A trend analysis on Sri Lankan politics based on facebook user reactions

M.S. Sally, Lecturer in Computer Science [a,*], M.I.E. Wickramasinghe, Dr., Senior Lecturer in Computer Science [b]

[a] Lecturer in Computer Science Holding a Postgraduate Degree (Master of Computer Science) from University of Colombo School of Computing, Sri Lanka
[b] Senior Lecturer in Computer Science at University of Colombo School of Computing, Sri Lanka

ABSTRACT

The rapid growth of user interactions in social media sites gives useful insights in many areas. Facebook is the most popular social media site lately, with the highest number of active users, which is a valuable and hassle-free source in obtaining data. Despite its enthusiastic nature, it is a mere fact that people use Facebook to gain instant updates on the current state of affairs. The ability of getting updates from several sources of news channels in a single user news feed, the extreme ease of providing feedbacks on those news posts using gesture-based reactions, send and share messages among people are some of the main reasons for its increasing popularity in the perspective of attaining news. Politics has always been a ubiquitous topic in the world. Sri Lanka was in a war on terrorism for nearly three decades, followed by a governance (2005–2015) led by the same political party which was alleged for autocracy and lasted for nearly a decade has influenced the citizens' political conviction heavily. On such a background, the "Good-Governance" (2015–2019) which is a coalition government, trounced the ruling government at the presidential election held by then, which they claimed to direct Sri Lanka towards a sustainable, stable, responsible and moral society with necessary constitutional amendments guaranteeing democracy to all ethnic groups eradicating corruption, wastage and fraud. The interest and motivation of this study builds up to discover whether there are any significant trends in the Sri Lankan political context following this transformation, in the perspective of the general public. Facebook user reactions on news posts have been used for this study as the data source. The analysis of this study reveals an increasing trend of user reactions in politics from 2011 to 2018. Further, it is identified that the present government (2015–2019) has a decreasing trend of user reactions over the past years (2011–2015) in the sight of its citizens, although they pledged for a better governance. On the contrary, the previous government has an increasing trend even though they were overpowered by the "Good-Governance" for its alleged unscrupulous ruling.

1. Introduction

Politics is a widely discussed topic in all parts of the world. It is mainly important because the critical decisions taken on the entire country solely depends on the government which is in power. As Sri Lanka consists of a culturally diverse population with ethnic groups spread over the country it has been a prime factor to take equitable decisions that would be fairly applicable to all the citizens. In past decades, there were many tragic and crucial incidents reported which has eventually deteriorate the development, culture and well-being of the country [1,2,17].

The rapid usage of social media has exposed to novel methods of communicating especially between the government and its citizens. The massive amount of data could give useful insights such as the user

engagement which subsequently helps the government and the policy makers to utilize the public expertise and experiences [21].

The government in rule from 2015 to 2019 is hereon referred to as the "present government" and the government in rule from 2010 to 2015 is referred to as the "past government".

1.1. Motivation

Although Sri Lanka has been a democratic country since 1948, the direction of politics has been chaotic and crisis more often. Some of the issues arose from the reign of the former government are, corruptive nature in the state institutions, security threats of extremist groups, rising inequality, high development debts and lack of media freedom [19]. The present government came into power amidst such scepticism

with a new revolution called the "Good-Governance" to restore democracy and rebuild the nation from where it was left. At the milestone of the fifth successive year of the "Good-Governance" the current political situation is yet debatable among people, as some argue it as a real political transformation while some others do not agree with the same.

1.2. Statement of problem

As noted in the previous section, the motivation for this research has been evoked in a background which people claim that the present government has failed in achieving the needs of the country and its crack down on bribery and corruption in accordance to their hundred-day election manifesto of stability. This study is conducted to find whether there is any significance of the "Good-Governance" compared to the previous reign from the perspective of the general public using their interactions on social media. Social media sites are rapidly popular for its high interactive nature and ease of use among people, despite their age, religion, gender, education level and cultural differences since its inception. Facebook is a well-known social media site used by billions of active online users in Sri Lanka as per the Internet World Stats, which is 5,500,000 out of 7,169,533 internet users by 2018, it has been preferred over other sites [20].

