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Communication Network Analysis #INA_CoronaVirus Alert On Twitter

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***Abstract*— This research is motivated by the lively discussion about the corona virus issue on Twitter. The issue of the corona virus attracts the attention of the world and the people of Indonesia because of its massive spread and no medicine has been found to heal patients affected by corona virus. This study analyzes conversations about the corona virus on Twitter with hashtag #INA_CoronaVirusAlert. The research method utilized was social network analysis with the NodeXl was exploited as a collecting big-data engine. The results showed the #INA_CoronaVirusAlert conversation map which was divided into 161 groups. From 161 groups, there are 10 top tweeters and 10 top mentioned. Social network analysis has strengths and weaknesses that need to be continuously studied.**

Keywords—SNA, corona virus, Indonesia, Twitter

I. INTRODUCTION

Currently, the issues of the corona virus are widely discussed in the global community as well as in Indonesia. The corona virus was identified in 2019 [1]. This virus was found in Wuhan City, Hubei Province, China. This virus is called 2019-nCov. Corona virus is a virus that causes respiratory diseases. The corona virus is still in the same family as the SARS and MERS viruses. Until February 12, 2020 morning, it was stated that there were 45,057 people died [2]. Yet, no vaccine has been found to heal corona virus.

Considerations about corona virus not only arise in daily face-to-face interactions but also is widely discussed on Twitter. On February 5, 2020, #INA_CoronaVirusAlert became a trending topic on Twitter. Thus, this research was conducted to find out how conversations about corona virus on Twitter to be found. Twitter was chosen because Twitter becomes Indonesia's favorite micro-blogging. Based on data from Statista.com, the number of Twitter users in Indonesia has increased from year to year.

Based on Statista.com [3], the number of Twitter users in Indonesia in 2014 totaled 12 million accounts, in 2015 there were 14.3 million accounts, in 2016 it reached 16.8 million accounts, in 2017 there were 18.9 million accounts, in 2018 there were 20.9 million accounts and in 2019 Twitter users have increased by 22.8 million accounts. For this reason, research on communication networks on Twitter accounts is interesting method to perform in investigating the information-dissemination character of some issues on the global computer network.

This paper aims to map the typical network fashioned during the deployment information of corona virus issue in Indonesia through specific hashtags of Twitter using NodeXl as a collecting big-data engine. The characteristic of the network will be presented in both figures and pictures.

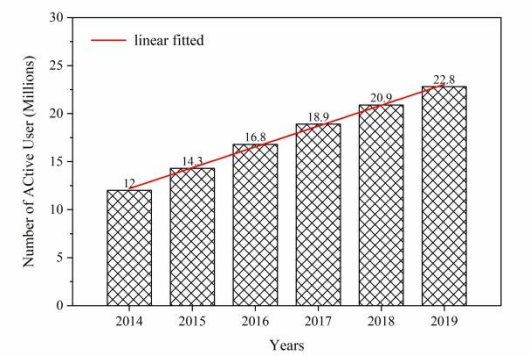

Fig. 1. The number of active Twitter users in Indonesia from 2014 to 2019. The red line shows the linear fitting curve of the increasing number of Twitter active users.

II. THEORETICAL BACKGROUND

A. Social Network Analysis (SNA) Concept

The concept of social networking related to sociometry and sociograms has emerged since 1954. Barnes is credited with the idea of social networking. The main assumption of this analysis is a study of how the social structure of relationships between groups, people, or organizations affects beliefs and behaviors [4]. Analysis of social networks provides an understanding of information flow patterns and emphasizes his attention to aspects of giving and receiving information. Social networks can identify key users with their potential influence at different levels of analysis. When we use this analysis, we will find nodes, links, clusters, in the whole network [5].

B. Citizens Participation

Several studies have shown the participation of citizens on the internet. One of the examples of the research is conducted by Jensen et al [6]. Jensen explores the motivation of Twitter users to share and create memes in crises. It was when Brussels made a lockdown because of corona virus. Jensen focused his attention on #Brusselslockdown on Twitter. Another example is research conducted by Lycariao and dos Santos [7]. The results of their research showed that the TPM magazine was successful in spreading and was able to gain support for its #precisamosfalarsobreaborto campaign (we need to talk about abortion) on Twitter. Both studies showed citizen's participation via Twitter by using a specific hashtag.

III. METHODS

The method used in this research was social network analysis (SNA). SNA is a mapping and measurement analysis to determine relationships and interactions in a network of people, groups, organizations, and other information that are interconnected [8]. Social network analysis focuses on relational ties among social actors, such as organizations or individuals [9]. The previous study conducted by Sari et al in 2019 is similarly using SNA in analyzing the conversations about deleting Facebook [11]. Specifically, in harvesting the data, NodeXl developed by The Social Media Research Foundation was employed [10]. Furthermore, to obtain the optimum network, the data was collected on February 5, 2020, on the day the #INA_CoronaVirusAlert became a trending topic on Twitter.

IV. RESULTS

Table 1 shows the characteristic of the established network of #INA_CoronaVirusAlert on Twitter. It is observed that the conversation #INA_CoronaVirusAlert has 2089 accounts involved in conversations in the communication network. Meanwhile, there are 2968 connections or interactions between the 2089 Twitter accounts. Data retrieval on the conversation is limited to 18000 tweets. Friendship and follower limits are 2000 per user.

TABLE I. GRAPH METRIC OF THE ESTABLISHED NETWORK OF #INA_CORONAVIRUSALERT ON TWITTER.

