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A Digital Humanities Approach: Text, the Internet, and the Egyptian Uprising

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ABSTRACT *Can Twitter really bring a dictator to his knees? Does YouTube stream information that is more influential than traditional news providers such as the* New York Times? *In the mainstream media debate between Clay Shirky and Malcolm Gladwell about whether "the revolution will be tweeted," both pundits make confidently totalizing arguments (see Malcolm Gladwell (2010) Small Change: Why the Revolutions Will Not Be Tweeted,* The New Yorker *(October 4), available online at: newyorker.com/reporting/2010/10/04/101004fa_fact_gladwell; and Clay Shirky (2011) The Political Power of Social Media,* Foreign Affairs *(Jan./Feb.). In contrast, this article presents a micro-study of the hashtag (#) Tahrir using an emergent method of cultural analytics and a repository developed by a digital Arabic knowledge management system—a body of work that coheres dissimilar elements not into a single idea, but rather into a heterogeneous network. It may be difficult to make direct correlations between the rise of revolutionary movements made manifest through large-scale street actions and the adoption of newly distributed communication practices around information technologies, but researchers can examine how verbal acts of protest can be conceptualized, facilitated, staged, ignored, negated, or thwarted in a culture of accelerated mediation and acknowledge the potential fragmentation of publics, the seeming disappearance of the civic, and, possibly, the dissolution of the nation-state in the shifts of globalization.*

KEY WORDS: *Arabic*; *big data*; *digital*; *Egyptian uprising*; *knowledge production*; *influence*; *semantic*; *linguistic*; *Middle East studies*

The unprecedented upheavals in the Arab countries that started in Tunisia in December 2010 spread like wildfire, igniting a wave of similar protests around the world and especially in Egypt, which erupted a month later. In an act of transnational solidarity, in February 2011, an Egyptian activist ordered pizza for labor union protesters in Wisconsin. The international phone call from Egypt was just one of many messages of solidarity streaming into Madison, Wisconsin, from all over the world. Such connections prompted this critical investigation regarding the interaction of ideas and triggers of influence on civic engagement and political mobilization ever since the Egyptian uprisings began in 2011. It is part of a larger collaborative study that examines the hermeneutics (text, context and intellectual origin) of digital knowledge

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[1] VJ Um Amel is the online name for Laila Shereen Sakr. Her works are published under both names.

produced from social unrest and citizen action as they flow among transnational actors in the Arab uprisings, Occupy Movements and socioeconomic protests in Spain and on Wall Street.[2]

While many facets of these movements have been studied recently, it is important to examine the distinct sociopolitical forces leading to their emergence and the mutual influences among them. This article contributes to the larger Collaborative Cultural Analytics (CCA) project by providing a micro-study on #Tahrir and its significance within a historical narrative of 'revolts' or '*thawra*' in Egypt. The revolutionary turmoil in Egypt did not emerge out of the blue and simply through social media activism as is often depicted, but rather was precipitated through many years of internal pressures and growing social movements.[3] Indeed, the social movements in Egypt, Spain, and Wall Street are unique historical moments that, in fact, represent culminations of myriad dynamics, actors, and forces over time, and are, therefore, extremely complex to research.

Reading the *Thawra*

The discourse around *thawra* (revolt or revolution) has emerged from a contemporary history of the 'idea of revolution' in Egyptian culture—from the 'Urabi revolt against the Muhammad Ali dynasty in 1882 to Zaghloul's uprising against the British in 1919, to Nasser's revolt against the monarchy in 1952, to the bread riots of 1977, and to the leaderless revolution of 2011. I argue that it was actually a convergence of (1) a technology infrastructure consisting of the Internet, micro-blogging, Twitter, Facebook, smart phones, the convention of the #tag, phone numbers stored in digitized contact lists, personal mobile communication devices; (2) physical habits such as communication habits, use of mobile devices, or movement and speech acts in public settings; and (3) a national narrative of *al-thawra* that enabled the mobilization of the body politic and was identified by global witnesses as the 'Arab Spring' and the moment of revolution in the global Middle East.

In Egypt during the Nasser era, a period in which a military regime embarked upon the construction of a new civic identity for an independent Egypt, writers began to explore issues of social inequity, colonial and feudal exploitation, changing gender roles, religious and cultural traditions and, finally, the disappointments of the revolutionary project itself.

In a recursive fashion, these same social justice and human rights issues have continued to re-emerge in waves through 2011 and beyond. More recently aimed against the newly elected regime, the cultural production—stories, symbols, and popular imagination—once again has played a significant role in shaping the evolving national identity. During these times, the cultural logic of contemporary Egyptian national identity not only is articulated through cinema or broadcast TV as it was in the mid-twentieth century, but also it is manifesting in collaborative multipolar platforms online.

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[2] The Collaborative Cultural Analytics (CCA) project involves a cross-disciplinary partnership among scholars at four main institutions: Prof. Nitin Sawhney and Prof. Peter Asaro at The New School are leading the project in the United States in collaboration with Laila Shereen Sakr, director of R-Shief, Inc. and a PhD candidate at the University of Southern California (USC); in the UK, Dr Christopher Brewster from the Aston Crisis Centre, Aston University is partnering with Dr Tarik Sabry at the University of Westminster.

[3] See, for example, P. Marfleet & R. Al-Mahdi (2009) *Egypt: The Moment of Change* (London: Zed Books).

By the end of the first decade of the twenty-first century, we clearly have moved from the world of 'new' media to a world of 'more' media. When we reached 2011 and the Egyptian uprisings—which many hailed as the revolution brought about by Facebook—the ubiquity of computers, digital media software, and computer networks had led to an exponential rise in the numbers of cultural producers worldwide. No longer simply a matter of the rise of new media production in new global contexts, these social media platforms served as the database architectures for the accumulation of data on a scale heretofore unknown.

