Abstract—The platforms of social Networks play a growing role in influencing the public opinion. In addition, social Networks can describe the reaction of communities towards the reigning conflicts in the world. As a matter of fact, analysis of Social Networks has been used widely for a better understanding how communities address prominent and influential events. As for Twitter, it has used as a platform for exchanging opinions and showing support for either of parties of a conflict. For instance, Twitter witnessed trending of hashtags such as #Gazawar #GazaUnderAttack or #IsraelUnderFire.

In this paper, we discuss the role of Social Networks, particularly Twitter, in influencing the Israeli war on Gaza Strip - Palestine during summer 2014. This study shows the mode of public opinion and its reflections on what is trending on Twitter. We construct a dataset drawn from Social Networks sources to examine the behavior of Israeli, Palestinian and foreigner universe. Moreover, we analyze the dataset including tweets as reactions to Gaza War 2014. The results illustrate the important insight of the Social Networks. As regards influencing, it affects perspective of the international universe as well how they address the conflict.

Index Terms—Social Network Analysis (SNA), NodeXL, Social Networks mining, Twitter trending, Opinion mining

I. INTRODUCTION

On 8 July 2014, a military operation launched by Israel in Gaza Strip - Palestine. Israeli Forces started attacks, targeting Palestinian cities and infrastructure, resulting in seven weeks of the war. The Israeli strikes and the ground fighting resulted in the death of thousands of people, the vast majority of them Gazans [15]. According to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), over 273,000 Palestinians in the Gaza Strip had been displaced, of whom 236,375 (over 11% of the population) were taking shelter in 88 UNRWA schools.

UNRWA exhausted its capacity to absorb displaced persons, and overcrowding in shelters risked the outbreak of epidemics. 1.8 million people were affected by a halt or reduction of the water supply, 138 schools and 26 health facilities [16][17][18] were damaged, 872 homes were totally destroyed or severely damaged, and the homes of 5,005 families were damaged but still inhabitable.

In a time of crisis and emergencies, media and Social Networks are seen as influential forces on public opinion [19]. Many researchers tried to explain the formation of public opinion as a phenomenon of a collective behavior [20]. For instance, people want to know where their families and friends are as not being able to reach them or they want to know where the dangerous locations are during wars. Fortunately, Social Networks offer a rapid platform for sharing of information. However, unfortunately, information mixed up with accurate and inaccurate. Nonetheless, there is an indication that Social Networks tend to favor valid information over rumors.

Since almost all online Social Networks allow networking, one interesting problem is an analysis of such networks. It is challenging whether to consider a theoretical model, which traditionally is used to study relationships between individuals, groups, and organizations [1], or adopt a visual model to represent actors and relationships [4]. For as the visual model, it can be of interest to analyze the networks for business. Companies, which are interested in marketing a new product, will analyze specific networks and often interested in finding the most suitable individuals, which are potential can be a target to promotions in a cost-effective way.

Anyhow, Social Networks have been flooded with conflicting opinions and information since the Israeli offense on Gaza, which began on July 8 - 2014. Twitter and Facebook are good examples of Social Networks interactive during crisis and emergencies. Not only they provide active follow-ups live events, but also, eyewitnesses can share relevant information and report news. In particular, Twitter became a valuable tool during crisis and emergencies, as there is increasing evidence that it is not just a social network, it is also a news service [2] [21]. That is exactly what happened during Gaza War.

In order to reveal the public opinion, we have exploited the approach of Social network analysis (SNA). For the better understanding international universe, we collected data of #GazaUnderAttack and #IsraelUnderFire hashtags to measure the support for Gaza and Israel. Accordingly, we used extensive disseminate of hashtags specific words or phrases prefixed with the pound (#) symbol in order to categorize tweets [3]. Israel and Gaza made extensive use of hashtags; Gaza promoted its own hashtag so that users could show their support by tweeting #GazaUnderAttack. Based on hashtag mentions of #IsraelUnderFire (Israel) versus #GazaUnderAttack (Gaza).
The major disadvantage of the traditional media that is the perceived bias is apparent. Sometimes journalist’s bias appears in their selection of events and stories that are reported and how they are covered. On the contrary, events cannot be ignored on Social Networks. Many civilians take the lead and play the role of journalists to cover stories on Social Networks. Put differently, millions of tweets trended and shared by regular citizens with handheld videos and graphic photos of the running events. Social Networks documented the murdered Palestinian civilians many of whom were women and children. All of the above rectified the mainstream of media coverage even though it shortened the reality.