1.3. Objectives

The Facebook platform has played a silent but a vital role in the election campaign, providing the Sri Lankan community to easily interact with the political news. It has been in favor of the present government to gain victory over the bitterly divisive decade-long ruling [19]. It was a noticeable fact that many news and media establishments had replenished their morality by then and actively engaged in their duties of reporting the accurate information to the public [3]. On the popularity of Facebook, a news post published can reach a vast number of online users in a minimum time. Upon the ease of interacting, these posts can be viewed and given feedback as likes, comments or share. Facebook like button is a quick, easy and gesture-based way of providing feedback to a post.

The main objective of this research was to identify the overall trend in Sri Lankan politics over a substantial period of time including governance of the past and the present. Furthermore, the political trend of the past and the present government is also obtained severally.

1.4. Scope

This study focuses solely on news posts that are related to the political context on a Facebook news page. Data regarding user reactions are obtained for each news post on a time period from 2011 to 2018 adhering to certain limitations on Facebook. As Sinhala is the native language in Sri Lanka, it was observed that Sinhalese news pages were liked by users more over news pages of other languages. "Lankadeepa" is chosen as the source page for data retrieval ascribed that it has a higher user involvement in news posts compared to other news pages.

The remainder of this paper is organized as follows: Section 2 discusses related work; Section 3 gives an overview of the methodology; Section 4 provides an evaluation with a comprehensive trend analysis for political data and finally Section 5 summarizes the conclusions.

2. Related work

Many studies highlight the importance of users in a social media site and how they generate massive data without any hassle that is favorable in making decisions. Cristian Bucur, in Ref. [4] proposes a software system design for a web platform by conducting various methods of analysis of information from web pages, which extracts opinions of customers from the online content available and support the decision making in a company. He also emphasizes how opinion mining methods

would be beneficial in an era where social media is growing rapidly and contains an enormous amount of relevant information in the creation of effective referral systems, financial analysis, market research and product development.

Saurin Dave and Hiteishi Diwanji emphasizes on the importance of social media data such as comments and reviews to study about the community [5]. The authors point out the relationship between people, how they take certain decisions based on reading the comments or reviews of others. A sentimental analysis-based approach has been used to find the polarity of user text. They also focus the attention on the hybrid approach of community detection in trend analysis which they regard as a lacking sector in recent research conducted on this area.

The importance of microblogging and social communication in business branding is discussed by Salampasis et al. in Ref. [6]. They accentuate the high popularity of usage in social media sites being a major factor to do a continuous monitoring and mining on the consumer behavior. A dataset of thousands of microblogging messages containing comments, sentiments and opinions about food and brand products has been used. The results conclude that there is a strong indication in the role of a user to support and enhance important business processes.

Despite of the business area, social media can be used as a learning tool due to its higher user interactive nature. Reddicka et al. suggests a learning framework for local government departments [7]. The framework uses social media text analytics from Facebook pages of government departments, and it integrates double-loop learning theory. In the double-loop learning theory, the first loop is used to educate the citizens through Facebook posts and the second loop is used to get their feedbacks. The resultant insights have shown a promising direction of enhancing the quality of the public services.

News Channels have been of one major reasons people access Facebook. A study [8] has been done by Mhamdi et al. on Fox News, CNN, and ABC news channels to find interesting relationships among the news items they post. The data were retrieved using FacePager and analysis done through RapidMiner, which indicated that USA election news have been the highest coverage among other news across all these news channels. In fact, it divulges that users are much interested in perusing news on Facebook over other activities.

Political context has also been a fascinating area in social media related research lately. Many researchers find politics as a hot topic at any point of time and it has focused them in finding interesting relationships. In Ref. [9] Diego Tumitan and Karin Becker finds whether user comments on online newspapers reflect external indicators of public acceptance. The study is done on Brazilian politics and sentimental analysis on comments written in Portuguese. The results indicated that most comments refer to frustration about politics in general; transference of opinion by the candidate's association to other corrupt politicians or parties; political scandals; poor previous administration.