This over-proliferation of data challenges one's research methodology—the impossibility of knowing or representing such a mass of information requires new ways of investigating and interpreting. In just a few years, a plethora of articles and books on the Arab uprisings were published and trillions of Twitter and Facebook postings were micro-blogged in multiple languages. Though social media is often considered co-authored by the public, much research on 'the Arab public' has focused on political histories,[4] public opinion through traditional polling,[5] or conducted ethnographic investigations.[6] In this regard, they have tended to undercut the mechanisms for verification and authority within the domain of the digital. Digital knowledge production is not like pop-culture or traditional public texts, i.e. newspapers or legal documents. Rather, it offers a redefinition of 'the public' as societies systematically engage more in the Internet, open-source transactions, and mobile devices, for example, worthy of rigorous study.

Addressing Challenges

My approach here, CCA, is built on a cooperative research and analytic framework to examine large-scale multilingual data and contextual knowledge from contemporary social movements. This newly emerging research by computer scientists, linguists, social scientists, humanities scholars, and interaction designers seeks to understand how both micro-level qualitative analysis and 'big data' computational analytics offer varying and complementary perspectives on complex sociocultural research questions. I am interested in gaining critical insights into how transformational ideas and information on a large scale move differently among various actors within and across movements. I approach research questions by combining network analysis and language analytics/text-mining with CCA. This methodology entails large-scale analysis, in particular of the R-Shief living data repository (http://r-shief.org), a unique and rich archive of multilingual social media content from the 2011 uprisings, along with qualitative research based on ethnographic, social, and historical inquiry. R-Shief is a 'big data' repository in terms of volume, velocity, and variety of data (see details below).

Cultural analytics is an emerging methodology for researchers who wish to examine rich sociocultural phenomena across heterogeneous and multimodal data sources. It leverages a range of mixed methods for understanding the nature of digital knowledge production across media and social networks, while simultaneously engaging in historical

[4] For example, M. Lynch (2012) *The Arab Uprising: The Unfinished Revolutions of the Middle East* (New York: Public Affairs).

[5] The annual Arab Public Opinion Poll conducted by Zogby International and Brookings Institute (2003–11).

[6] For example, J. Anderson & D. Eickelman (2003) *New Media and the Muslim World: The Emergent Public Sphere* (Bloomington: Indiana University Press).

and cultural analysis. The body of literature studied includes not only scholarly and scientific materials, but also social media, blogs, and other online publications. It is in part the socio-digital convergence of technology, cultural transformations, and national narratives that enabled the mobilization of what people and participants have called the 'Arab Spring.' The political upheaval mediated on the Internet over the past few years has raised crucial questions about the influence of technology (particularly social media) in mobilizing and enabling popular uprisings.[7]

These events, therefore, also raise questions about the role of communication technology in relation to the development of social movements: Do recent political uprisings in Egypt, Spain, and on Wall Street confirm the 'horizontal networks' paradigm proposed by Barry Wellman[8] and Manuel Castells[9] and echoed by Michael Hardt and Antonio Negri, Joss Hands, and Paul Mason?[10] What kind of hierarchical relations are undermined and which are confirmed in the stream of social media patterns that emerged? The ongoing Egyptian uprising offers a unique opportunity to research how political agency is mediated and how these voices are connected, creating—thanks to the characteristics of digital media—more transnational political identities and political subjectivities. An important shift is that contemporary mediation cannot continue the online–offline/digital–paper separation, but merged they may represent a 'Convergence Culture,'[11] Produsage[12] or media synchronization.[13] The political changes and outcomes in turn raise new questions about the efficacy of prior empirical methods and tools. Further obscuring the difficulty of analyzing complex developments are the differences between the distinct theoretical and methodological foci among separate academic disciplines.[14]

Recent studies about the influences of technology on social movements like the Arab uprisings rarely have incorporated rigorous Arabic language analyses on large-scale social media (i.e., billions of tweets and millions of website articles over several years). This is partly due to the lack of Natural Language Processing (NLP) tools to conduct computational linguistic research in languages other than English, but also due to lack of access to appropriate large-scale data collections. The growth of 'big data,' particularly collections of social media patterns, has enabled more in-depth examination of the role of digital networks, allowing scientific and policy communities to direct their attention

[7] See further M. Castells (2012) *Networks of Outrage and Hope: Social Movements in the Internet Age* (London: Polity).

[8] B. Wellman (2001) Physical Place and Cyber Place: The Rise of Networked Individualism, *International Journal of Urban and Regional Research*, 25(2), pp. 227–252.

[9] M. Castells (2009) *Communication Power* (Oxford: Oxford University Press).

[10] M. Hardt & A. Negri (2011) Arabs are Democracy's New Pioneers, *The Guardian*, February 24, 2011. Available at www.guardian.co.uk/commentsfree/2011/feb/24/arabs-democracy-latin-america; accessed June 23, 2013; J. Hands (2010) *@ is for Activism: Dissent, Resistance and Rebellion in a Digital Culture* (London: Pluto Press); and P. Mason (2012) *Why It's Kicking Off Everywhere: The New Global Revolutions* (London: Verso).

[11] H. Jenkins (2006) *Convergence Culture: Where Old and New Media Collide* (New York: New York University Press).

[12] A. Bruns (2010) From Reader to Writer: Citizen Journalism as News Produsage, in: J. Hunsinger, L. Klastrup & M. Allen (eds) *Internet Research Handbook* (Dordrecht, NL: Springer), pp. 119–134.