Indeed, Twitter witnessed a public opinion of support from millions of Arabs, Muslims, and friends around the world, which helped transform the meta-narrative on the Gaza conflict. Tweeting creates a maelstrom that quickly outpaced the coverage from CNN or the New York Times [2]. As in the Gaza War 2014, the public support and international mediators were influential to the course of events. Depending on SNA, hashtags served to give accurate and timely statistics about trending tweets of international support. Actually, Twitter offered an important insight for influencing and helped in the formation of public opinion of the international universe.

This paper is organized into six sections. In section II, we have reviewed the literature and compared the previous similar analysis of Social Networks during serious periods. In section III, we illustrated the steps of our experiment. Our methodology has depended on collecting and analyzing data from Twitter. In section IV, results are stated supported with five figures. In section V, we discussed results’ implications. Indicators and counts illustrated with two figures. Finally, in Section VI, we concluded that Twitter had witnessed a large wave of support for Palestinian people under attack during Gaza War 2014.

II. RELATED WORK

Given that Twitter is a utility of communication and interaction platform for driving the events and emergencies, it is not surprising to find out that a number of studies have been performed to analyze tweets posted under such conditions. Here we present a number of papers, which demonstrate the analysis of Social Networks. Essentially, exploring through helped us to have a comprehensive idea about the analysis of Social Networks.

Our study addresses the Israel-Gaza conflict, especially during the clashes. In the same way, (E. Siaperaa es al.) in [22] aimed to investigate the images shared on Twitter in connection with the Israeli-Palestinian conflict, in the aftermath of Operation Pillar of Cloud the summer of 2012. They examined the most frequently shared images referencing both actors involved in the conflict, as well as the conflict’s location, immediately following the operation’s ceasefire. In addition, the investigation established whether the online conflict continued even following the official diplomatic ceasefire. In brief, the study classified the shared images with analysis. The aim of the analysis is to recognize trends and to examine the overall contribution and role of Twitter in this particular iteration of the conflict.

Another study of Twitter sentiment analysis was carried out by (M. MasterMineDS) [23] in order to describe Israel – Gaza conflict on 2014. The conversations around the world about the situation in Israel and Gaza are studied. (M. MasterMineDS) wanted to find out, per country, how many people are talking about the Israel-Gaza conflict through all the general tweets out there. In addition, in the aspect of the public conversations are represented in Google’s Maps for the top 40 countries. Findings show that the western countries are not highly interested in the conflict. Moreover, the amount of users who condemn Israeli side is larger than those who showed support Israel.

In the same way, (G. Lotan et al.) have analyzed Twitter information flows during the 2011 Tunisian and Egyptian uprisings. Information has been drawn from two datasets of public tweets, each shared during a period of approximately one week. That is to say, information flowed across different actor types was described and with a discussion of seen patterns. Moreover, a conclusion was stated by discussing the symbiotic relationship between news media and information sources.

(N. Eltantawy and J. Wiest) in [5] seek to open dialogue about the utility of resource mobilization theory in explaining social movements and their impact by exploring the use of Social Networks in the 2011 Egyptian revolution through a limited case study analysis. It argues that Social Networks played an instrumental role in the success of the anti-government protests that led to the resignation of the country’s dictatorial leader, and calls for further examination of the proposed incorporation of Social Networks as an important resource for collective action and the organization of contemporary social movements.

Australia experienced its worst flooding disasters in 2010 and 2011. Using tweets extracted from Twitter during floods, SNA techniques were used to generate and analysis the online networks that emerged at that time [4]. (F. Cheong and C. Cheong, 2011) in [4] aim to develop an understanding of the online communities for the Queensland, New South Wales, and Victorian floods in order to identify active players and their effectiveness in disseminating critical information.

