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ZAKAT IN THE VIRTUAL WORLD: SENTIMENT ANALYSIS OF NETIZENS' OPINION ON TWITTER

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Abstract: *This paper explores the netizens' opinions on zakat during the Covid-19 pandemic by evaluating the sentiment score of data tweets containing the word '#zakat'. The machine learning analysis via RStudio is done to perform lexicon-based sentiment analysis. The number of 100 Tweets in English that contain the '#zakat' is sampled via an automated web-scrapping using RStudio. The lexicon sentiment analysis is employed via R Shiny Web App to test the sampled tweets' two primary sentiments (i.e. negative and positive). The supervised machine learning analysis finds a 78 overall sentiment score. The score represents 84 for positive words and 6 for negative words. The visualisation of wordcloud and histogram is made to describe the finding. In addition, the top 20 Twitter users mostly use the #zakat in Twitter using the English language is identified. The finding is practically important to explain the social implication of zakat in times of the pandemic from the virtual communication on Twitter.*

Keywords: *Zakat, Big Data, Social Media Analytics, Sentiment Analysis.*

INTRODUCTION

During the unprecedented times of Covid-19, the role of zakat (almsgiving) has been significant, particularly in managing social problems due to the control measures implementation (e.g. lockdown) (Hudaefi et al., 2021; Hudaefi & Beik, 2021). Virtual zakat events have been significantly conducted to discuss zakat's role in times of the Covid-19 pandemic. The discussion of zakat in both real-world practices and virtual environment, such as social media, have created big data that is unstructured and is rich information (Hudaefi et al., 2021).

The information from social media communication contains important knowledge that opens substantial spaces for scholarly works (Hassan et al., 2021; Hudaefi & Beik, 2021; Kaplan & Haenlein, 2010; Kietzmann et al., 2011). Social media has been practically crucial for decision-makers, consultants, and others for business purposes (Kaplan & Haenlein, 2010) and knowledge discovery from a social phenomenon in a virtual world (Hudaefi & Beik, 2021). Social media opens spaces for digital ethnography (Hudaefi & Beik, 2021; Kozinets, 2002, 2015). It has been used for participating in political interests (Tufekci & Wilson, 2012), political communication and social behaviour studies (Stieglitz & Dang-Xuan, 2013). In the context of zakat in the Covid-19 pandemic, social media provides important information about people's opinions on zakat during the outbreak.

What are netizens' opinions about zakat as they communicate on social media? The current scholarly works have not much dealt discussing this vital question. The topic of zakat and Covid-19 have addressed several issues. For example; the global zakat administration during the pandemic via written interview (Hudaefi et al., 2020), the lessons from the digital zakat campaign in times of the outbreak in social media (Hudaefi & Beik, 2021), and the contribution of zakat institution during the pandemic analysed using machine learning (Hudaefi et al., 2021). However, such studies which have explored netizens' opinions on zakat from virtual environments may remain insignificant. Against this backdrop, this paper aims at studying people's views on zakat in the virtual world. This topic is theoretically essential to understand people's opinions about zakat as communicated in the virtual world.

This paper offers novelty in several ways. First, it explores the opinions of netizens about zakat that explains the use of big data to understand the social phenomenon of zakat from the information in the virtual world. Future studies can benefit from this study in employing machine learning for scholarly works in the Islamic social finance arena. Second, the discussion of this study can contribute to the advancement of the Islamic economics literature in general and Islamic social finance and zakat in particular.

This work is organised as follows. The following section is the literature review, in which the identification of a knowledge gap is established. Furthermore, the following section presents the research method used in this study. Theoretical and practical contributions are discussed in the following sections. Conclusion and recommendations are drawn in the final section of this paper.