Graph Metric	Value
Graph Type	Directed
Vertices	2089
Unique Edges	2397
Edges With Duplicates	571
Total Edges	2968
Self-Loops	437
Reciprocated Vertex Pair Ratio	0.001752081
Reciprocated Edge Ratio	0.003498032
Connected Components	223
Single-Vertex Connected Components	85
Maximum Vertices in a Connected Component	1437
Maximum Edges in a Connected Component	2136
Maximum Geodesic Distance (Diameter)	13
Average Geodesic Distance	5.425485
Graph Density	0.000524321
Modularity	0.74916

Interactions between the accounts then are illustrated in Figure 2. It shows a map of the conversation on Twitter using hashtag #INA_CoronaVirusAlert on February 5, 2020. This map represents interactions among actors in a graph known as a sociogram [12]. The sociogram was rendered using the Fruchterman Reingold algorithm that uses physical simulation to draw each node according to connected edges. In these social networks, smaller subgroups which more connected to one another, arise. These smaller groups called clusters, and these clusters often called “communities”[5]. There are 161 groups in the entire #INA_CoronaVirusAlert communication network.

Based on the Fig.2, there is an account called top tweeters. In the first group (G1), @marsyaheedas are the top tweeters with the number 200222. In group two (G2), @dedihermanto813 account is top tweeters with a total of 201650. In group three (G3), @viriyabot account is top tweeters with 381691. The fourth group (G4), account @umam_chaerul is the top tweeters with the number 194742. While in the fifth group (G5), @Kompascom as the top tweeters with a total of 144218. The sixth group (G6), the account with the name @liem_id is the top tweeters with the number 97824. In the seventh group (G7) there is an @infosumbar account with a total of 250848. The eighth group (G8) has top tweeters with the name @onlyfortaetae account with the number 65607, while in the ninth group (G9) and the tenth group (G10) respectively as top tweeters are accounts with the name @amstrongbiring with 64215 and account with the name @haidir_setiawan with number 64215.

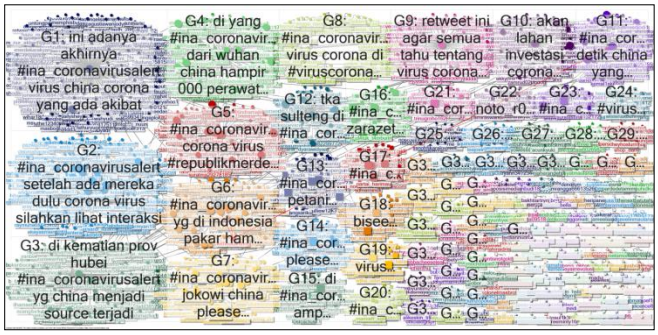

Fig. 2. Conversation Map #INA_CoronaVirusAlert on Twitter.

The other things that can be observed based on the grouping of #INA_CoronaVirusAlert communication networks are about ‘top mentioned’. The top mentioned category is the account most often mentioned in each group. The most frequently mentioned accounts starting from the first group (G1) to the tenth group (G10) in a row are: G1 no top mentioned account, G2 is @idtodayco account with number 19, G3 has @robin352494828 account with number 108, G4 has an account with the name @jokowi with the number of mentions 2, G5 there is @robin352494828 account with the number 2, G6 there is @robin352494828 account with the number 5, G7 there is an account with the name @jokowi with the number of mentions of 46, G8 no top mentioned, G9 also has no top mentioned, and G10, there is an account named @robin352494828 with a mention of 2.

Based on these data, there are some interesting things to analyze. First, based on ten top tweeters data, there is one account that is not personal. @Kompascom accounts are the only online news accounts that are the top tweeters in G5. It is known that Kompas.com is one of the favorite media of Indonesian people to access information [13]. Second, an account with the name @robin352494828 can be said to be an account that is a 'bridge' between groups that use #INA_CoronaVirusAlert on Twitter. The account is the top mentioned account in G3, G5, G6, and G10. The second most mentioned top is an account with the name @jokowi. This account is referred to in G4 and G7. As we know, Jokowi is the President of the Republic of Indonesia who is currently ruling. The mention of the Head of State in a microblogging account like Twitter is one of the advantages possessed by computer-mediated communication media.

Before this communication media developed, the opportunity to directly mention the Head of State was impossible. Citizens have limited access to communicate directly with the Head of State. But now access has become open and communication can be done directly.

Despite the advantages found in this social network analysis, there are also some weaknesses. Some of the weaknesses are the analysis is limited to only 18000 tweets, friendship limits and follower limits are 2000 per user, all accounts analyzed are assumed to be accounts controlled by humans and not by robots. In addition, the absence of top mentioned in some of the top 10 mentioned groups is also a separate note for this analysis.

V. CONCLUSION

Social network analysis on #INA_CoronaVirusAlert on Twitter has several analyzes. The communication network involves 2089 accounts and has 2968 connections between the accounts therein. From 2089 accounts, 161 groups or groups were formed that spoke of the Corona virus. Out of 161 groups, there are 10 top tweeters and the top 10 mentioned. One of the top tweeters among the top 10 groups of top tweeters is not a personal account but an online news account. The account is a @kompascom account. Referring to the findings of the top 10 mentioned, two accounts are the most mentioned among the top 10 mentioned. These accounts are @robin352494828 accounts and accounts with the name@jokowi.

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