Still in Australia, (S. Sinnappan et al., 2010) in [24] analyzed the content of 1684 tweets collected during Black Saturday, Australia’s worst fire disaster found that these tweets contained actionable factual information contrasting with claims that the contents of tweets are of no value as they are mostly chatter. The tweets made during Black Saturday are laden with actionable information, which contrasts with earlier claims that tweets are of no value made of mere random personal notes.
Other studies of the 2010 earthquake in Chile took place to measure the credibility of information contained in tweets. For example, (Castillo, et al., 2011) in [26] developed an automatic credibility analysis. That is, an automatic classifier was built using features extracted from “trending topics” and was found to be able to classify tweets as credible or not credible with precision and recall in the range of 70% to 80%. As well as, (M. Mendoza et al., 2010) in [25] examined the veracity of information disseminated on a small number of tweets during that critical event showed that false rumors tend to be questioned much more than confirmed truths.

Another example of emergencies was the 2009 Red River floods in USA and Canada. (K. Starbird and J. Stambler, 2010) analyzed tweets posted in [27] to identify the mechanisms for information production, distribution, and organization. A prescriptive tweet-based syntax was proposed to increase the utility of information generated during emergencies. Concluding that the production of new information on Twitter is by means of derivative activities such as directing, relaying, synthesizing, and redistribution and is complemented additionally by socio-technical innovation.

More examples can be found such as the Twitter content analysis by (C. Chew and G. Eysenbach, 2010) in [28]. They suggested and evaluated a complementary approach using Twitter during the 2009 H1N1 pandemic. Over 2 million tweets were collected during a period of about 8 months during the 2009 H1N1 outbreak. The researchers validate Twitter as a real-time content, sentiment, and public attention trend-tracking tool on a random sample of 5,395 tweets. Content analysis revealed that 52.6% of the posts were resources-related and the most popular resources were news websites followed by web pages of government and health agencies.

Finally, (C. Ullrich, K. Borau and K. Stepanyan, 2010) in [29] have used SNA to study the patterns and trends of network dynamics. They explore associations of student achievement records with the observed network measures and evaluate the use of Twitter as part of a foreign language-learning course by analyzing the interaction of learners and teachers over a period of 56 days. The findings indicate that there is greater interaction among students of similar levels and more attention is paid to higher achieving students. As far as gender is concerned, it was observed that there is a preference for study participants to interact with peers of the same gender and that gender does not determine popularity.

To sum up, all of the surveyed researches are in harmony of our conceptual aspects. Indeed, all of the above researches utilized the SNA techniques and NodeXL for the analysis of Twitter. The key to innovation is to reflect public opinion trending on Social Networks with the adoption of suitable technologies. As proven for literature review, NodeXL is a powerful tool to collect, store, analyze, visualize, and publish network dataset.

III. METHODOLOGY

In this study, we chose to investigate in two hashtags; #GazaUnderAttack and #IsraelUnderFire. Based on popularity, we have selected the two hashtags trending about Israel-Gaza Conflict. We studied the interaction of Twitter’s users with these two hashtags. As for the dataset, we have downloaded the tweets data for the period from July 2014 to May 2015. The data was stored in excel table spreadsheet which contains many fields such as User, Relationship, Tweet, Hashtags in Tweet, Tweet Date (UTC), Twitter Page for Tweet, ID.

Here is description of these fields
1) User: the person who posts the tweet.
2) Relationship: Mentions, Tweet, or Replies to.
3) Tweet: the text of tweet containing any more details like hashtag, links, pictures, or videos.
4) Hashtags: the top words containing the prefix (#) symbol.
5) Tweet Date: specific time (day, month, year and (hour, minute, seconds) in UTC timing when tweeting.
6) Twitter Page: Twitter user profile.
7) ID: a unique number for each tweet.