LITERATURE REVIEW

Zakat is the third of the five pillars of Islam that aims to purify a Muslim's wealth and redistribute the wealth to the poor and the needy (Abuznaid, 2009; Boonyamanond & Chaiwat, 2020; Choudhury, 1989; Djaghballou et al., 2018; Hudaefi et al., 2021; Hudaefi & Beik, 2021; Sulistyowati, 2019; Yusoff et al., 2019). Zakat obliges a 2.5% payment from the Muslims' productive wealth when reaching the nishab (full ownership) and haul (one lunar year) (Bin-Nashwan, Abdul-Jabbar, Aziz and Haladu, 2020; Choudhury, 1989; Esa et al., 2018; Raimi et al., 2014). In zakat agriculture, a 10% zakat is required for agriculture products irrigated with rainwater, and a 5% zakat is charged other than that (Hudaefi et al., 2021; Hudaefi & Beik, 2021). Moreover, Islam requires zakat fitrah that Muslims must pay before 'aid al-Fitr (Islamic holy day). It is one sha' compulsory levy or an equivalent of 2.5 kilograms of rice, wheat, dates, sago or other staple food (Hudaefi & Beik, 2021).

The objects of zakat in contemporary practices have evolved. Hafidhuddin (2002) classifies them into two (i.e. classic and contemporary zakat). Classic zakat includes zakat al-Fitr, zakat al-mal (wealth) of 85 grams gold, zakat on agriculture and zakat on trading and business with nishab of 85 grams gold and meets the haul. Meanwhile, contemporary zakat is any halal (allowed by Islamic law) wealth equals the nishab of 85 grams of gold subject to a 2.5% zakat when it reaches the haul. Such zakat in the current practices, including; zakat profession (monthly salary), corporate zakat, zakat on stocks and bonds, and zakat on Islamic investments (Hafidhuddin, 2002; Hudaefi & Beik, 2021; Talattov et al., 2016).

In times of the Covid-19 pandemic, the demand for zakat has been increasing. The potential of zakat in managing the pandemic consequences has been addressed significantly in virtual events. It has been the primary topic in the arena of Islamic social finance debates. The discussion of zakat in a virtual environment opens significant space for scholarly works. However, the existing studies on zakat that employ big data analytics have been few in numbers. This study uses social media analytics to explore the netizens' opinions on zakat as posted on Twitter.

Social Media and Big Data

Social media transforms a culture of connectivity where 'sharing', 'friending', 'liking', 'following', 'trending', and 'favouriting' have come to symbolise online practices where everything turns out to be "social" (van Dijck, 2013). Social media provides virtual spaces where people can create and share content and participate in social networking (van Dijck, 2013). The content in social media can predict tie strength (Gilbert & Karahalios, 2009) and forecast real-world outcomes for the intended purposes (Asur & Huberman, 2010; Kaplan & Haenlein, 2010). The consequence of communication made up in social media creates big data that is unstructured and rich information (Hudaefi & Beik, 2021; Paizin, 2021).

Scholarly works have offered numerous understanding of big data. Gandomi and Haider (2015) explain that big data can be understood under six points (i.e. volume, variety, velocity, veracity, variability, and value). The magnitude of data is explained as data volume. It means that big data sizes are in multiple terabytes and petabytes (Gandomi & Haider, 2015; Paizin, 2021). Furthermore, the structural heterogeneity in a dataset refers to data variety that contains various types of structured, semi-structured, and unstructured data (Gandomi & Haider, 2015). Structured data is the tabular data found in spreadsheets or relational databases, while unstructured data involves text, images, audio, and video (Gandomi & Haider, 2015; Hudaefi & Badeges, 2021; Hudaefi & Beik, 2021). The speed and the rate at which data is generated refers to as data velocity. The fast-growing of digital devices and the internet has led to an unprecedented rate of data creation (Gandomi & Haider, 2015; van Dijck, 2013).

Furthermore, the unreliability characteristic of some data sources is called data veracity. For instance, the human judgment from customers reviews in social media is uncertain. However, such judgement provides valuable information (Gandomi & Haider, 2015). The data flow rate variation generated through countless sources refers to data variability and complexity (Gandomi & Haider, 2015; Philip Chen & Zhang, 2014). In addition, data value refers to the data received in the novel form. It usually contains a low value. Such a high value can be gained by investigating large volumes of the data (Gandomi & Haider, 2015).