[13] M. Aouragh & A. Alexander (2011) The Egyptian Experience: Sense and Nonsense of the Internet Revolution, *International Journal of Communication*, 5, pp. 1344–1358.

[14] Analysis presented to Collaborative Cultural Analytics research group by Miriyam Aouragh.

toward aggregated imprints of online and social media activity, without engaging in critical methodological analyses that take into account the historical and cultural basis to inform meaningful critique. This fetishization of data over meaning has produced much research that examines the scale, speed and directional influences in digital networks and social media (such as those presented at the International AAAI Conference on Weblogs and Social Media[15] conferences in recent years); however, complementary approaches engaging in historical, cultural, and textual analysis can reveal richer insights to explain the wider context of such phenomena.

For example, in 2009, Harvard University's Berkman Center for Internet and Society conducted one of the first research initiatives on political dissent and digital content. The resulting publication, 'Mapping the Arabic Blogosphere: Politics, Culture and Dissent,' focused on 'node-to-node' interaction and general demographics of bloggers.[16] While the article marked a new direction in this field of research, it lacked explanation about the data modeling and sampling methods that were used. Moreover, the model focused on defining groups of people, rather than combining the resulting empirical data with historical and cultural understandings of the region or the transmission of ideas across multilingual discussions in the blogosphere.

In the case of the Egyptian Revolution, the challenge facing scholars when examining contemporary digital media and political change is how to analyze information quantitatively about groups of people in a region where, historically, data science has been used to support a form of colonialism.[17] As Timothy Mitchell explains in *Colonising Egypt*,[18] the practice of science and systems of ordering national standards are modern projects that enable governments to maintain discipline and surveillance. A cog in the colonial project, the science of documenting every political act reflected a 'tendency of disciplinary mechanisms, as Michel Foucault has called these modern strategies of control, … not to expect and dissipate as before, but to infiltrate, and colonise.'[19] At a time when unprecedented Islamophobia and anti-Arab sentiment exist throughout the West, critical readings of race and cultural meaning across media are necessary. Thus, another challenge to studying technology is learning how to distinguish the tool from the political designs embedded in them.

A review of scholarship on media and the Middle East reveals a lack of engagement with digital media content, whether as primary sources or in critically questioning the tools and analytics provided. While many humanities scholars bring rich insights in history and culture, their analyses often are constrained by limited tools for understanding the ontology and syntax of digital production and social media networks. Arguments by writers, such as Malcolm Gladwell, who writes that 'high risk social activism requires deep roots and strong ties,'[20] likely can be verified or challenged only

[15] International AAAI Conference on Weblogs and Social Media (ICWSM), http://www.icwsm.org.

[16] B. Etling, J. Kelly, R. Faris & J. Palfrey (2010) Mapping the Arabic Blogosphere: Politics and Dissent Online, *New Media & Society*, 12(8), pp. 1225–1243, http://dx.doi.org/10.1177/1461444810385096

[17] On the use of data to support colonialism, see J. C. Scott (1999) *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press).

[18] T. Mitchell (1988) *Colonising Egypt* (Cambridge: Cambridge University Press).

[19] Ibid., p. 12.

[20] M. Gladwell (2011) Does Egypt Need Twitter?, *The New Yorker*, February 2, 2011. Available at http://www.newyorker.com/online/blogs/newsdesk/2011/02/does-egypt-need-twitter.html, accessed October 6, 2013.

by a combination of ethnographic research and social network analysis on large-scale datasets.

Knowledge production in the digital realm tests the boundaries between the cultural, the archival, and the technical. It can embody all of these dimensions at once, and thus reconfigure our understanding of each. To this extent, the digital humanities and sciences require new methodological and conceptual tools with which to attend to computation and empirical knowledge.[21] This language provides the conceptual framework for the research presented here.

Background to the Study of Digital Media on the Middle East

Before 2010, many of the books published on 'new media' in the Middle East deal with *Al Jazeera* or television: *Al-Jazeera: The Story of the Network that is Rattling Governments and Redefining Modern Journalism* (2003), *The Al Jazeera Effect: How the New Global Media Are Reshaping World Politics* (2008), *Reality Television and Arab Politics: Contention in Public Life* (2010) or *Arab Television Industries* (2010).[22] Other books on Middle East media scholarship use ethnographic approaches to investigate how 'new media' has shaped belief, authority, social structures, and the Arab public: *New Media and the Muslim World: The Emergent Public Sphere* (2003); *New Media and the Middle East* (2009).[23] Indeed, before the uprisings and even after the uprisings of 2011, there was a clear divide between the qualitative, humanistic research Middle East media scholars produced and the more quantitative approach of traditional communications scholars. For example, in the articles of volume 5, *Middle East Journal of Culture and Communication* (2012),[24] the authors do not employ methods needed to examine large datasets of digital media content, specifically; yet they address important sociopolitical concerns about Middle East media.

In his book, *The Arab Uprising: The Unfinished Revolutions of the Middle East*, Marc Lynch works towards defining a political history to the Arab public sphere. Also engaged in the subject 'the Arab public sphere,' like Anderson and Eickelman, Lynch, though, writes post-2011 and he specifically takes a stance on the role of social media in the uprisings early on in his book.

> The role of social media and the Internet in the Arab uprisings has often been exaggerated, with too much focus on Facebook or Twitter than on the underlying political struggles. But this generational, structural change in the nature of political

[21] See further M. Mateas (2007) Procedural Literacy: Educating the New Media Practitioner, *ETC Press*, May 4, 2007.