While collecting data from Palestinian people for a day, we have noticed an issue. The tool for collecting the tweets was implemented to work very slowly. Unfortunately, Twitter only makes the last 14 days tweets available to the public. That is we were unable to go back in time to capture them. Once the tweets were stored in a database, they were available for further analysis. In terms of data cleaning, not much was required since most of the tweets could be traced back to their owners, and the web pages mentioned in the tweets easily located.

Another issue we have noticed, that is the matter of user privacy. We have formed a profile for users available for research. But what if any user has posted something illegal, racist or private. Moreover, we could obtain some extra detail from the NodeXL. For example, the specific place for the user (longitude, and latitude) if the GPS is turned on, or sometimes from the network on the phone if he tweeting from his phone.

IV. RESULTS

In this study, we notice that 657 tweets were in this hashtag during 8 days only, but 97% of them were on April 29th, 2015 and the major source is Gaza.

As shown in TABLE I, results show that #IsraelUnderFire has 1589 tweets authorized by 1110 contributors and a total universe of 2886426. However, #GazaUnderAttack has 6775 tweets authorized by 4221 contributors and a total universe of 8,017,747.
TABLE I
COMPARISON RESULTS BETWEEN THE TWO HASHTAGS

<table>
<thead>
<tr>
<th></th>
<th>#GazaUnderAttack</th>
<th>#IsraelUnderFire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Tweets</td>
<td>6775</td>
<td>1589</td>
</tr>
<tr>
<td>users</td>
<td>4221</td>
<td>1110</td>
</tr>
<tr>
<td>Total Impression</td>
<td>18,017,187</td>
<td>2,886,426</td>
</tr>
<tr>
<td>Tweets/user</td>
<td>1.61</td>
<td>1.43</td>
</tr>
<tr>
<td>Total universe</td>
<td>8,017,747</td>
<td>2,112,126</td>
</tr>
<tr>
<td>Measured Time</td>
<td>298 days</td>
<td>298 days</td>
</tr>
<tr>
<td>Impressions universe</td>
<td>2.25</td>
<td>1.37</td>
</tr>
<tr>
<td>Frequency</td>
<td>22.73</td>
<td>5.33</td>
</tr>
</tbody>
</table>

Figure (1) shows that for GazaUnderAttack, the signal is high in July, August, and September 2014. However, for IsraelUnderFire, the Reach/Repeats Signal strength is high only in July, August 2014.

In figure (2), the X-axis represents time evolution and the Y-axis represents the number of followers of the contributor, the upper the blob, the more followers of the contributor and the Z-Axis (blob radius): Represents the amount of searched keyword repetitions [8]. We can see that blob radius is the biggest from July 2014 to September 2014.

Figure (3) shows that for Fig. 3. Blob Graph, Analyze represents the amount of searched keyword repetitions. The blob radius is the biggest on July, August 2014.

V. DISCUSSION

Fig. 2 draws the relation between user interaction over Twitter and the period of the Gaza War. Usually, the user interacts with the event by tweeting, rolling over relative content, or clicking on links of news websites for more details. The circles in blue plot the number of users from 100 up to 1,000,000 and the period extended from 1 July 2014 until 1 July 2015. The bigger the circle is, the larger number of interactions by users is. As shown in fig. 2, the biggest circle took place between July and September 2014 with an average of 1000 users. The smallest circle took place in May 2015 with average users of 100,000. It is noticed that the most active interactions took place during July and September 2014. However, the largest number of users took place between May and June 2015. In addition, the most of the interactions came from a minority of users. It is also noticed that interactions
vanished after September 2014 but it came back spring 2015.

As similar, fig. 3 represents the repetitions of searched keywords. The period also took place between 1 July 2014 until 1 July 2015. This figure shows the relation between the period of Gaza War and the number of keywords. The size of the blue circles represents the number of times searching for keywords over Twitter. The biggest search took place in August 2014 for over 100,000 keywords. However, specific keywords, less than 100, were the most searched keywords. In addition, the search vanished after September 2014 but it came back mostly in June 2015.

Another characteristic of the Israel-Palestine conflict, it is a polarizing world wild conflict. This appears clearly from the Geo-locations of the users. When we look at the map, we can see that the tweets came from almost all countries around the world as shown in fig. 4 and fig. 5.

