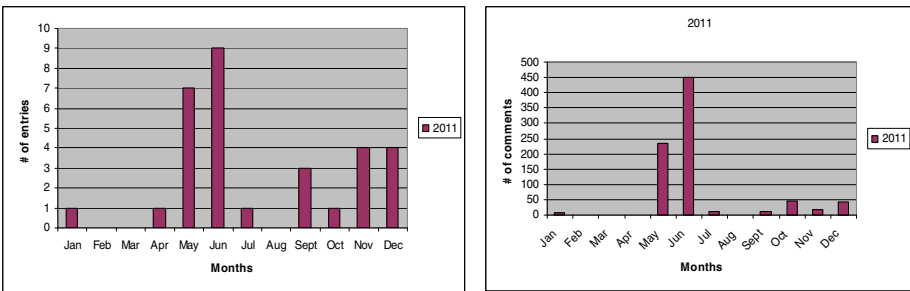**Fig. 6.** Data distribution of blog posts and follower comments in 2009

Fig. 7. Data distribution of the blog posts and follower comments in 2011
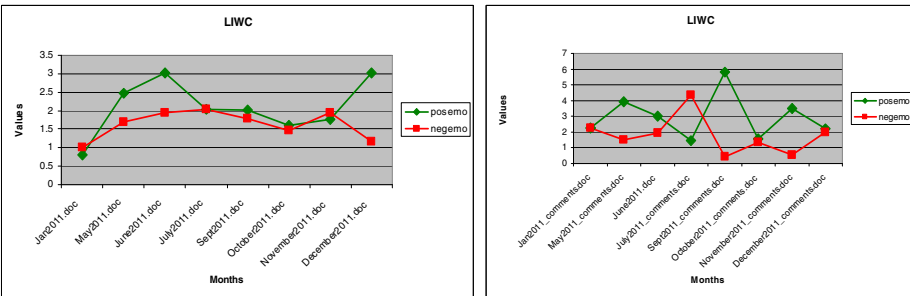

Fig. 8. LIWC results for the *Women2Drive* 2011 campaign

As we see from the charts in Figure 8, bloggers' thoughts about the *Women2Drive* campaign was increasingly positive, supporting and creating awareness towards the campaign. This demonstrates our ability to observe, capture, and model online collective action among female Muslim bloggers. However, we observe a decrease in followers' positive emotions regarding this movement. Upon investigating, we found some anti *Women2Drive* followers' reactions coming primarily from males resulting in the decrease in the positive emotions and increase in negative emotions. Although we carefully handpicked the bloggers as female Muslim users, our data collection does not filter out the male commenters. This suggests a need for considering demographic based filtering of the followers for a more accurate analysis. This remains to be a future direction for our research. Based on our results from the LIWC analysis, we conclude that there was indeed an online collective action observable among Muslim female bloggers for the *Women to Drive* movement.

6   Conclusion

We proposed a novel methodological approach highlighting several key contributions to the fundamental research of online collective action as well as computational studies of social media. Through a rigorous study of various organized events in the *Women to Drive* campaign, we offer: (1) a new framework to understand the evolution and the diffusion of sentiments in online blogger networks; (2) a new approach focusing on the transformation of individual opinions to collective sentiments providing a powerful explanatory model; and, ultimately, (3) a new understanding of the relationship between online collective actions and the rapidly changing online environment. Moreover, our findings highlight a need to discover further pathways of knowledge to fully understand people's cognitive and social behavior, individually and collectively, in online environments with diverse social, cultural, and political backgrounds. Our future research thus will attempt to perform cross-cultural analysis, including data from non-English speaking communities.

We encourage the reader to envision our case study and analysis in the broader context, as our research also lends insights into the relationship between social media and governance. The al-Huwaider case study presented in this contribution shows that collective action is a form of citizen engagement, acting as a corrective mechanism and it is in itself a part of a governance system. In addition, such actions often also enable new organizational forms as well as refreshingly new forms of citizen and government engagement. Social media lend themselves to give citizens a new voice to be heard and, conversely, encourage citizens to engage and participate. Ongoing citizen participatory actions through social media, such as online citizen journalism, can provide a mechanism to pursue a better governance through public monitoring for better decision-making, transparency, and accountability. Consequently, social media can potentially be a bridge to connect the government and its citizenry, have dialogues, and together pursue democratic forms of governance.

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