[22] M. M. el-Nawawy & A. Iskandar (2003) *Al-Jazeera: The Story of the Network that is Rattling Governments and Redefining Modern Journalism* (New York: Basic Books); P. M. Seib (2008) *The Al Jazeera Effect: How the New Global Media Are Reshaping World Politics* (New York: Potomac Books); M. Kraidy (2009) *Reality Television and Arab Politics: Contention in Public Life* (Cambridge: Cambridge University Press); M. Kraidy & J. F. Khalil (2010) *Arab Television Industries* (London: British Film Institute).

[23] J. Anderson & D. Eickelman (2003) *New Media and the Muslim World: The Emergent Public Sphere* (Bloomington: Indiana University Press); P. M. Seib (ed.) (2009) *New Media and the Middle East* (New York: Palgrave Macmillan).

[24] *Middle East Journal of Culture and Communication* (2012), Volume 5(1) (Leiden: Brill).

> communication represents the most fundamental and significant effect of these new media.[25]

In chapter 5, he devotes a section to 'Hashtag Protests' providing historical context to a series of Twitter hashtag feeds without any empirical or textual analysis of the primary sources—tweets themselves.[26]

Since 2010, more nuanced contributions, based on empirical data about the Internet in the region, have come out, as well as several balanced studies that explore how the revolutions were embedded in material conditions.[27] However, these authors admit to limitations such as the inability to 'discriminate the actual mechanism underlying those chain reactions (or unmistakably pin down social influence),'[28] limitations that I believe are crucial for understanding the full complexity of contemporary events. It is in this light that we seek to contextualize the social media data with ethnographic and historical data.

However, Timothy Mitchell's concern about the disciplinary and colonizing purposes of data science must be carefully employed in these empirical critiques on the recent Arab uprisings. Many of the cited research projects, conferences, and publications that have conducted in-depth data analytics on social media and Internet content from the Arab uprisings are sponsored by think-tanks like RAND and political organizations like the National Endowment for Democracy and the Dubai School of Governance, which are supported by policy-makers and the interests of current global hegemonic structures.

Two years after the Bruce Etling *et al.* article, 'Mapping the Arabic Blogosphere: Politics, Culture and Dissent Online,'[29] and following the uprisings in Tunisia and Egypt, the same core group of scholars organized a roundtable conference entitled 'Blogs and Bullets II.'[30] Following the conference, the *Journal of Communications* published a special edition, 'Social Media and Political Change: Capacity, Constraint, and Consequence.' A year later, Rob Lever interviewed the same group of scholars who participated in the Blogs and Bullets II conference for his article 'Debate Flares on "Twitter Revolutions" Arab Spring.'[31] The common thread in all these discussions has

[25] M. Lynch (2012) *The Arab Uprising: The Unfinished Revolutions of the Middle East* (New York: Public Affairs), pp. 10–11.

[26] Ibid., pp. 104–124.

[27] See, for example, P. Howard (2010) *The Digital Origins of Dictatorship and Democracy: Information Technology and Political Islam* (Oxford: Oxford University Press); Aouragh & Alexander (2011) The Egyptian Experience; M. El-Ghobashy (2011) The Praxis of the Egyptian Revolution, *Middle East Research and Information Project*, no. 258. Available at http://www.merip.org/mer/mer258/praxis-egyptian-revolution, accessed October 6, 2013; C. Hirschkind (2011) Uprising in Egypt: The Road to Tahrir, in: *The Immanent Frame*: *Blog of Social Science Research Council*. Available at http://blogs.ssrc.org/tif/2011/02/09/the-road-to-tahrir/; and A. Iskandar & B. Haddad (2013) *Meditating the Arab Uprisings* (Tadween Publishing).

[28] S. Gonzalez-Bailon, J. Borge-Holthoefer & Y. Moreno (2012) Broadcasters and Hidden Influentials in Online Protest Diffusion, *American Behavioral Scientist*. Available at http://ssrn.com/abstract=2017808, accessed October 6, 2013.

[29] Etling, Kelly, Faris & Palfrey, Mapping the Arabic Blogosphere.

[30] This author attended the conference as director of R-Shief.

[31] See R. Lever (2013) Debate Flares on 'Twitter Revolutions' Arab Spring, *AFP*, March 10.

been the focus on debating the role of social media in the revolutionary praxis of the region. However, each additional scholarly production does not seem to bring new knowledge, but rather continue to debate on the causational role of social media on social movements.

One comprehensive research effort to study the impact of social media on the Arab world is a three-part series co-authored by Racha Mourtada and Fadi Salem.[32] Their intention was to make sense of Twitter by recoding it into geo-locate/geo-coordinates, which is a way of estimating, not actual statistics.[33] It is important to note the effort in translation to find a numerical estimate that could represent the data in terms of nation-states and populations, rather than simply exploring what is in the data imprints. Geo-location is not a common data imprint, and is therefore often an interpretation. This top-down approach to data mining allowed the researchers to find answers about Facebook usage based on gender, age, and national origin. However, the categories chosen left no space for including hybrid or shifting identities. In the second report in the series, the authors built upon their previous research on Facebook and introduced Twitter analytics. By the time Mourtada and Salem authored the third part of the series, 'The Role of Social Media in Arab Women's Empowerment,' they had started discussing 'netizens' (online communities) in more detail. Each of their charts provided a demographic breakdown by country. But their approach remained unable to account for transnational netizens, or any individuals for that matter who did not fit neatly into predetermined categories.

While technology enthusiasts are being heard, so are more conservative voices. In an article that appeared in the February 2012 issue of *The Atlantic*, Megan Garber warned, 'A Year After the Egyptian Revolution, 10% of Its Social Media is Already Gone.'[34] Earlier Bassem Youssef argued that 'one of the difficulties with efforts to understand the role of social media in the successful North Africa uprising (Tunisia and Egypt) is a paucity of theory.'[35] He builds his argument by critically highlighting three problems with Internet studies: (1) They theorize new media using theories that have been shown to be unsophisticated even when applied to old media, i.e., seeing media primarily as a vehicle for the more or less passive receipt of information; (2) they fail to theorize the specific elements that make new media 'new;' and (3) they ignore the active ingenuity, creativity, and agency of users, who not only receive but also *write* new narratives, and generate such

[32] F. Salem & R. Mourtada (2013) Facebook Usage: Factors and Analysis (January, vol. 3, no. 1, http://www.arabsocialmediareport.com/Facebook/LineChart.aspx); Civil Movements: The Impact of Facebook and Twitter (May 2011, vol. 1, no. 2, www.dsg.ae/portals/0/ASMR2.pdf); and The Role of Social Media in Arab Women's Empowerment (November 2011, vol. 1, no. 3, www.arabsocialmediareport.com/UserManagement/PDF/ASMAR%20Report%203.pdf); all in *The Arab Social Media Report* (Dubai, UAE: Dubai School of Government) and all accessed June 23, 2013.

[33] Salem & Mourtada (2011) Civil Movements. They explain their statistical methods as, 'with a sample of about 10,000,000 tweets among 190,000 Twitter users, estimating *the size of a Twitter population* was a simple two-step process: capture a number of samples (or «sweeps») of users from each country, and use a mark-recapture based technique to compute a population estimate.'

[34] M. Garber (2011) A Year After the Egyptian Revolution, 10% of Its Social Media is Already Gone, *The Atlantic*, February 16, 2011. Available at http://www.theatlantic.com/technology/archive/2012/02/a-year-after-the-egyptian-revolution-10-of-its-social-media-documentation-is-already-gone/253163/

[35] B. Youssef (2011) Internet and Political Mobilization in Egypt and Tunisia, *Connected in Cairo*, August 8, 2011. Available at http://connectedincairo.com/2011/08/08/internet-and-political-mobilization-in-egypt-and-tunisia/, accessed October 6, 2013.

innovations as the Bassem Youssef Show and *Pigipedia.* Furthermore, only about 20 percent of people in Egypt are online, and they fall into specific age groupings, income divides, and education demographics, yet the resistance movement itself clearly extends into many other walks of society.[36]

An example of the kind of writing on new media that Youssef is criticizing might be a 2012 report by the Center for International Media Assistance (CIMA) and the National Endowment for Democracy (NED), 'Digital Media in the Arab World: One Year After the Revolutions.' According to its author, the research was conducted through a series of '35 interviews in person, by telephone, e-mail, and Skype: primary and secondary documents; commentaries; websites; blogs, and other sources.'[37] This research provided an overly optimistic conclusion:

> Social media's potential represents the brightest hope for the greater freedom of expression in the Arab region, enabling tens of millions of people, and ultimately many more, to actively pursue civic engagement, free and fair elections, political accountability, the eradication of corruption, as well as free, independent, and pluralistic media in a rapidly changing media environment.[38]

What is most striking in this investigation into 'digital' media is the absence of any analysis of primary digital information. One might ask appropriately whether publishing on digital humanities without speaking digital languages or engaging primary digital media is akin to publishing on France without knowing French or engaging with any French primary material. Furthermore, the choice of interviewing 35 key individuals does not speak to the scale of the research question the report poses. It also negatively reinforces the top-down authority structures that these very upheavals have been resisting.

Outside of the Arab world, Twitter data have been used for now-casting or measurement in a variety of domains, such as stock markets, politics, and social movements. In 2011, M. Choy's Twitter sentiment failed to predict Singapore's 2011 presidential election.[39] Several research projects on Twitter sentiment analysis in particular have emerged during the last few years, including one 80-page report by the Rand Corporation that uses tweets by Iranians to measure public opinion in the aftermath of the 2009 presidential election.[40] This research was one of the first projects to use natural language processing and text analysis to determine sentiment in tweets. Without much of a review of the historical scholarship on public opinion in Iran, this research focuses on a linguistic approach to understanding how people communicate and the functions of the words they use. 'In practical terms, this approach suggests that it is possible to gain insights into emotional

[36] Ibid., p. 4.

[37] J. Ghannam (2012) Digital Media in the Arab World: One Year After the Revolutions, March 28. A Report to the Center for International Media Assistance, available online at: http://cima.ned.org/publications/digital-media-arab-world-one-year-after-revolutions.

[38] Ibid., p. 3.

[39] M. Choy, L. F. M. Cheong, N. L. Ma & P. S. Koo (2011) *A Sentiment Analysis of Singapore Presidential Election 2011 using Twitter Data with Census Correction* (eprint arXiv:1108.5520).

[40] S. B. Elson, D. Yeung, P. Roshan, S. R. Bohandy & A. Nader (2011) *Using Social Media to Gauge Iranian Public Opinion and Mood After the 2009 Election* (Santa Monica: The RAND Corporation).

states and social disposition, regardless of the content of the writing.'[41] It is important to note that all of this analysis to measure a Persian/Farsi-speaking public was conducted on English language tweets, blinded to tweets in any other language. Despite RAND's efforts, their computer-driven analytics recently transitioned from 'manual analysis' to applied simple computing techniques using a free Twitter archive service: TwapperKeeper.com.[42] Like the others mentioned, RAND's analysis relies on other sources to provide the technical analysis. These secondary sources and their methodologies are not examined in RAND's larger research.

All the above efforts, while paving the way for new grounds in research, have highlighted a growing and very tangible need for more research to interpret aggregated mediated interactions, as well as a different set of tools and languages that take seriously the digital as an archive of primary material.

Large-scale Dataset Impact on Research Paradigm

With four billion tweets and millions of online articles posted since 2008, the unique features of the R-Shief dataset are its size and its historical depth. The growth of corpus-based lexicography[43] and corpus linguistics showed that large collections of data concerning language significantly alter the conclusions that can be drawn and the quality of the material available to provide evidence for those conclusions.[44] In addition, this body of work noted the significant difference between what people say or believe they do, and what they actually do. Equally, when it comes to a diachronic understanding of conceptual and cultural influences, it has been usual for students of the history of ideas or cultural analysis to choose narrow sets of material even if analyzed over longer periods of time, largely due to the substantial challenge of addressing wider quantities of material.

Recent research on social networks and micro-blogs has tended to be based on relatively limited samples of data usually restricted to a few days or weeks of data.[45] Even when a greater quantity of data is used, the techniques employed focus on network structure and frequencies rather than the concepts and ideas. R-Shief provides the opportunity to examine research questions from a number of perspectives simultaneously. The quantity of data allows an analysis of the networks between different actors, not just as a snapshot at one time but also as they develop and grow. For example, we can trace the growth of re-tweets of a particular actor or set of actors over time, thus acquiring a diachronic representation of network structure. The depth of time in the dataset allows us also to trace the development of ideas using methods from corpus linguistics (collocations, phraseology) and information extraction (IE). The quantity of data also allows for appropriate tests of statistical significance to be applied when the specific questions warrant this. We should add here also that while there is a growing body of Arabic language analysis tools, Arabic remains under-researched with respect to the tools and

[41] Ibid., p. 26.
[42] In September 2011, TwapperKeeper was bought by HooteSuite, which left the Twitter market for archived tweets in great demand again.
[43] J. Sinclair (ed.) (1987) *Look Up: An Account of the COBUILD Project in Lexical Computing* (London: Collins ELT) and G. Dunbar (ed.) (1989) *Computers and Translation*, 3 (3/4), pp. 263–266.
[44] J. M. Sinclair (1991) *Corpus, Concordance, Collocation* (Oxford: Oxford University Press).
[45] Gonzalez-Bailon, Borge-Holthoefer & Moreno, Broadcasters and Hidden Influentials.

systems available for language analysis. The use of R-Shief allows researchers to pose questions that arbitrary snapshots of time segments (even if focused on specific relevant communities) would not permit. The size of the dataset furthermore provides a certain methodological validity that would be difficult to obtain under other circumstances.

The Science of a Knowledge Management System

Rather than traditional data analysis, the CCA project provides a method for uncovering culturally significant patterns. These methods are used in making the cultural significance of data analysis evident. There are two important elements of R-Shief's knowledge management system that have enabled it to produce meaningful insight into Arabic language content and real on-the-ground events. The first is that R-Shief's analytics draw from its heterogeneous architecture composed of many different platforms: Twitter by hashtag and by user, Facebook public pages, video and YouTube feeds, Flickr feeds, blogs, websites, news feeds, e-publishing sites. This comprehensive archive offers a breadth of historical information over five years that few other systems can claim.

Second, from the beginning, R-Shief has focused on providing analysis in foreign languages. Using its sizable archive, R-Shief has been able to develop its own language detection algorithm for Arabic, Persian, Urdu, English, French, German, and Spanish character by character.

This research uses interdisciplinary methodologies and builds innovative data models using a type of computing known as swarm computing, where the machine learns from the size and material saved in its databases. This enables researchers and scholars to examine digital media and its impact on social, political, and economic events. R-Shief responds to the palpable and growing need to make the convergence of technological infrastructure, body-habits, and national narratives legible. For example, when analyzing modes of behavior, what does one consider? Some researchers conduct poll interviews or survey television programs. R-Shief anticipated looking at Twitter in its first beta launch in 2008, long before the hashtag #Jan25 became a ubiquitous node for discourse analysis. By 2008, activists in the Middle East had honed their work on and through Twitter. R-Shief was poised to archive public sentiment as it was mediated and molded through Twitter. Like many research projects examining big data, R-Shief began its research into social media by analyzing Twitter's micro-blogging platform. This has to do with the ease of Twitter's data structure, 140-character word limit, Twitter's accessible API, and its simple design. It is relatively easy to analyze Twitter, as compared with Facebook, for example.

Since 2008, R-Shief has grown into a knowledge management system that has three distinct functions. First, it archives digital media data in multiple languages—this includes a heterogeneous ecology of datasets, not just Twitter. Second, it processes the scope of the data in terms of location, time, language, semantics, sentiment, and frequency using our own language detection algorithms. Third, it finds interesting data patterns across the ecology of networks. R-Shief first was conceived in 2008 with the purpose to archive the Internet in Arabic and to make that archive accessible to researchers. The project resists collapsing its work into a single vector of analysis or explanatory narrative. It aims instead to map crucial patterns that play out across all media forms and languages.

By honing this mapping, R-Shief can document a science for verifying Internet data. This knowledge management system archives content that is written, posted, shared, and commented on by a networked community. Individuals who participate in this community

via list serves, social networking sites, and professional networks receive hundreds of digital announcements on local and regional developments throughout the Middle East.

R-Shief aggregates these local and regional missives to create a broad and expansive living archive. This archive produced in local situations fosters a global transnational conversation as it is read, reposted, circulated, discussed, refuted, contested, and expanded by people across many regions. These geographically dispersed interlocutors are as integral to the discourse as are those who are embedded in local situations. This study employs new methods to study, specifically, the use of the hashtag on Tahrir Square, a place of significance in Egypt.

I Vote #Tahrir: Beginnings of a Micro-case Study

Tahrir Square is a practiced space with historic significance. Symbolically, it represents a message of liberty for the people of Egypt. In 1881, the Egyptian army officer, Colonel Ahmad Orabi led a military unit from Liberation Square, where he gave his memorable speech in front of the ruler of Egypt, Khedive Tawfiq. In this speech were his famous words: 'Our mothers bore us free men.' On January 25, 2011, this symbolic location became the primary destination for a series of protests. It has been suggested that Tahrir Square be limited to pedestrian traffic, and to re-plan it to be a plaza for arts and creativity reciting the story of the 2011 Egyptian popular revolution and its martyrs. A simple memorial for martyrs now exists in Tahrir Square to remind visitors of this historic incident.

Since the resignation of Former President Hosni Mubarak in February 2011, there has been a continued sense of leaderlessness and overall instability throughout Egypt, despite the election of Mohamed Morsi in June 2012. During this transition period, the Egyptian military has shifted from its original peacekeeping role to violent action against civilians. On the 59th anniversary of the 1952 Revolution, July 23, 2011, the Abbasiyya neighborhood of Cairo was the site of confrontations between armed civilians and hundreds of protesters, marching from Tahrir Square to the headquarters of the ruling Supreme Council for the Armed Forces (SCAF). Security forces blocked the street and fired teargas at the protesters. Violent clashes continued through the summer and, in October 2011, the massacre of predominantly Coptic protesters in Maspero circulated widely on YouTube. On November 21, 2011, the Egyptian cabinet resigned amid a rise in deadly clashes and a week before parliamentary elections. The violence has continued, and clashes erupted in Abbasiyya in late April 2012, a month before the presidential elections.[46]

When charting various hashtags, it seemed evident that Tahrir has been imagined as a nationalist trope for the revolution. For instance, Figure 2—a longitudinal study (April 2011 through February 2012)—illustrates the rise of Egypt-related tweets during the November clashes on #Tahrir, specifically. When looking at a year of tweets, the spike on #Tahrir tweets on November 21, 2011 is notable. Other related hashtags did not spike as high. And, in Figure 3, we see #Tahrir tweets consistently contain a higher percentage of Arabic-language content than other similarly symbolic hashtags, such as #Jan25 and #Egypt. Also, there are more dramatic increases and decreases in the activity of #Tahrir tweets, which might indicate the newfound role for Tahrir as a nationalist icon.

[46] This research was conducted prior to the violence of June 2013.

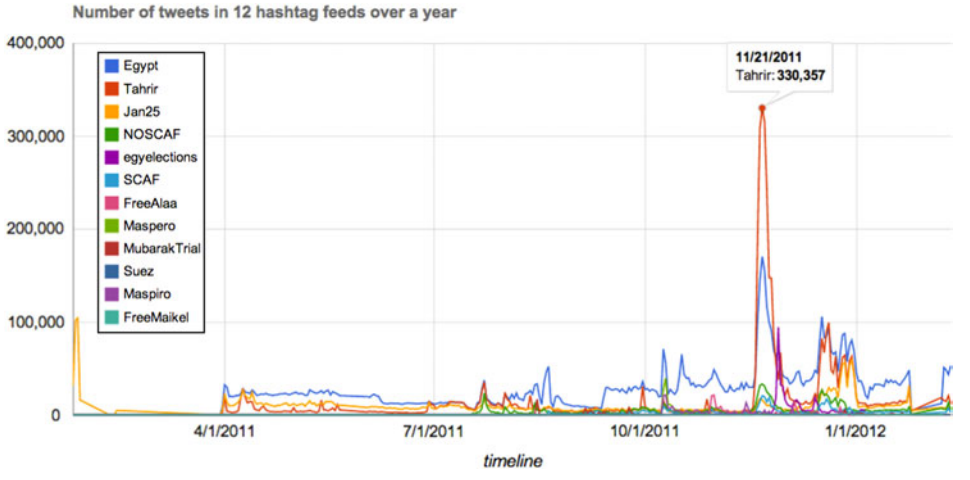

Figure 1. This graph resulted from a collaborative study of 24,275,110 tweets from 12 hashtag feeds. Created by VJ Um Amel, 2012

Even as organizational formations and technologies of mediation in Egypt have changed over the last few decades, the call for human dignity and social justice remained unchanged. The images in Figures 1 and 2 are an introduction, intended to give a general idea of different ways we can better understand the terms of these cultural productions and people who self-identify as Egyptian or Arab, rather than identify with a specific place with geographic boundaries.

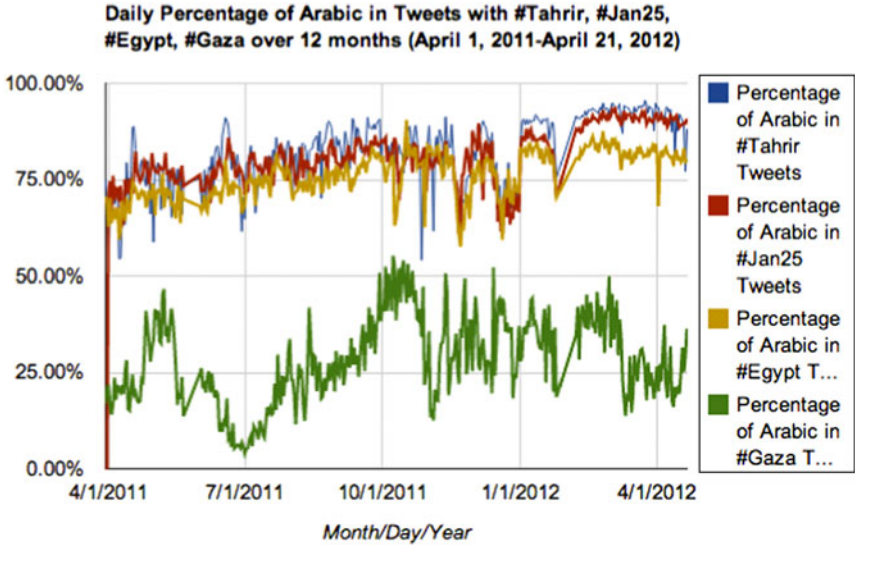

Figure 2. Daily percentage of Arabic in Tweets with various hashtag feeds. Created by VJ Um Amel, 2012