For instance, fig. 4 shows that the tweets of #GazaUnderAttack came from Far East of Tokyo, crossing India, Arab countries, European Union, and North America, up to Montreal, Canada. The number of users varies of course up to 101 per country. On the other hand, fig. 5 shows the tweet of #IsraelUnderFire but with less number of users per country, up to 56. Places like Alaska, London, New York, Dubai, New Delhi, and Cape Town had the largest number of users.

For more analysis, we wanted to investigate users. We classified users for male and female. In TABLE II, we showed a comparison between the two hashtags #GazaUnderAttack and #IsraelUnderFire. For both hashtags, the male has the majority with 66.5% of #GazaUnderAttack and 61.8% for #IsraelUnderFire. Blob radius is the biggest from July 2014 to September 2014 for #GazaUnderAttack. On the other hand, Blob radius is the biggest from July 2014 to September 2014 for #IsraelUnderFire. As shown in fig. 6, the top active user was @AnonymousVideo. He has 24,461 followers. The average was about 3600 followers such as @leilanazzar, @WRH_Mike_Rivero, and @ss_Tomlinson.

Regarding users by retweets; we needed to compare with respect to both sides; Israel and Palestine. As shown in fig. 7 and 8, the average retweets was 40 retweets from the supporters of Palestine. The top user was @NadeenR with 89 retweets. We noticed users around the average such as @Op_Israel, @jpney, and @JOL_NEWS. On the other hand, the average retweets were 16.8 retweets from the supporters of Israel. The top user was @IsraelUnderFire with 42 retweets. We noticed users around the average such as @H_barqah, @StandWithUs, and @IsraelhasRights.

In addition, we presented the related hashtags our study. We have found the most related hashtags were #Gaza, #PrayForGaza, & #FreePalestine. The English hashtags are much popular than Arabic ones. As shown in fig. 9, the graph represents Comparison frequency of #GazaUnderAttack and #IsraelUnderFire tweets between April 13 and May 13. The frequency was oscillating up and down. The maximum value of the hashtag #GazaUnderAttack took place on April 26 with 786 tweets, while the minimum values took place on May 8.
with 105 tweets. The average tweets were 296 tweets and almost maintained through the period.

On the other hand, the maximum value of the hashtag #IsraelUnderFire took place on April 25 with 195 tweets, while the minimum values kept repeated three-quarters out the total period with 0 tweets. The actual period took place from April 22 to April 30 with 43 tweets.

![World map represents Twitter user’s geolocation of #GazaUnderAttack](image1)

![World map represents Twitter user’s geolocation of #IsraelUnderFire](image2)
TABLE II
Gender and blob radius Comparison between the two hashtags #GazaUnderAttack and #IsraelUnderFire

<table>
<thead>
<tr>
<th></th>
<th>#GazaUnderAttack</th>
<th>#IsraelUnderFire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>66.5% Male and 35% Female</td>
<td>61.8% Males and 38.2% females</td>
</tr>
<tr>
<td>blob radius</td>
<td>Is the biggest from July 2014 to September 2014</td>
<td>Is the biggest from July 2014 to September 2014</td>
</tr>
</tbody>
</table>

VI. CONCLUSION

This paper selected and analyzed the highlight tweets, which were being trended during the Gaza War in summer 2014. The large dataset showed some interaction from all over the world of this conflict. It is noticeable that the rough situations in Palestine cause the support from many people around the world. Consequently, Social Networks became a platform for thousands of people to share their opinion or challenge someone else's point of view in this active conflict. A formation of public opinion was obvious on Social Networks particularly addressing the Middle East, has become a minefield of propaganda and misinformation. Therefore, the Palestinian people and those who showed support should utilize the Social Networks for highlighting this reigning crisis. To summarize, they should use the meaningful hashtag on platforms like Facebook and Twitter to counter the mainstream narrative of the Israel-Palestine conflict. In addition, they should target a wider slice of people all over the world seeking for sympathy.


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