Please Sign to Save ... : When Petitions on Environmental Causes Succeed

Abstract

Social media have become one of the key platforms to support the debate on climate change. In particular, Twitter allows easy information dissemination when running environmental campaigns. Yet, the dynamics of these campaigns on social platforms still remain largely unexplored. In this paper, we study the success factors enabling online petitions to attain their required number of signatures. We present an analysis of e-petitions and identify how their number of users, tweets and retweets correlate with their success. In addition, we discuss how campaigns with high user engagement are the most active in promoting petitions on Twitter PCM: I don't understand that. Finally, we present an annotated corpus of petitions posted by environmental campaigns together with their corresponding tweets PCM: why? towards what goal? seems disconnected to the res.

1 Introduction

The discourse on climate change is often focused on the impact it has on the environment and on the wildlife (Solomon et al. 2009). To bring these issues in the public spotlight, social media campaigns have proved to be an effective instrument to raise awareness and mobilize masses (Pearce et al. 2014). To further push for concrete action from government or public entities, many campaigns resort to e-petitioning (Mosca and Santucci 2009), whose success is also much easier to assess: reaching or not a required number of signatures. Information about the number of signatures obtained for a given e-petition is often publicly available via e-petitions aggregators websites such as `thepetitionsite.com`, `avaaz.org`, `change.org` etc., and can be used as a proxy for the performance of the public campaigns and petitions themselves.

In this work we tackle two main research questions: *What is the role of petitions in various types of environmental campaigns?* To answer this question, we studied several environmental campaigns run in the beginning of 2015, measuring the incidence of e-petitioning as an instrument for campaigning across different types of campaigns (awareness, mobilization). We find that petitioning is particularly important during mobilization campaigns.[1] *What makes a petition promoted by a public campaign successful?* In this work we answer this question by making an analysis of the features extracted from the tweets that are both marked by a campaign hashtags and not marked. We propose a set of social and contextual features and reveal that required number of signatures for an environmental petition is particularly correlated to its outcome. Additionally, we release an annotated corpus with the petitions, their tweets and outcomes[2]. For this study we focus on Twitter, which remains one of the main channels for social media campaigns, also providing relatively easy access to campaign data.

Climate Change Discourse on Social Media. Climate change is highly discussed topic by various segments of society. (Kirilenko and Stepchenkova 2014) overview the climate change domain, its polarization, discussion over time etc. (Olteanu et al. 2015) study how various climate related events are highlights by various media sources. Variety of public campaigns use social platforms to increase awareness or mobilize people (Mahmud and Gao 2014). (Tufekci 2013) describes how the on-line attention can be driven towards particular politicized persona, while (Gonzalez-Bailon and Wang 2013) analyse information transmission during protests. (Hestres 2013) studies public mobilization and online-to-offline social movement strategies for two major environmental movements. Unlike the prior work, we analyze a over 100 environmental campaigns as well as their effect on the petition success.

Characterizing E-petitions. Various works were conducted to analysis the e-petitions on various petition aggregators. (Hale, Margetts, and Yasseri 2013) describe a temporal analysis of 8K petition on the UK No. 10 Downing Street and make an observation towards early signs of successful petition (large number of signatures during the first days). (Huang et al. 2015) analyse "power" users that produce petitions. The authors have shown that only 1% of general topic petitions on `change.org` reaches their goal. How-

---

[1]Mobilization campaigns refer to the campaigns whose primary goal is to engage and motivate a wide range of partners, allies and individual at the national and local levels, towards a particular problem or issue. While awareness campaigns refer to the campaigns whose primary goal is to raise peoples awareness regarding a particular subject, issue, or situation.

[2]Link is removed to ensure anonymity.

ever, to the best of our knowledge, we are the first to analyze which factors predict the success of an environmental petition based on the internal and external attributes of the corresponding public campaign on Twitter. On the other hand, analysis of the e-petitions can be compared to the crowd-funding, since in both fields desired and obtained support can be analysed. (Etter, Grossglauser, and Thiran 2013) study various prediction techniques of the Kickstarter campaigns. Later, (An, Quercia, and Crowcroft 2014) analyse investor activity on Kickstarter and make recommendations of projects based on their activity on Twitter. Unlike aforementioned works, we focus on the climate change and animal welfare petitions, as a part of the environmental public campaigns on Twitter.

We found that 25% of the petition posted with hashtags of the environmental campaigns on Twitter received required number of signatures. Moreover, we have revealed major Twitter features that could craft the success of the petitions. This information might be of a great interest to the environmental activists and campaign leaders as it can influence the success of the message they are conveying to public. It should be noted that the techniques presented below are not restricted to the environmental domain and could be applied to any similar setting.

2 Data Collection, Cleansing and Insights

Our study relies on the collection of roughly 7500 tweets and retweets about a set of 240 petition related to the campaigns on climate change and animal welfare, which were posted from January 2015 to April 2015. Specifically, we consider a tweet to be related to a given petition if it contains a word "petition" in its content.

Campaigns dataset and petition tweets: In order to analyze the role of the petitions in success of public climate change and animal welfare campaigns we have obtained an annotated corpus of such hashtags[3]. The campaign corpus consists of 101 public environmental campaigns with over 850K unique tweets that spans over Jan 2015 - April 2015. We assume that each campaign has a uniquely identified hashtag, e.g., #saveafricananimals, #tweet4dolphins etc. Moreover, all the campaign hashtags are labeled by (a) a high-level goal, e.g., awareness or mobilization type, and (b) a user engagement pattern over time, e.g., one-day campaigns, ever-growing, annual, inactive[4]. Those are the main categories that will be used in the analysis of the petition role across various types of campaigns. Among those, "ever-growing" campaigns are the most interesting ones since they maintain constantly growing number of people that are involved in their action on Twitter.

We have extracted all "petition" tweets from the annotated collection of environmental public campaigns tweets. Here we present an example of a tweet with a petition URL:

---

[3]Link is removed to ensure anonymity.

[4]One-day campaigns have the most user activity fallen into the start/first mention of the hashtag. Ever-growing campaigns have constantly growing number of users posting with the hashtag. Annual campaigns are mentioned annually, e.g., yearly, monthly. Inactive campaigns have very low user engagement overall.

".@thetimes Petiton: Call for Safer Storage of Nuclear Waste in over 80 USA cities. http://tiny.cc/okzicx #SaveFukuChildren". Such tweets were identified in 39 (out of 101) campaigns with a total tweets count of 15K out of which belonged to unique unresolved links (excluding tweets with broken links). Further, we have resolved, stored and annotated all petition URLs. As a result we have found 294 unique petition links and 158 broken or outdated links. For valid petition links we have also stored their resolved URL. We have further used this information to eliminate URLs that point to the same petition. This process has resulted in 240 unique petitions.

Tweets with petitions: Regarding the question of what makes a petition successful as part of the public campaign, it should be noted that the campaign tweets collection does not account for the overall distribution of the petition tweets across the whole Twitter. Therefore, we collected additional data as we describe below. To minimize the bias in our collection, we further collect tweets that contain one of 240 petition via `backtweets.com`. For this task we have used the collection of the extracted URLs with their resolved links (if applicable) and requested `backtweets.com` to return all historical tweets that mention given URL. Clearly, this still results in only a subset of the petition tweets since it does not account for the URL redirects and shortening. However, we aim for a best effort collection which gives us a clearer picture on the distribution of the petitions' tweets. As a result, we have enriched the tweet collection with over 1700 new tweets without campaign hashtag.

Thepetitionsite.com. To compare campaign petitions with other environmental petitions, we have additionally collected all the environmental and animal welfare petitions from the major petition aggregator[5] `thepetitionsite.com` and corresponding tweets from `backtweets.com`. This resulted in over 2800 petition with the following properties: (a) 35% of them are successful; (b) 79 of them are in the campaign dataset, (c) 186 of them are mentioned on Twitter with their direct URLs.

Dataset preprocessing To be able to compare petitions with each other, we use both campaign and non-campaign tweets. A petition p is characterized by its signature goal $S(p)$, collected signatures $C(p)$, $SignatureRate = \frac{C(p)}{S(p)}$ and the following set of Twitter related features $T_i(p)$.

1. Number of unique users posted the petition url;
2. Number of tweets with url;
3. Number of followers of the users posting petition tweets;
4. Number of tweets with campaign hashtags vs without;
5. Number of users that tweet a petition without campaign hashtag etc.

3 Petition analysis

Given the list of petitions corresponding to campaigns about environmental and animal welfare issues on Twitter (described above), we first present an analysis on the petitions' usage within different types of public campaigns and then analyse petition presence outside of the campaign.

---

[5]Accessed on the 16th Feb 2016

3.1 Petitions and tweets stats

Table 1 includes the basic figures extracted about our list of petitions[6]. Surprisingly, we notice that failed petitions aimed to gather only about half as much signatures than successful. This observation is opposite for the Kickstarter[7] campaigns (Etter, Grossglauser, and Thiran 2013), where failed campaigns have about trice as much goal as successful ones. Furthermore, in our data about a quarter of the petitions were successful, as opposed to only the 1% figure found by (Huang et al. 2015) across a broader range of petitions. Overall, the tweets corresponding to the successful petitions are more likely to be passed on, i.e., they are retweeted about 4 times more frequently.

After a deeper inspection of the petition collection, we have identified that over 6% of the petitions in our dataset have a low signature goal $S(p)$, e.g., under 1000 required signatures, out of which 13% are identified as successful. On the other hand, around 50% of the petitions have a high initial goal (over $30\,000$) among which 35% are successful. Additionally, we have observed 39 petitions to reach over 100K signatures and 130 petitions to collect over 10K signatures. Distribution of the petitions by their collected signatures versus their rank is shown on the Figure 1 and convey Zipfian distribution.

|	Successful	Failed
Petitions	61	179
Original Tweets	601	716
Original tweets users	245	313
Reweets	4828	1451
Retweets users	3965	1207
Average $S(p)$	153093	79597
Average $C(p)$	170351	43739
Petition tweets without campaign hashtags		
Tweets	1054	707
Users	626	472

Table 1: Global statistics of the petition dataset of environmental campaigns. We show the data for the successful and failed petitions, as well as total numbers. Users are unique people who tweeted the petition URLs at least once. $S(p)$ and $C(p)$ for successful and failed petitions are highlighted in the table. Additionally, we show statistics of the petition tweets that does not have a campaign hashtag.

3.2 Petitions in public campaigns on Twitter

Out of the 118 environmental campaigns in our dataset, only 39 campaign hashtags co-occur with a valid petition URL. In our data, with only two exceptions, all the petitions were promoted by mobilization campaigns. The two exceptions are "#talkfracking" and "#worldlovefordolphins", which are both awareness campaigns. Interestingly, the petitions with hashtags of awareness public campaigns were not directed towards a particular action but rather long term plans, e.g.,
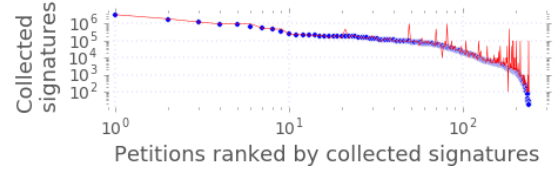
Figure 1: Zipfian for the final number of signatures received by each petition. Red line indicates required number of signatures. The change in the slope of the Zipf's law happens at 1K signatures, i.e., a threshold for a petition to make an impact.
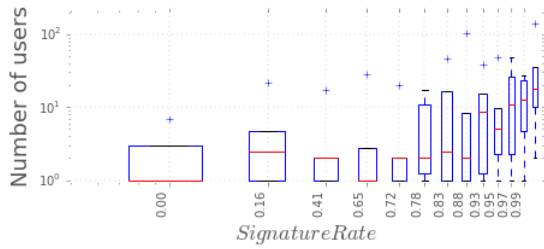
preventing "covering up" hydraulic fracturing by some organizations, or legalizing hemp farming.

As described in the Section 2, the campaign corpus is also annotated according to the user engagement patterns for each campaign, and consist of the four main types: one-day campaigns, ever-growing, annual, inactive. We have found that petitions were mainly promoted and tweeted by the "ever-growing" campaigns ("#saveafricananimals", "#tweet4dolphins" etc.). The rest ∼15% of the campaigns are mainly "inactive" ("#savethereef", "#votegreen2015"). Not surprisingly, "one-day" campaigns do not tend to use petitions as their instruments since usually they require faster actions. Among campaigns with petition we also identified one "annual" campaign ("#worldlovefordolphinsday") that is advertising multiple "Protect Dolphins" petitions that tend to have a high failure rate. Overall, there is no clear distinction between campaigns in terms of having dominantly successful petitions, however, only mobilization and "ever-growing" campaigns were most active in promoting petitions on Twitter.

3.3 Campaign petitions on Twitter

After meticulous data collection, cleaning and preprocessing, we have extracted a number of basic features from the tweets containing a petition URL. This process is explained in Section 2 in details. We have build a binary decision tree classifier[8] over our petition set using described features and examined their effect on the overall success of the petitions. On average, the tree has relatively high branching uncertainty, however, a few paths were more determined at predicting the petition success. Unexpectedly, we have observed that the higher the signature goal, $S(p)$, of a particular petition, the more likely it is to succeed. In particular, over 92% of the petitions with $S(p)$ higher 100K obtained the required number of signatures. Moreover, the higher the average number of followers a user posting about a give campaign has, $T_3(p)$, the less likely the petition is to attain the required number of signatures. On the contrary, the higher the average number of followers a user posting the petition URL without campaign hashtags has, $T_5(p)$, the more likely the petition is to attain the required number of signatures. It should be noted, that the average number of followers is 10x higher for users outside of the campaign compared to the campaign activists. Other features did not reveal significant correlation.

---

[6]Latest petition signatures reassessment is on 28 Jan 2016.

[7]www.kickstarter.com

[8]http://scikit-learn.org

Figure 2: $SignatureRate$ against number of unique users posting about a petition on Twitter.

3.4 Lessons Learned

Since it is not trivial to provide step-by-step instructions on how to drive your petition to success in general, we would like to highlight major lessons learned from our analysis.

Does petition success correlate with the number of tweets? - Yes. We have observed uniform distribution for the petitions with 0 tweets found on `backtweets.com` in terms of $SignatureRate$. On the contrary, for the petitions with several tweet carrying its direct URL we have observed a very high fraction of successful ones (88%). This effect is particularly strong when we consider only tweets without campaign hashtags. We have observed similar behavior for `thepetitionsite.com` petitions.

Does the number of users posting about the petition affect its success? - Yes. We have binned the petitions from the campaign corpus based on the $SignatureRate$, and extracted the average number of unique users posting about the petition in each bin. Figure 2 shows a boxer plot with 25th, 50th and 75th percentile for each bin. As a result, we have found moderate positive correlation with Pearson correlation of 0.7 for the bin mean values.

Is it common to post (a) identical tweets without acknowledging original tweets or (b) retweet? - Retweet. In our petition tweets dataset we have not identified any duplicated tweets, i.e., tweets that are identical. However, as it is shown in the Table 1, a number of retweets for the successful petitions is several times greater than the failed ones.

Which word features are more representative for tweets with successful petitions? - Uppercased. We have discovered that tweets with successful petitions have more words and uppercased words on average, by 9% and 12% correspondingly. We have compared distribution of the uppercased words between the collections of successful and failed petitions by computing relative change for each word. We define it as follows: $RelativeChange = \frac{W_{succ} - W_{fail}}{W_{fail}}$, where W_{succ} and W_{succ} are the counts of uppercased word W for tweets with successful and failed petition correspondingly. Top words from the successful collection: "ACTION", "URGENT", "WAZA", "PETITION", "SIGN", while failed ones did not uppercased those at all.

4 Conclusions

In this paper we introduce a dataset of environmental petitions that were promoted by major environmental public campaigns on Twitter. We study the petition role as one of the actions performed by a public campaign. We propose a model to identify successful petitions by their presence on Twitter and highlight the main aspects featuring a petition to obtain required number of signatures. Although, our dataset is limited in size, we made a best effort data collection and cleaning, and could observe the petition spread within the public environmental campaigns and identify the major factors that may lead to the success of the petition. Our findings can provide helpful directions for all leaders of the public campaigns, its participants, petition initiators and signers.

We plan to enhance the petition dataset by repeating the collection process over larger span of time from Twitter. Another interesting future direction is to study the user aspect of the petition promoters on Twitter. In particular, we could identify the relations between petition signers and users who promote petitions on Twitter. The main difficulty here is to obtain this information for the large number of petition. Currently we propose a set of basic features and highlight the most valuable ones. The next step would be to explore time series properties of signatures, as well as, give actionable feedback on how to increase number of signers.

References

An, J.; Quercia, D.; and Crowcroft, J. 2014. Recommending Investors for Crowdfunding Projects. *Arxiv - Computers & Society* 261–269.

Etter, V.; Grossglauser, M.; and Thiran, P. 2013. Launch Hard or Go Home! *COSN '13* 177–182.

Gonzalez-Bailon, S., and Wang, N. 2013. Networked discontent: The anatomy of protest campaigns in social media. *Available at SSRN 2268165*.

Hale, S. A.; Margetts, H.; and Yasseri, T. 2013. Petition growth and success rates on the uk no. 10 downing street website. In *WebSci '13*, 132–138. New York, NY, USA: ACM.

Hestres, L. E. 2013. Preaching to the choir: Internet-mediated advocacy, issue public mobilization, and climate change. *New Media & Society* 1461444813480361.

Huang, S.-W.; Suh, M. M.; Hill, B. M.; and Hsieh, G. 2015. How Activists Are Both Born and Made. *CHI '15* 211–220.

Kirilenko, A. P., and Stepchenkova, S. O. 2014. Public Microblogging on Climate Change: One Year of Twitter Worldwide. *Global Environmental Change* 26:171–182.

Mahmud, J., and Gao, H. 2014. Why Do You Spread This Message? Understanding Users Sentiment in Social Media Campaigns. *ICWSM '2014* 607–610.

Mosca, L., and Santucci, D. 2009. Petitioning online. the role of e-petitions in web campaigning. *Political Campaigning on the Web* 121.

Olteanu, A.; Castillo, C.; Diakopoulos, N.; and Aberer, K. 2015. Comparing Events Coverage in Online News and Social Media : The Case of Climate Change. *ICWSM '15* 288–297.

Pearce, W.; Holmberg, K.; Hellsten, I.; and Nerlich, B. 2014. Climate Change on twitter: Topics, Communities and Conversations about the 2013 IPCC Working Group report. *PLoS ONE* 9(4):1–11.

Solomon, S.; Plattner, G.-K.; Knutti, R.; and Friedlingstein, P. 2009. Irreversible climate change due to carbon dioxide emissions. *Proceedings of the national academy of sciences* pnas–0812721106.

Tufekci, Z. 2013. "Not This One": Social Movements, the Attention Economy, and Microcelebrity Networked Activism. *American Behavioral Scientist* 57(7):848–870.