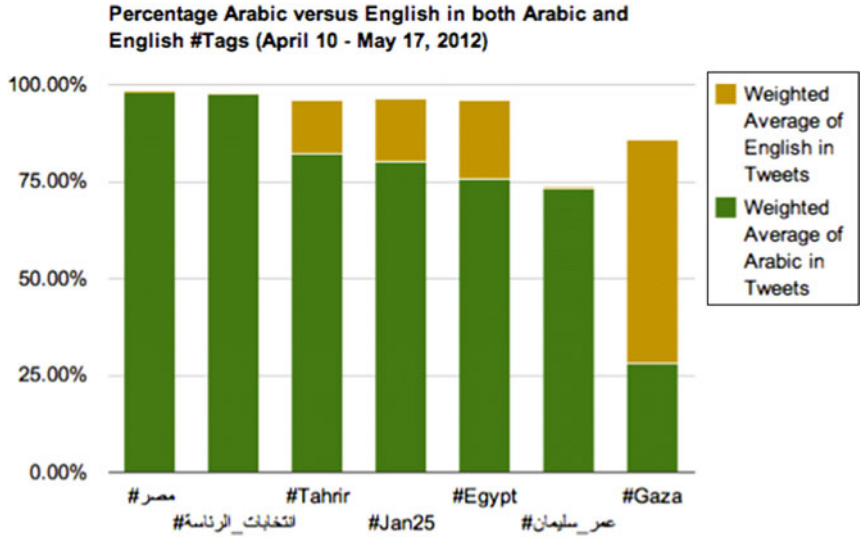

Figure 3. These weighted averages indicate a high level of Arabic tweets on Egypt since 2010

The next steps in this project are to continue further large-scale data analysis (social media analytics) and combine research with culturally contextualized ethnographic and historical methodologies. In this paper, I am arguing for future research that builds upon these quantitative analyses of social media using a number of tools (statistical aggregation and visualization, network analysis, text mining, information extraction) that integrates qualitative understanding of the social and historical context of media production to bring insight into the problem space between technology and political change. This approach will also integrate a number of different media and modalities, not only micro-blogs, but also news reports, conventional blogs, and—where appropriate—multimedia outputs. This research project builds upon previous e-research structures that have embraced interdisciplinarity and collaboration methods across disciplinary methods in the scientific and humanistic visions of the world, and will continue to be enriched by teams of scholars.

Conclusions

My argument presents a basic genealogy of the development of cultural analytics within the emergent fields of digital humanities and new media studies. I also summarize the limitations of this approach as compared to other methods of media analysis. Despite these challenges, how might we frame new cultural insights that we can glean from the deployment of these methods as a way of understanding contemporary media culture?

The aim of this is to map the plurality of patterns, stories, ideas, analyses networked across media forms. It is designed to refute the possibility of a monolithic narrative about contemporary Egypt. The methodology of R-Shief works specifically at intersections—between cultural and technical analytics, theory and practice, virtual and embodied practices, and Eastern and Western languages. These ideas are based in a multi-dimensional approach, and thrive in situations where differences between modalities of

knowledge production, culture, and languages require one to translate and straddle these differences into a cohesive form.

My first objective is to provide context for the growing interest in the analytic properties of social media content. I argue that the stock of 'primary data' is important, but not determinant in creating nuanced cultural analyses. I consider the work of data visualizations, especially in relationship to the stock of primary data (actual tweets, status posts, etc).

My second objective is to argue for the importance of paying attention to the specific language of the stock of primary 'social media' data. In my work, I focus specifically on the use of Arabic online. This is absolutely critical for a number of reasons. Of course, there is the cultural moment of what the United States calls 'The Arab Spring.' But most analyses of this so-called social media revolution had not taken into consideration the analysis of the meaning of actual Arabic language use. After harvesting and analyzing Twitter posts for more than three years (2008–12), I became aware that the use of Arabic language online was steadily rising.[47] Hence, by presenting this work, I hope we come closer to identifying and addressing the gaps in the textual analysis of digital information on the Middle East and North Africa (MENA).

The medium of digital substance is computer code; the manner of its composition is through words and images that can be interactive and animated; and its form is the posted digital composition itself. Thus, to understand the gamut of factors in this emergent form and how in turn it can reflect behavior and ideas, such as political mobilization or peace and conflict resolution, practitioners and scholars must take into account a host of variables.

With the goal of attaining cross-cultural understandings that provide insight into the levers of influences across the globe, the research enabled by technologies such as R-Shief allows research on large-scale, open-ended, interactive, international collaborative ventures in which scholars, activists, technical experts, librarians, and academics work together. However, studying and interacting in a networked culture requires fluency in interfaces and digital software. Such literacy understands computational media at the level of its 'rhetoric, aesthetics, and poetics encoded in any work.'[48] This language provides the conceptual framework for the research presented here. I argue that a shared procedural literacy among collaborators in digital and new media productions can provide critical insights into our contemporary culture and behavior.

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[47] For example in one month alone (April 2012), more than 80 percent of the tweets that used the English-language hashtags #Tahrir and #Jan 25 were written in Arabic. More than 95 percent of tweets using related Arabic hashtags were written in Arabic.

[48] Mateas, Procedural Literacy.

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