In a study done by Joseph et al., they explain [10] how social media has been an influential factor in the political landscape with examples of incidents and events which took place in the world by performing several document analyses. They emphasize the unimaginable influential power that social media has created in which to affect something positively or negatively.

In addition to the above, Woolley et al. state in their study [11], that social media is a viable tool for political communication. The authors used Facebook group pages for this research from the beginning up to the election date that focused on how the presidential candidates Barack Obama and John McCain would be portrayed. The results of the research after a qualitative analysis concluded that Barack Obama was portrayed more positively than John McCain which had also been the outcome in reality. Therefore, it has proved the fact that the population could be inferred by the users engaged in Facebook pages.

In a study done by Juliet Carlisle and Robert Patton [12], the authors conceptualize the political engagement on Facebook as focusing on the user activities regarding politics during the US presidential primary and general election held in 2008.

They use a resource model to test whether the factors helpful in understanding offline political participation also explain political participation in Facebook. In addition to that, the resources socioeconomic status [SES] and political interest has been considered to test whether network size works to increase political activity. The finding concluded that the individual political activity in Facebook is not as extensive as popular as the accounts suggest. Furthermore, Stieglitz et al. [13] describes in their research, how important social media has been in communication and how it has increased the political participation by direct dialogs with the users. The statement of problem in this research is that the lack of systematic tracking and analysis approaches in the political domain with appropriate scientific methods and techniques due to the large amount of social media platforms and complex bulk information. As a solution, a methodological framework for social media analytics has been proposed in the political context.

In a study done by Ceron et al. [14] on forecasting electoral results based on social media platforms, the authors state that the growing usage of social media is sharply increasing and that it could be used as a device to explore and track political preferences. They have applied a method proposed by social scientists to three different scenarios, by analysing on one side the online popularity of Italian political leaders throughout 2011, and on the other the voting intention of French Internet users in both the 2012 presidential ballot and the subsequent legislative election. Although, Internet users are not necessarily representatives of the whole population of a country's citizens, yet the analysis has shown a remarkable ability for social media to forecast electoral results, as well as a noteworthy correlation between social media and the results of traditional mass surveys. They also illustrate that the predictive ability of social media analysis strengthens as the number of citizens expressing their opinion online increases, provided that the citizens act consistently on these opinions.

In a study done by Sam Dekay [15] on how large companies react to negative Facebook comments, he found that, of Fortune 100 companies 79% use some form of social media to communicate with customers and other stakeholders and that most marketing specialists recommend that negative comments should be treated as opportunities to resolve potential problems. The study identified official Facebook pages sponsored by the top ten companies (as defined by the Forbes 2000 for 2010) in four industry groups – banking, retailing, software and services, and household and personal products. The number of negative comments posted to these pages are calculated and corporate reactions to the comments are analyzed. The study concludes that large corporations do not generally approach negative comments as public relations opportunities, but prefer to censor, or ignore, critical feedback.

Tamara Small [16] has performed a study to analyze on Canadian politics using Twitter Hashtags. The author has selected Twitter as the source of data as it was the latest social networking tool since then and is said to be reshaping politics. This research analyses the intersection of microblogging and Canadian politics and seeks to fill this gap through a content analysis of the most popular Canadian political hashtag, #cdnpoli. With 50 million tweets per day, hashtags are central to organizing information on Twitter. Hashtags organize discussion around specific topics or events. The popular literature suggests that Twitter is a democratic media because it allows for on-the-ground reporting of breaking news and democratic activism.

Considering the aforementioned studies on social media analytics, it is a notable fact that there has been no analysis done in politics to identify the trends by means of comparing the former with its latter governing bodies. Moreover, the Sri Lankan political arena has not been in discourse to the extent of a trend analysis. It is also noticeable that, analysis on Facebook user reactions is a lacking area that many have neglected or considered unworthy. The enthusiasm of mining these data regarded as less important has been a driving force to perform an analysis as such.

Fig. 1. Model of facebook graph API (Source: http://m.magemonkeys.com/images/blog/189-4.png,2018).

3. Methodology

This section mainly outlines the methodology used for data collection and pre-processing. Additionally, the assumptions and the Facebook limitations are presented as well.

3.1. Data collection

Data is collected from Facebook using the Facebook Graph API Explorer version 2.11. Graph API is a low-level HTTP-based API that can be used to programmatically query data. It is a representation of social graph composed of nodes, edges and fields.

a. Nodes – the primary elements that are found in Facebook such as a user, photo, page, post
b. Edges – the connection between the primary elements such as the comments on a post
c. Fields - attributes of the primary elements such as the name of a page

Since the API is HTTP-based, it can be used with any language that has a HTTP library. It can be executed directly on a browser by browsing for Facebook developer's URL. A GET request can be used to obtain necessary information regarding a node.

Fig. 1 illustrates how the nodes are being interconnected with each other and how their fields can be accessed by the edge relationships.

The results obtained through a GET request is in JSON format and generally, it will not be received through a single response. Hence, the responses are paginated by default. The Facebook SDK for PHP which is a library with powerful features that enable PHP developers to easily make requests to the Graph API with the integration of Facebook login, has been used in this study. A single PHP script is used to retrieve the required data as stated in the previous section and to transform it to JSON format. As Graph API has a limit of hundred data items per GET request, data will be collected on a batch basis by setting the offset. The offset is a numerical value that is set to indicate the start of each page. Offset based pagination does not concern on the chronology of the events and some results may not be returned due to certain conditions set on Facebook. The alternative method of accessing all posts is to set a time-based paginating using the "since" and "until" parameters. Regrettably, this method has been removed by Facebook since July, 2017.

Table 1

Description of data collected from facebook.

Data	Description
id	Unique identifier of a page post. The value has two components concatenated with "_". The first part is the page id and the latter is the post id.
title	The title of the post. It will be in Sinhala language.
sad	The six reactions with its counts.
wow	
like	
love	
haha	
angry	
shares	The number of occurrences the post was shared.
comments	The number of comments on the post.
created_time	The date and time which the post was initially published in Facebook.

Table 2

Composition of political and non-political news posts in lankadeepa facebook page from August, 2011 to March, 2018.

	Frequency	Percentage (%)
Non-Political	2143	46.3
Political	2483	53.7
Total	4626	100.0

3.2. Parse data

OpenRefine[1] is an open source tool used to handle large, messy data. The JSON data obtained is parsed using OpenRefine and is exported as an Excel sheet. Whilst parsing the data, unescaped double quotes in JSON description fields were found and thereby eliminated.

3.3. Data preparation

It was observed that not every post was a news item, thus it could be a post of a profile or cover photo update which required elimination from the data set. The news items are subjected for categorization merely on my personal opinion. The main issue found here is the ambiguous nature of the news titles. In many occurrences the meaning was not expressed explicitly, due to the usage of the language and the usage of images containing cartoons, hence more exploration was required.

At the higher level, the news items have been identified as

a nominal variable with two values as political and nonpolitical. They are indicated as "1" and "0" respectively, for the ease of analysing. The field created_time mentioned in Table 1, is of ISO 8601 format which requires to be transformed to a date format, in order to be accessed in a yearly and monthly manner.

4. Evaluation

This section presents the evaluation of this research. The total news posts gathered for this research from August, 2011 to March, 2018 is 4626. Table 2 shows the composition of the political and non-political news posts. The data contains news items reported at the periods of two governments, namely the past and the present government. The entire duration from 2011 to 2018 is subdivided into two segments considering the period of ruling of the past government (2011–2015) and the present government (2015–2018).

As the research suggests observing the trends of Sri Lankan politics, it is of utmost importance to evaluate whether there is any trend in the present government compared to the past government. To achieve this,

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Table 3

Summary statistics for data from august, 2011–march, 2018.

Observations	Mean	Std. deviation
70	21677.643	41309.419

Table 4

Mann-Kendall two-tailed trend test.

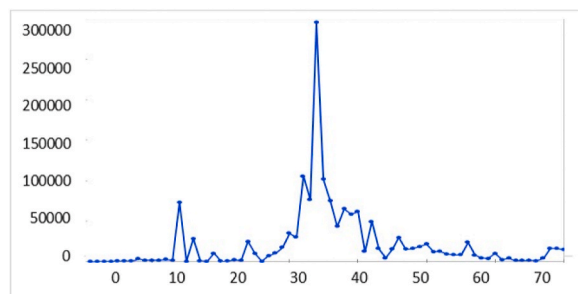| Kendall's tau	0.182
S	439.000
Var(S)	38908.333
p-value (Two-tailed)	0.026
alpha	0.05
Sen's Slope	85.808

Fig. 2. Trend analysis graph for reactions from August, 2011–March, 2018.

Mann Kendall test for trend analysis is used which is a non-parametric test that helps to analyze data collected over time for consistently increasing or decreasing trends. The null hypothesis H_0 for these tests is, there is no trend in the series. The three alternative hypotheses defined are as, there is a negative, non-null, or positive trend in the series. The test is conducted using the XLSTAT which is an add-on for MS Excel. Data should be prepared in order to apply these tests.

All tests are performed using a significance level of 5%.

The evaluation is done to identify the trend in three cases.

4.1. Case 1: The overall Trend in politics

Here, the reactions from August, 2011 to March, 2018 has been considered as the data set and Table 3 shows the summary statistics of the data.

The hypothesis that is been tested here is whether there is a trend in politics for the entire range.

The null and alternative hypothesis can be stated as below.

H0 There is no trend in the series
H1 There is a trend in the series

The results of the Mann-Kendall Two-tailed Test is illustrated in Table 4. As the computed p-value is lower than the significance level alpha = 0.05, the null hypothesis H_0 can be rejected and the alternative hypothesis H_1 can be accepted.

The risk to reject the null hypothesis H_0 while it is true is lower than 2.60%.

The Kendall's Tau is the measure of the ordinal association between two measured quantities. The Sen's Slope measures the slope value of a linear trend which in this test is a positive value and holds a magnitude of 85.808.

The trend analysis graph for Case 1 is shown in Fig. 2. The x-axis represents the observations regarding the time period from August, 2011 to March, 2018 and the y-axis represents the reactions.

Table 5
Summary statistics for data from August, 2011–December, 2014.

Observations	Mean	Std. deviation
34	21964.088	54346.521

Table 6
Mann-Kendall upper-tailed trend test.

Kendall's tau	0.558
S	313.000
Var(S)	4550.333
p-value (one-tailed)	<0.0001
Alpha	0.05
Sen's Slope	488.500
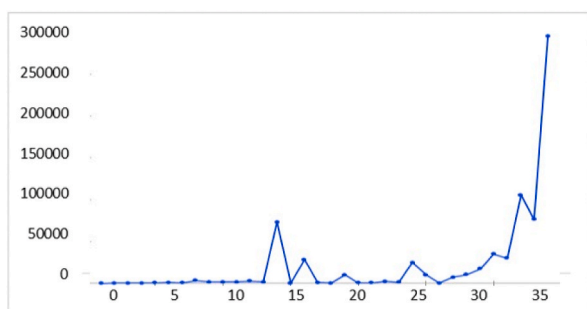
Fig. 3. Trend analysis graph for positive reactions from August, 2011–December, 2014.

Table 7
Summary statistics for data from January, 2015–March, 2018.

Observations	Mean	Std. deviation
35	19108.686	20012.959

4.2. Case 2: Trends in politics for the past government

For this case, the reactions from August, 2011 to December, 2014 has been considered as the data set. Table 5 shows the summary statistics for this set of data.

The hypothesis that is been tested here is, whether there is a positive trend in politics for the past government. The null and alternative hypothesis can be stated as below.

H0 There is no trend in the series
H1 There is a positive trend in the series

The Mann-Kendall Upper-tailed Trend test is performed, and the results are illustrated in Table 6. As the computed p-value is lower than the significance level alpha = 0.05, the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted.

The risk to reject the null hypothesis H_0 while it is true is lower than 0.01%.

The Sen's slope holds a positive value with a magnitude of 488.5. It is a much higher value compared to the value identified in Case 1.

The trend analysis graph for Case 2 is shown in Fig. 3 which has a monotonically increasing trend. The x-axis represents the observations ranging from August, 2011 to December, 2014 and the y-axis represents the reactions.

Table 8
Mann-Kendall lower-tailed trend test.

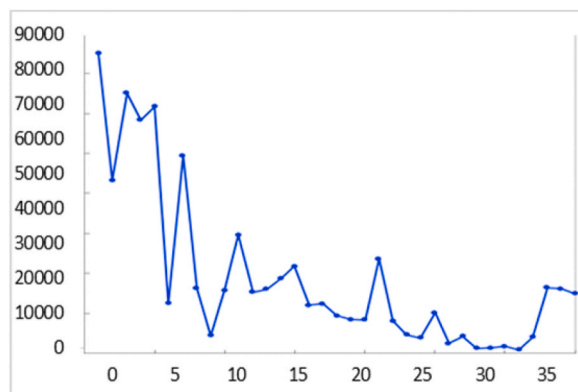| Kendall's tau	−0.556
S	−331.000
Var(S)	4958.333
p-value (one-tailed)	<0.0001
Alpha	0.05
Sen's Slope	−874.000

Fig. 4. Trend analysis graph for reactions from January, 2015–March, 2018.

4.3. Case 3: Trend in politics for the present government

For this case, the positive reactions from January, 2015 to March, 2018 has been considered as the dataset. Table 7 indicates the summary statistics of the data.

The hypothesis that is been tested here is whether there is a negative trend in politics for the ruling period of the present government. The null and alternative hypothesis can be stated as below.

H0 There is no trend in the series
H1 There is a negative trend in the series

The Mann-Kendall Lower-tailed Trend test performed is illustrated in Table 8. As the computed p-value is lower than the significance level alpha = 0.05, the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted.

The risk to reject the null hypothesis H_0 while it is true is lower than 0.01%. The Sen's slope holds a negative value with a magnitude of 874.

The trend analysis graph for Case 3 is shown in Fig. 4 which has a monotonically decreasing trend. The x-axis shows the observations from January, 2015 to March, 2018.

Considering all the three cases presented in this section, it is seen that on the whole, political news reported has an increasing trend with respect to the reactions over the years from 2011 to 2018. However, if the time periods of past and present governments are considered separately, it is noted that the past government has a monotonically increasing trend whereas the present government has a monotonically decreasing trend. The Sen's Slope values further strengths the visually represented trends for the two governments which indicates that the past government has a high positive slope value compared to the present government having a high negative slope value.

5. Conclusions

This study performed on news posts on a Facebook page has shown that useful insights can be obtained by user reactions. The study would have been more accurate if data were obtained and analyzed from several news pages rather than one. The results obtained by the Mann-Kendall trend test has proven that the majority of the Sri Lankan

community displays a positive tendency on the overall interest and engagement in politics. The overall trend shows an increasing pattern until 2015 and then it decreases by 2018. This behavior can be related to the presidential election which was held in January, 2015. The increasing trend from 2011 to 2015 denotes the positive impact of the public towards the past government. The decreasing pattern after 2015 to 2018, can be a marginal indicator which resembles the dissatisfaction the public has towards the present government. Furthermore, it can be said that the "Good-Governance" has not made a remarkable impact on the citizens of the country. Additionally, this statement has proven to be exact by the presidential election held late in 2019, where the past government defeated the "Good-Governance".

As mentioned in Ref. [21], this study has elaborated the perceptibility of drawing useful insights from social media sites specifically Facebook in order to predict the engagement and the opinion of the public towards its governing body.

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