Big data has gained massive attention from researchers, policymakers, governments and enterprises (Philip Chen & Zhang, 2014). There are at least five types of big data analytics. They are text analytics or text mining, audio analytics, video analytics, social media analytics and predictive analytics (Gandomi & Haider, 2015). Communication in the virtual world has made up essential data for Islamic social finance debates. This study performs social media analytics to explore the netizens' opinion on zakat as posted on Twitter.

Big Data Analytics and Zakat Research

Hudaefi and Beik (2021) perform a digital ethnography or netnographic study to examine the digital zakat campaign in the Covid-19 pandemic. They use social media posts of a zakat institution on Facebook, Instagram, Twitter, and YouTube to study digital zakat campaigns, and the lesson can be learned from the content posted during the pandemic. The study offers theoretical implications of inclusive marketing. This theory explains that the inclusivity of social media content is practically critical to delivering the message of zakat as a religious obligation that shapes the socioeconomic processes of a Muslim community (Hudaefi & Beik, 2021).

Furthermore, Hudaefi et al. (2021) use unsupervised machine learning to analyse the contribution of a zakat institution during the pandemic Covid-19. They use the unstructured textual data from information in a zakat institution website. The study uses Sankey graph visualisation to explain their findings. Of the theoretical contribution is the explanation of 'socioeconomic zakat'. This theory describes that zakat is a religious obligation that plays a critical role in shaping a Muslim community's social and economic processes, notably during the pandemic. In addition, Paizin (2021) propose a method of big data analytics for zakat administration. The study is practically critical for the practice of data management in zakat institutions.

Taken together, the unstructured data made up by internet users and the information from virtual websites is important for zakat studies. In the current research, such data has facilitated researchers to draw theoretical implications of inclusive marketing from digital zakat campaigns (Hudaefi & Beik, 2021) and the concept of socioeconomic zakat (Hudaefi et al., 2021). Nevertheless, research on zakat that explicitly uses social media analytics from data Tweet may remain absent in times of this study. This work aims to fill in this gap in the research practices.

Gap in Knowledge

Researches on zakat that have used big data analytics have been limited in number. Moreover, the studies that specifically address zakat and Covid-19. The existing studies that have engaged with big data analytics include Hudaefi and Beik (2021). They use social media to learn the lessons from digital zakat campaigns in times of the pandemic. In addition, Hudaefi et al. (2021) sampled the information from the virtual website of the zakat institution to explain the contribution of zakat in times of the pandemic.

However, to the time of this study, an attempt that engages with social media analytics to explore the netizens' opinion on zakat may remain absent, specifically the study that uses data tweets. Against this backdrop, this study employs machine learning to perform sentiment analysis of data tweets that contain #zakat.

Twitter Data Analytics and Research Question

Twitter has been highly used in computer and social science researches. Twitter feeds are used for predicting the stock market (Bollen et al., 2011), election (Tumasjan et al., 2010), cryptocurrency prices and sentiment analysis (Hassan et al., 2021; Kraaijeveld & De Smedt, 2020) and others. Data tweets have been significant for sentiment analysis and opinion mining,

which analyses people's opinions, sentiments, evaluations, attitudes, and emotions from written language (Hassan et al., 2021; B. Liu, 2012; Bing Liu & Hu, 2004; Pang & Lee, 2008). To drive this study, the following research question is asked:

RQ1; What are netizens' opinions about zakat as they communicate via Twitter posts?

RESEARCH METHODS

Answering Research Question via Text mining and opinion mining

Text mining definition and algorithms involved in its implementation has been ambivalently discussed (Hudaefi et al., 2021; Hudaefi & Badeges, 2021; L. Jiang et al., 2013; Villarroel Ordenes & Zhang, 2019). Text mining can be understood as a specialised procedure of data mining to extract information and discover knowledge from vast volumes of unstructured textual data (Cheerkoot-Jalim & