

Presidential Elections in Ecuador: Bot Presence in Twitter

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Abstract—The world’s digital transformation has influenced not only the way we do business, but also the way we perform daily activities. Social media has a clear influence on people, especially during events such as elections where recent international events have shown that social media played an important role. In fact, there are three main aspects in this digital landscape: political movements and political candidates looking for popular support (*number of followers*), citizens’ messages discussing social issues (*trending topics on social media*), and political propaganda appearing in the net in favor of or against politicians or political movements (*advertisement*). One of the issues with social media is the presence of automatic accounts (*bots*) that artificially fill accounts with fake followers, create false trending topics, and share fake news or simply flood the net with propaganda. All this artificially generated information may influence people and sometimes may even censor people’s real opinions undermining their freedom of speech and affecting true democracy. In this paper, we present a set of observations based on two main objectives: collect evidence of digital campaigning during the Presidential Elections in Ecuador 2017 and describe the mechanisms used for this campaign. Finally, we show how candidates prepared online campaigns in Twitter and how normal patterns of new followers’ subscriptions were altered. And, we collected information about more than 30,000 bots filtered only by political content used for propaganda purposes.

Index Terms—Twitter, Social Media, Bot Detection, Elections.

I. INTRODUCTION

Social media has become an important platform for political speech due to a vast spread of device networks, cheaper and alternative ways to access the Internet and the necessity to keep up with new trends of global communication [1]. Political movements and politicians are using social media more than ever to make their platforms known, show their popularity, create discussion and answer questions. But, not all the content in Social Media is generated by actual users. Aside from showing the presence of automatic accounts that perform targeted activities (*bots*) [1]–[5], researches have also shown political bots and how they are being used by political actors in other countries to subtly manipulate opinion

online by boosting followers [4], attacking opponents, creating distractions [2] and spreading false information about local concerns [3], [4].

According to reports, these political bots were deployed in countries such as: Argentina (2012), Mexico (2012), Russia (2011), United States (2012), Venezuela (2014) among many others [4]. The Brexit, the peace agreement referendum in Colombia, and the presidential elections in the United States are also examples of the influence of social media [6], [7]. In particular, in the United States, the automatized diffusion of content by accounts identified as bots represented about one-fifth of all messages on Twitter during the presidential elections in 2016 [8]. And, even the The New York Times has a series of news regarding how Russia interfered in the 2016 US Presidential Elections by manipulating social media and targeting people’s emotions and preferences [9].

In our particular case study of, Ecuador, reports have shown the presence of both, human and automated accounts that share pro-government and pro-party messages, attack and discredit the opposition movements and activists [5]. As a well known case of harassment on opposition activists, Martha Roldós, the daughter of former president Jaime Roldós, had her email account hacked and her job on National Endowment for Democracy (NED) discredited, claiming that her contribution to the project was funded by the CIA [3]. In fact, Freedom House ranks Ecuador’s Internet freedom as partially free, due to government control and blockage of content based on copyright infringement, specially targeted to political activists [10].

The importance of Internet and social media has been constantly increasing in Ecuador, as of 2014, 86,4% of homes had at least a cellphone and 46,4% of the population older than five years old had accessed the Internet at least once a year. This represents an increase of 36,7% and 17,4% respectively in comparison to the data available from 2010 [11]. In fact, the two most used social media in the country are Facebook and Twitter. Twitter in Ecuador accounts over 2,000,000 active users (2015) [12], and in a recent count (2018) of

potential scope for distributing propaganda in Facebook, about 12,000,000 active accounts can be reached within the legal voting age (16 and older) [13].

For the first time in a decade, Ecuador lived a transition in its government. Rafael Correa, former president of Ecuador, for the first time in ten years was no longer a viable candidate for a new presidential period. Hence, eight new candidates from different parties and political movements participated during the 2017 presidential elections [14]. Elections were held in two rounds: the first round on February, 19th 2017, and the second round with two candidates: Lenin Moreno and Guillermo Lasso on April, 2nd 2017.

