

Between a Rock and a Cell Phone: Social Media Use during Mass Protests in Iran, Tunisia and Egypt

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In this paper we examine the use of social media, and especially Twitter, in Iran, Tunisia and Egypt during the mass political demonstrations and protests in June 2009, December 2010 - January 2011, and February 2011, respectively. We compare this usage with methods and findings from other studies on the use of Twitter in emergency situations, such as natural and man-made disasters. We draw on our own experiences and participant-observations as an eyewitness in Iran (first author), and on Twitter data from Iran, Tunisia and Egypt. In these three cases, Twitter filled a unique technology and communication gap at least partially. We summarize suggested directions for future research with a view of placing this work in the larger context of social media use in conditions of crisis and social convergence.

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1. INTRODUCTION

This paper seeks to build on an area of work known as emergency information management and, more specifically, on a growing research area referred to as ‘crisis informatics’ -- a term coined by Hagar (Hagar, 2007) and extended by Palen, Hughes and colleagues (Hughes, Palen, Sutton, Liu, & Vieweg, 2008; Palen, Vieweg, Liu, & Hughes, 2009), among others. Emergency (or crisis) communication management pertains to the use of communication channels and messages to coordinate activity and convey information among citizens, rescue workers, government agencies and others. The recent literature on crisis communication includes analyses of information seeking behavior following such disasters as 9/11 (Schneider & Foot, 2004), Hurricane Katrina (James & Rashed, 2006), the Virginia Tech shooting tragedy April 16, 2007 (Palen et al., 2009; Sheetz, Kavanaugh, Quek, Kim, & Liu, forthcoming 2010; Vieweg, Palen, Liu, Hughes, & Sutton, 2008), and various natural

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disasters, such as the earthquakes in Haiti and New Zealand (Goolsby, 2010), to name just a few.

Speaking on the role of information and communication technology (ICT), Palen and colleagues note that ‘crisis informatics’ includes “empirical study as well as socially and behaviorally conscious ICT development and deployment. Both research and development of ICT for crisis situations need to work from a united perspective of the information, disaster, and technical sciences.” It is the sharing of information in a disaster that is especially crucial, and different types of ICT facilitate sharing to a greater or lesser degree based on a variety of circumstances.

In this paper we consider the use of twitter in the mass protests in Iran, Tunisia and Egypt and specifically, information sharing among the general public (as opposed to information sharing among rescue personnel and/or government officials). We compare the use of twitter in prior studies of similar cases of mass post-election protests (Zuckerman, 2009), and types of socially convergent behavior (Hughes et al., 2008). The goal is to clarify the use of twitter and the particular gap this technology filled.

2. SOCIAL MEDIA USE IN CONTEXT

In thinking about the use of social media during the uprisings in Iran, Tunisia and Egypt, it is important to keep in mind the penetration of satellite television, the internet, social media (e.g., Facebook, Twitter) and mobile phones. The diffusion of satellite communications and broadcast programs with Middle East news, talk shows and political discussion has arguably laid a foundation for rising expectations among citizens and local organizations, including the private sector. London-based Middle East Broadcast Corporation introduced entertainment programming of, by and for the region. More importantly, the advent of Al-Jazeera television, based in Qatar with the 24 hour news and feature stories in multiple languages (i.e., Arabic, Turkish, Persian, English), has offered programming that is often critical of Middle East regimes and national or regional policies. In Iran, despite an official ban on satellite dish ownership, many middle class families have them. Government confiscations just mean that people have to purchase another dish and install it.

Internet penetration throughout the Middle East is quite variable; based on 2009 estimates by the International Telecommunications Union of the percent of the population who use the internet, it was highest in the United Arab Emirates (UAE) (75%), Israel (63%), Oman (51%) and Morocco (41%). It was lowest in Iraq (1%) Libya (6%), and Yemen (10%). Of the three countries we focus on in this paper, Tunisia is highest (34%), followed by Egypt (24%) and Iran (11%). It is helpful to see these percentages in comparison with cell phone (2009) and Facebook penetration (2010) shown in see Table 1.

Table 1. Internet, Cell Phone and Facebook Penetration

	Internet (2009)	Facebook (2010)	Cell Phone (2009)
Tunisia	34	19	95
Egypt	24	5	67
Iran	11	FB blocked	71

Source: Internet and Cell phone data are from the International Telecommunications Union Statistics Database (2009); Facebook data is for 2010 (*Arab Social Media Report*, 2011).

Facebook users are very few across the region, with the highest percentages in the UAE (45%) and Israel (43%). At 19%, however, Tunisia is among the next highest (after Kuwait at 21%). In Egypt, only 5% of the population uses Facebook, and in Iran, the government blocks the site, although many Iranians are able to use proxies.

In all these locations, however, the majority of users are young adults, who also make up the largest proportion of the adult population in Tunisia, Egypt and Iran. They are not only typically well educated (at least high school diploma), but they are also typically without jobs.

Mobile phone penetration throughout the region is much higher than Facebook or the Internet; it is close to full penetration in Tunisia (95%), followed by Iran (71%) and Egypt (67%). In the Gulf States (UAE, Qatar, Kuwait), Saudi Arabia and Israel there are more cell phones than citizens (ranging from 232 to 125%); even Libya has high penetration (78%). Lowest are Yemen (35%) and the Palestinian territories (29%). It is worth noting that cell phone penetration is also very high in Algeria (94%) where there have been some demonstrations in recent weeks. Mobile phone penetration is key to communications from the streets and in crowds not only for voice and short message systems (SMS), including twitter, but also for capturing images and sound on smart phones.

3. USE OF TWITTER IN EMERGENCIES

Twitter, a form of micro-blogging using an open-source web framework called Ruby on Rails, is a free, short messaging service established in 2004 by a private company based in San Francisco. The growing research on the use of twitter in emergencies, crises or disasters has a short history, given twitter's short life. Some of the most relevant work has been done by Palen, Hughes and colleagues on the 2008 Hurricanes Gustav and Ike (Hughes & Palen, 2009), the 2007 wild fires in Southern California (Hughes et al., 2008), by Zuckerman on the Moldovan election protests in Africa (Zuckerman, 2009), and Starbird and colleagues (2010). These studies specifically focus on the use of twitter in a disaster or crisis situation. Highly relevant is the work of Devin Gaffney (2010) and a 2009 study by the Web Ecology Project (WEP) that analyzed over 2 million twitter posts (tweets) on the Iran elections that WEP collected between June 7 (just before the election) and June 26, 2009. The Gaffney research and the WEP analyses include tweets both inside and outside Iran, with the vast majority of tweets being posted from outside Iran.

The distinction between the analysis by the WEP and our work is that we are focused on the use of twitter by citizens in the midst of the crisis situation, that is, the streets and alleyways of Iranian cities during the demonstrations. We treat this as a crisis situation because after the first demonstration on June 13 involving millions of people, the protesters were always under threat of attack by uniformed police and plainclothes, volunteer militia members (the 'Basij').

Hughes et al report that twitter use under duress and in crisis conditions of the two hurricane episodes of Ike and Gustav in 2008 is distinct from routine general twitter communication behavior in two ways: 1) fewer tweets are sent as replies to other tweets; and 2) fewer URLs are included in the tweet posts. They surmise that this is because in a crisis, people need information broadcast as widely as possible to as many people as possible at once (i.e., no need to reply to a specific individual) and people are less likely to go to a website for additional information during the emergency. In the case of Iran, it was difficult for people in Iran to consult the Web, because the Internet was extremely slow during the weeks following the elections.

3.1 Twitter Use in Mass Protests in Iran: June 2009

The day after the election results were announced in Iran, i.e., on June 13, 2009, a crowd estimated at several million people poured into the streets surrounding Azadi Square in Tehran. Eight people who were among a group of protesters who attacked a barracks were reported killed by militia from inside the barracks. Throughout the next five days, there were additional (although smaller) mass demonstrations in the

streets that were relatively peaceful, culminating in a large demonstration in Teheran on Thursday, June 18, to mourn those who had been killed or injured earlier week. On Friday, June 19, one week after the elections, the Supreme Leader Ayatollah Khamenei announced during his Friday prayer sermon that the election results would stand (with the announced winner as incumbent President Ahmadinejad) and that any further protests would be considered illegal.

Throughout the weeks following the disputed election results, the government tightened control over data networks and Internet gateways, such that traffic over them was reduced to a crawl. Various social Internet sites were blocked, including Twitter, Facebook and eventually Youtube. Voice of America Persian, a US funded satellite television network, broadcast proxy IP sites so citizens could connect to blocked sites, and upload or download pictures and videos of recent street protests. A Twitter data collection by Gaffney (2010) for this period indicated that the overwhelming number of tweeters were, in fact, outside Iran.

Iranian citizens used a mix of interpersonal and mediated communication to get and compare information, about the election results, the opposition or government's response, what had been happening in the streets, and whether, when and where additional protests were being called. Taxi drivers were a particularly good source of information on whether and where there were protests planned during this period.

There are several reasons why the use of twitter was particularly important in the case of the Iran street protests: 1) the governments had blocked access to the twitter website, so it was only accessible via a proxy server or a text message on a mobile phone, and 2) protesters often needed information 'on-the-fly' while they were in the streets, to avoid clashes with police and plainclothes militia. So they used their mobile phones not only to take pictures or videos, but also to share information about what was happening at that moment and specific location, such as which street to avoid due to heavy police presence. This was also the case for Tunisia and Egypt.

3.2 Twitter Use in Tunisia: December 2010

Twitter as well as Facebook appeared to play a key role in spreading information in Tunisia at the outset of the unrest in response to the suicide by self-immolation of a young street vendor, Mohamed Bouazizi, in the town of Sidi Bouzid. According to Ryan (2011) reporting for Al-Jazeera, Rochdi Horchni, a relative of Mohamed Bouazizi said protesters took to the streets with "a rock in one hand, and a cell phone in the other."

The Facebook statistical portal (Socialbakers) claims the penetration rate of Facebook in Tunisia is only about 19%, but in combination with other channels, including face-to-face, TV and phone, it helped to notify others of events and to coordinate initial street demonstrations. The Tunisian government blocked access to the Internet in early December, thereby restricting use of Facebook, Twitter (on the web) and YouTube (until Jan 13, 2011). Subsequently, President Ben Ali tried to calm the population by promising to unblock access to Internet Web sites. Ben Ali fled Tunisia on January 14. Figures 1 and 2 shows charts (proportion of tweets per tweeting individual or organization) and trends (tweet frequency per day) for Tunisia. We collected and analyzed 65,748 tweets (using #SidiBouzid, #tunisia, #tunileaks) from January 1, 2011 to February 1, 2011 and produced visualizations using Desktop Archivist and web-based Archivist.

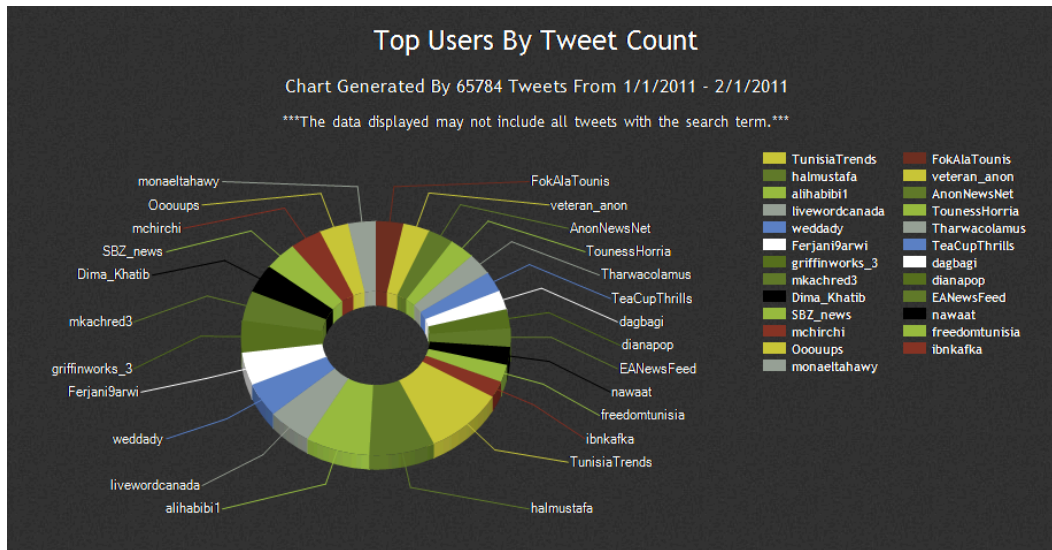


Figure 1. Top Users by Tweet Count (#SidiBouزيد)

The most frequent tweeters (twitter users posting messages or ‘tweets’) were not necessarily in the country. There is a large majority (almost 63%) of our collected tweets that are retweets (original tweets that are copied by other tweeters and sent out under their twitter account as ‘retweets’). This pattern is a likely indication of users outside Tunisia forwarding on messages from users inside the country. There were clear peaks in the volume of tweets in January on the 9th, 10th, 12th and 14th (President Ben Ali left the country on the 14th of January).

The protests in Tunisia inspired similar street demonstrations across the Middle East, the largest of which have been in Egypt. The unrest in Libya continues as of mid-March, but there is a near black-out of communication media of all kinds.

3.3 Twitter Use in Egypt: January 2011

Egypt is the most populous Arab country with almost 85 million inhabitants. Massive protests building throughout January 2011 (primarily in Cairo and Alexandria, the two largest cities) called for an end to the 30-year reign of President Hosni Mubarak with complaints of corruption, unemployment and lack of democracy. The Pew Research Center’s Global Attitudes Survey conducted April 12 - May 7, 2010 showed a majority of 59% of Egyptian Muslims reported that they believed democracy was preferable to any other kind of government. The street demonstrations seemed to reflect this kind of sentiment for the most part. The demonstrations were clearly a crisis situation for citizens, as several hundred deaths were reported from the initial crackdown by pro-Mubarak forces.

The Egyptian government quickly cut off access to the Internet and restricted the flow of cell phone network traffic. For example, a ReTweet (RT) on the day of the million man march (February 1) for example says, “RT @Dima_Khatib: Mobiles around Tahrir Square are not working any more. Blocked too. Like internet #egypt #jan25 #cairo”. Nonetheless, a stream of communications, including tweets, managed to find their way out of the country. We collected and analyzed tweets (using common hashtags including #jan25, #cairo, #egypt, #elbaradei) from January 28 to February 14, 2011 and produced visualizations using the Desktop Archivist and web-based Archivist tool. Just a collection of 500 tweets from the day of the million man march shows diverse sources of tweets, half of which are web-based, suggesting they are sent from outside Egypt.

A focus on tweets just before until just after Mubarak’s resignation, February 7 – 14, 2011, with 514,782 posts, shows a clear spike in communications during key events (Figure 2).

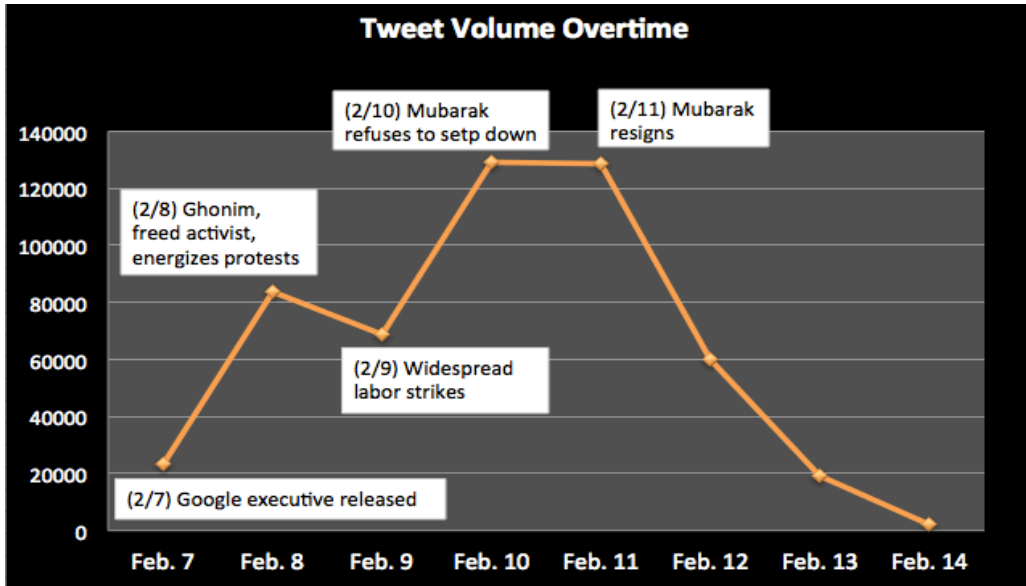


Figure 2. Tweet Volume Over Time: Egypt (Feb 7-14, 2011)

A tag cloud presentation of the 83,745 twitter posts on February 8 (with hashtag #jan25, although many posts include multiple tags, such as #Egypt, #Mubarak, #El Baradei, #Tahrir) the day that activist Wael Ghonim roused protesters, shows the most common terms that appeared (Figure 3).



Figure 3. Tag Cloud of Top Tweets February 8, 2011

Wael Ghonim is a prominent Egyptian activist who, among other communications, created the Facebook page (anonymously at first) called “We are all Khaled Said” –

named after a young Egyptian who was brutally murdered by police allegedly for capturing police corruption on video. The Facebook page gained much attention in the weeks leading up to the demonstrations in Tahrir Square, Cairo (Figure 4).



Figure 4. Facebook page: We are all Khaled Said, created by Wael Ghonim

Changes in the predominance of terms appearing in tweets with these hashtags during the week of February 7-14, 2011 indicate the changing focus of communication among users as events unfolded and led up to Mubarak's February 10th radio address in which he announces he will not resign (Figure 4 left), followed the next day, Friday, February 11, 2011, with Egypt's Vice President Suleiman announcing that Mubarak has resigned (Figure 5, right).



Figure 5. On left: Tag Cloud of Tweets: Mubarak radio address refusing to resign (Feb 10); On right: Vice President announces Mubarak has resigned (Feb 11)

The location of tweeters is sometimes indicated (optionally) in a user's profile. A listing of the top tweeters locations, excluding 'not reported' and Arabic words

(not captured by Archivist) in Egypt just during the week of February 7-14, 2011 is shown in Table 2.

Table. 2. Location and Frequency of Top Tweeters

Location	Frequency
Egypt	63255
London	5921
Kuwait	5415
USA	4697
iPhone:	2925
dubai	2347
Earth	2004
Jordan	1918
Canada	1789
NYC	1785
UK	1760
Jeddah	1691
Paris	1665
los angeles	1644
Lebanon	1630
Saudi Arabia	1592

We have collapsed all locations within Egypt into one category in Table 2 for the sake of clarity and comparison; users indicate their location in multiple ways (e.g., Egypt; Cairo, Egypt; Cairo; Alexandria, Egypt). The top location of Egypt would have presumably many more users if we were able to show the users who indicated their location in Arabic. What is important to note is that the highest frequency of tweets is within Egypt, whereas in the case of Iran during the June 2009 post-election demonstrations, there were fewer than 100 estimated twitter users inside Iran. The bulk of the tweeting was being done by users outside Iran, often re-tweeting posts from users inside the country.

4. COMPARISON WITH OTHER CASES

The Iranian government appeared to have restricted cell phone use in areas of the Tehran where protests were taking place (around Azadi Square, along Vali Asr street, and Ferdowsi Square) and in Cairo (around Tahrir Square) by limiting bandwidth on cell phone towers that serve those areas. This government control was also reported in the mass street protests in Moldova and in Belarus. By shutting down cell phone service, the government can reduce the possibility of protestors receiving messages via mobile phone while in the streets where protests are underway. This also eliminates protesters' ability to send and receive twitter posts, and other SMS messages. The Iranian Ministry of Telecommunications reported that it shut down Internet-based message services during the Iranian elections in 2006 (local elections) because it was not possible to identify users, whereas the content of SMS messages sent via cell phones was not shut down completely because subscribers could be easily identified (Zuckerman, 2009). This identification of senders and receivers benefits police intelligence.

In the cases of Tunisia and Egypt, the government shut down Internet access, although briefly, in an attempt to squelch communication among citizens with each other and with the outside world. On January 25, 2011 about 5:20 pm, Internet traffic to and from Egypt across 80 Internet Service Providers (ISPs) around the world dropped precipitously (the four main ISPs are Link Egypt, Vodafone/Faya, Telecom Egypt, and Etisalat Misr). Close to 97% of Egyptian Internet traffic was reported lost, according to Julien Coulon, co-founder of Cedexis, a French Internet performance monitoring and traffic management system. The one exception, Noor Group, still had 83 live routes to its Egyptian customers, possibly out of technical incompetence on the part of the Egyptian Ministry of Post and Telephone in shutting down the gateway, or possibly because the Egyptian Stock Exchange has a Noor address (<http://www.egyptse.com>). Despite the loss of Internet access to most users, some Egyptians were able to gain intermittent Internet access via international telephone (dial-up) connections.

It is not technically difficult to disrupt mobile phone service, as the Egyptian government also did on Friday, January 28; it simply ordered the Egyptian operator ECMS to shut off service, especially in the main demonstration areas of Cairo and Alexandria. Mobile phone signals were patchy and text messages inoperative. Throughout the ordeals of both Egypt and Tunisia, however, Al-Jazeera continued to broadcast live television programming (with very brief disruption in Cairo) which was also available over the Internet.

5. CONCLUSIONS

The use of ICT during the mass demonstrations and street protests in post-election Iran, and in Tunisia and Egypt, as with similar protests, can be considered crisis informatics in social convergence events. It is a crisis in that people are sometimes under attack from police or plainclothes militia, and are always under the threat of attack based on past experience. The street protests are social convergence events, insofar as a large number of people are communicating with each other in proximity and with people in more distant locations (home, other parts of the city, other cities, abroad) who have an interest in what the individual participant is seeing and doing. Given the finding of Hughes and colleagues (Hughes & Palen, 2009) that people who adopted twitter during a crisis or social convergence event continued to use the service, and given the ongoing demonstrations and protests in the region, we can expect to see increasing use of twitter for crisis communication and response in Iran, Tunisia and Egypt.

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