Despite the information collected regarding Ecuador's Internet freedom and information controls over the Internet by different sources [3], [5], [10], which mainly consisted of media news and public denounces of harassment, no further evidence has been collected directly on any social media. In this work, we intended to collect such evidence and provide an initial overview of the mechanisms used by politicians and political movements in Twitter during the presidential elections in Ecuador. We show how presidential candidates engaged in social media platforms to promote their candidacies, the presence of several bots detected using third party systems for bot detection, such as DeBot [15], a classification of the content generated by these bots and an initial analysis of presidential candidate's new followers.

Our strategy consisted of three phases: pre-electoral, campaign and post-electoral. The rest of the paper is organized as follows: first we describe how elections in Ecuador work, then we provide a detailed explanation of the phases, methodologies and tools used for tracking the elections in Twitter. We present the results of our Twitter analysis in two scenarios: candidate account analysis and bot detection analysis. Finally, we present our conclusions and talk about the future work to enhance our approach.

II. THE 2017 PRESIDENTIAL ELECTIONS IN ECUADOR

Presidential elections in Ecuador are held every four years since the country returned to a democracy in 1979. Ever since, no president has been reelected, until 2006 when Rafael Correa ran for presidency and stayed in office until 2017. In fact, from 1996 to 2006 five different presidents went through office due to a highly unstable political situation in the country. The 2017 presidential elections were interesting since it marked an important timestamp in Ecuador's young democratic system. In addition, these elections were especially important due to the presence of new technologies (social media) and a strong political party (Alianza País) which supported Rafael Correa for ten years in office.

In general terms, presidential elections in Ecuador are mandatory for all Ecuadorian citizens older than sixteen years old. It consists of two rounds that are held in dates selected by "Consejo Nacional Electoral", CNE (the state institution responsible for holding elections in the country). If any candidate is able to obtain more than 40% of people's popular vote (after correcting for invalid ballots) and if he or she has

at least ten percent over the second place is declared President in the first round. Otherwise, the two with higher ballots go for a second round of popular elections, where the one who gets more than 50% of the ballots is declared President of the nation.

The 2017 Presidential Elections held in Ecuador took place in February 19th, and the second round in April 2nd. In the first round, eight parties and political movements inscribed their candidacies: Cynthia Viteri / Mauricio Pozo (Partido Social Cristiano), Abdalá Bucaram Pulley / Ramiro Aguilar (Partido Fuerza Ecuador), Iván Espinel / Doris Quiroz (Fuerza Compromiso Social), Guillermo Lasso / Andrés Páez (Movimiento CREO & Movimiento SUMA), Lenín Moreno / Jorge Glas (Movimiento Alianza País), Paco Moncayo / Monserratt Bustamante (Izquierda Democrática & Movimiento Unidad Popular & Movimiento de Unidad Plurinacional Pachakutik), Washington Pesántez / Alex Alcívar (Movimiento Unión Ecuatoriana), and Patricio Zuquilanda / Johnnie Jorgge Álava (Partido Sociedad Patriótica) [14].

After the first round, no candidate obtained the required votes to win the elections (see results of the first round of elections in table I). Therefore a second round of elections was held in April 2nd, where Lenín Moreno was elected President of Ecuador and the runner up was Guillermo Lasso (see results of the second round of elections in table II) [14].

TABLE I
RESULTS OF THE FIRST ROUND OF ELECTIONS [14].

Candidate	Votes
Lenín Moreno	39.36%
Guillermo Lasso	28.09%
Cynthia Viteri	16.32%
Paco Moncayo	6.71%
Abdalá Bucaram	4.82%
Iván Espinel	3.18%
Patricio Zuquilanda	0.77%
Washington Pesántez	0.75%

TABLE II
RESULTS OF THE SECOND ROUND OF ELECTIONS [14].

Candidate	Votes
Lenín Moreno	51.16%
Guillermo Lasso	48.84%

III. MEASURING POLITICAL CONTENT IN SOCIAL MEDIA

From the experience in other elections around the world, and the strong claims by political activists in Ecuador that the government were manipulating public opinion on local social media [16]–[19], we set our main objective to track political content on social media and measure censorship or interference by bots during the presidential elections.

Even though Facebook is the most used social network in the country, we decided to use Twitter because it offers an open and free application program interface (API) with a fair amount of users to conduct this study. The methodology and

third party tools used to collect data for this work can be easily transferred to any other social network of interest.

Our methodology consists of dividing the electoral year in phases: pre-electoral, campaign and post-electoral. In the case of the 2017 Presidential elections in Ecuador, we started planning our experiments in August 2016. The main problem we encountered is that measuring anything in social media requires establishing a base line. Therefore, we designed the pre-electoral phase in order to collect all data in advance before any political party or political movement made an official announcement of their presidential candidate. We selected over 100 special accounts and started following their activity on Twitter.

We planned two main experiments: data recollection for bot analysis, and data recollection for special accounts analysis. For the first experiment, we collected and classified data from November to December 2016 related to political events in the country. We filtered the trending topics as well as the most common words used in social media to describe political events and generated a list of potential political topics which included potential candidate names, names of political parties and movements, names of political scandals, etc. This list was used in the Twitter API to feed DeBot, which is the tool we used to search for automatic accounts. DeBot is an unsupervised bot classifier developed by Chavoshi et al. [15], [20]. We chose DeBot over other tools (such as Botometer [21]) because it allowed us to capture data by analyzing suspicious accounts in real time based on their behavior and filter them by tags, which reduced processing time afterwards. Also, we were able to get access to DeBot source code, allowing us to add some specific features for this research.

DeBot works in two phases: first, it listens to users mentioning a list of keywords and it creates a set of potential bots based on each account behavior. Second, it listens the activity of each potential bot for a few hours and creates a signal based on its activity. Later, DeBot calculates the correlation among accounts and determines which ones are related and places them in clusters [20]. Figure 1 shows three political bots promoting a particular candidate during the campaign.

Our second experiment consisted of tracking all special accounts on Twitter. We collected snapshots of Twitter followers from a set of selected accounts (chosen through a previous analysis of Ecuador's political situation) conformed by political parties and movements, government institutions, and political personalities (potential candidates, political activists, and active politicians). The graph was collected using the Twitter API and required almost two days in order to traverse the list of accounts without exceeding Twitter rate limits.

A. Phase 1: Pre-electoral phase

The pre-electoral phase lasted from November to December 2016 for our first experiment. We gathered hundreds of trending topics and started to collect bots from January 2017. The base line we established was the list of trending topics related to politics that were analyzed and validated by an expert knowledgeable in politics.

For our second experiment, the base line was established by collecting the first graph at the start of January 2017, before campaigning started. As we will see later in our results, the base line in this case was not perfect, because new candidates emerged in the very last month before elections when some past information was already gathered.

B. Phase 2: Campaign

During the campaign, we kept our bot analyzer running every single day gathering potential bots. We refreshed the database containing trending topics related to politics based on emergent topics that were not considered in our base line.

For our second experiment, we gathered a second snapshot of the graph of all special accounts. We also added those accounts that we did not consider in our base line. The second snapshot was taken one day before the first round of elections, February 18th 2017.

C. Phase 3: Post-electoral phase

For our post electoral phase, we kept DeBot running until the end of April 2017. And, we gathered a third snapshot of all followers of our special accounts, also by the end of April.

IV. RESULTS

We present our results in two sections: bot analysis and twitter graph analysis.

A. Bot Analysis

DeBot collected 32,672 bots from January to April 2017. Figure 2 shows the distribution of bots every day from January to April 2017. These bots interacted more in business hours and collectively increased their activity close to the election days. In particular, we ran a classification analysis on all the collected bots in order to understand what they were promoting during the campaign. We gathered all keywords used by all the tweets we were able to collect from each bot and match positive keywords in favor to a candidate and negative keywords against of a candidate. This classification was performed by ranking the keywords by which were the most mentioned to the least and having our expert validate whether a keyword was in favor or against a certain candidate. We later clustered all tweets produced by bots in these categories and generated figure 3.

B. Graph Analysis

For this experiment, we considered the differences among graphs in time. We calculated all new accounts following each candidate from the pre-electoral phase into the campaign, and from the campaign into the post-electoral phase. We found the most change in the first graph difference. Table III shows the transition that the Twitter accounts of Presidential candidates suffered in the lapse of a month (January to February). We have included former President, Rafael Correa, to the list because, even though he was not a candidate, he had an extremely active set of followers in Twitter.

In addition, we compare the three main candidate twitter accounts according to their final vote (see table I) and show

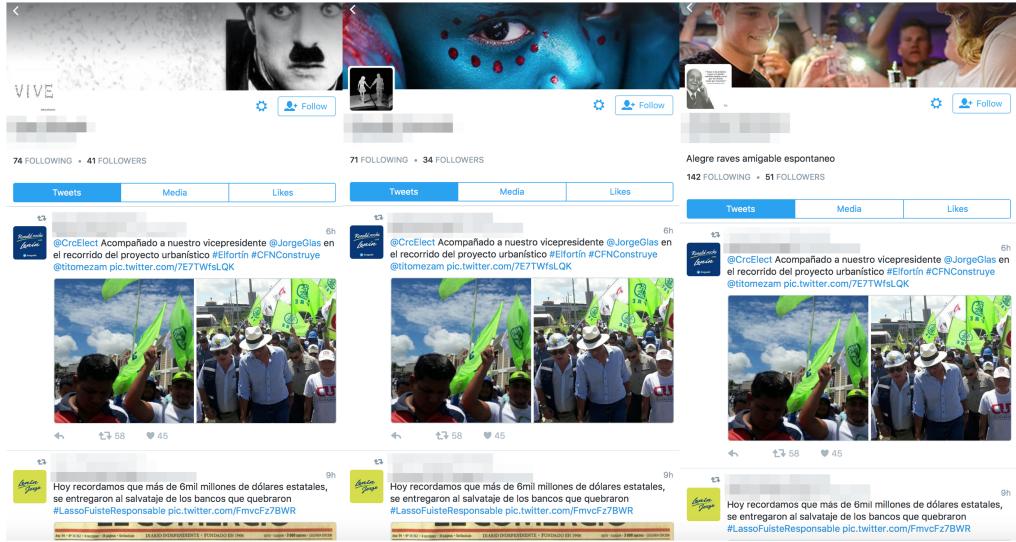


Fig. 1. Example of automatic accounts detected by DeBot during the 2017 Presidential Elections in Ecuador.

TABLE III
ACCOUNT FOLLOWER DIFFERENCES AMONG CAMPAIGN AND PRE-ELECTORAL PHASES.

Candidate's Name	User Account	Phase 1 - Followers	Phase 2 - Followers	Difference	Increase %
Cynthia Viteri	@CynthiaViteri6	99,669	117,634	17,965	18.02%
Dalo Bucaram	@daloes10	324,443	330,189	5,746	1.77%
Iván Espinel	@IvanEspinelM	N/A	10,287	N/A	N/A
Guillermo Lasso	@LassoGuillermo	244,990	259,444	14,454	5.90%
Lenín Moreno	@Lenin	4,462	126,791	122,329	2,741.57%
Rafael Correa	@MashiRafael	2,877,737	3,002,662	124,925	4.34%
Paco Moncayo	@PacoMoncayo	10,352	22,988	12,636	122.06%
Washington Pesántez	@PesantezOficial	1,807	2,021	214	11.84%
Patricio Zuquilanda	@ZuquilandiaDuque	N/A	1,562	N/A	N/A

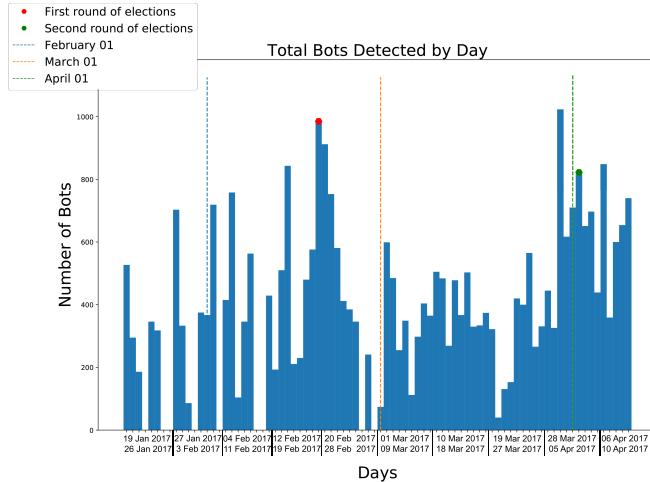


Fig. 2. Total number of political bots detected by date during the 2017 Presidential Elections in Ecuador.

in both a cumulative distribution of the date of creation of each new follower and observe a particular pattern from the day the official campaign started (February 1st) to the second round of elections (April 2nd). Figures 4 and 5 show how the patterns

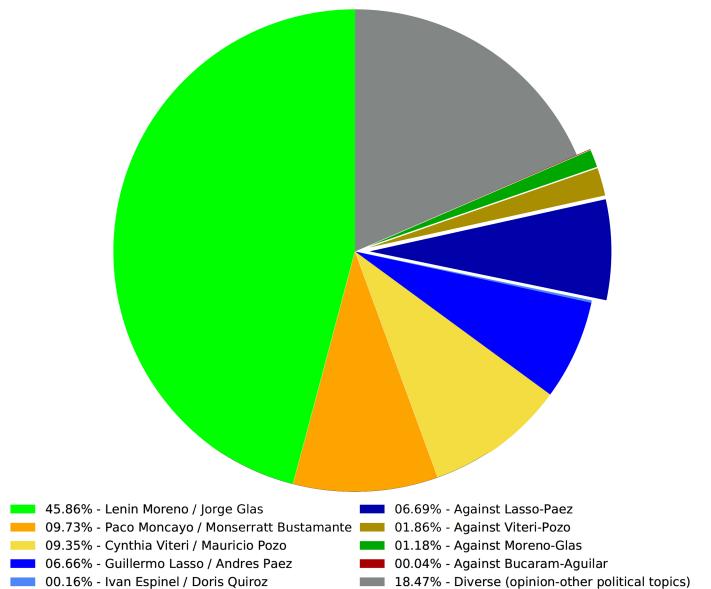


Fig. 3. Twitter bots messages during the campaign. Lighter colors represent positive messages in favor of a candidate and darker colors represent negative messages against a candidate.

of the main candidates increase the number of recently created accounts during the campaign.

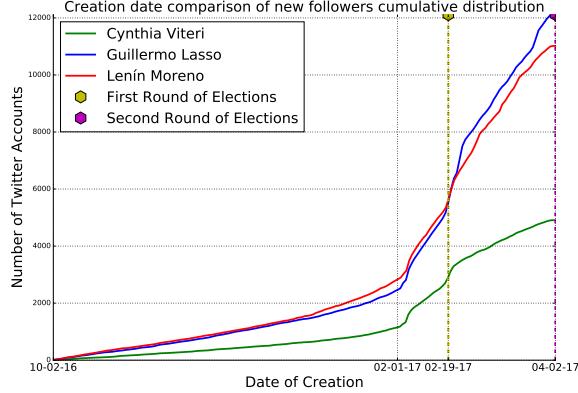


Fig. 4. Cumulative view: graph difference analysis of new follower accounts in comparison to the date of creation of the new follower account. Blue line shows Guillermo Lasso's twitter account, red shows Lenín Moreno's twitter account and green shows Cynthia Viteri's twitter account

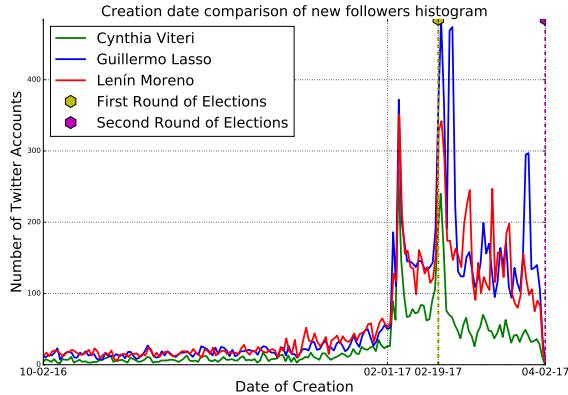


Fig. 5. Activity view: graph difference analysis of new follower accounts in comparison to the date of creation of the new follower account. Blue line shows Guillermo Lasso's twitter account, red shows Lenín Moreno's twitter account and green shows Cynthia Viteri's twitter account.

Finally, we compare the twitter accounts of official candidates (those that belong to the same political movement as former President Rafael Correa) with Rafael Correa's twitter account. We found that even though Rafael Correa was not a candidate, he had an even higher and abnormal follower activity during the campaign. In fact, figures 6 and 7 show how Rafael Correa's twitter account increases the number of recently created accounts during the campaign in about 5 times those from Lenín Moreno's and Jorge Glas' twitter accounts.

V. CONCLUSIONS

We present enough evidence to show that political bots were used in social media during the 2017 elections in Ecuador. Also, we demonstrate how these automatic accounts have been used to promote or discredit candidates. In fact, we

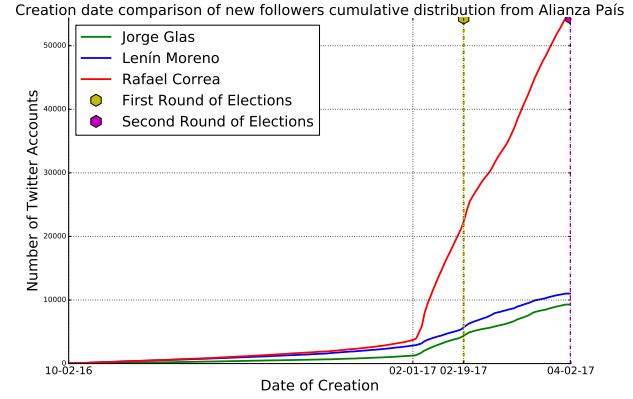


Fig. 6. Cumulative view: graph difference analysis of new follower accounts in comparison to the date of creation of the new follower account. Red line shows Rafael Correa's twitter account, blue shows Lenín Moreno's twitter account and green shows Jorge Glas' twitter account.

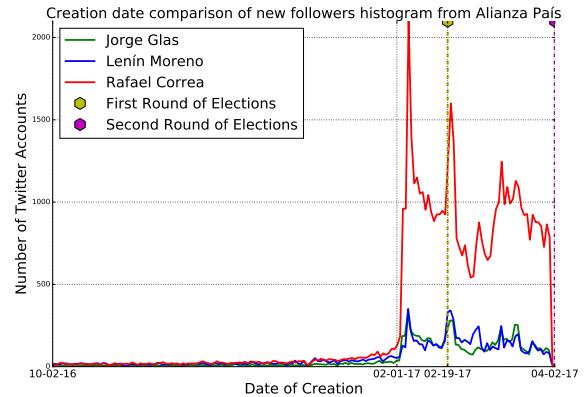


Fig. 7. Activity view: graph difference analysis of new follower accounts in comparison to the date of creation of the new follower account. Red line shows Rafael Correa's twitter account, blue shows Lenín Moreno's twitter account and green shows Jorge Glas' twitter account.

show how almost 46% of all bots collected supported the official candidate, Lenín Moreno, and other candidates, such as Guillermo Lasso, received almost a tweet against for every tweet in favor.

Additionally, we show with concern how the political campaign flooded Twitter with thousands of accounts that were recently created to support candidates. We understand that once we obtain the difference graph between our campaign data and the pre-electoral phase, our comparisons should accentuate the final period where new activity happened in Twitter. However, the increasing slope of new followers for the main candidates and in the account of Rafael Correa alerts about the nature of such accounts and therefore demands further research.

Finally, it is clear that all candidates with no exception understood the importance of the digital era in politics. All of them prepared twitter accounts and their accounts increased their followers during the campaign. It is important to mention

that even though we gathered data for the post electoral phase, since the campaign and the post-electoral phase were very close to each other, we were unable to see any significant differences.

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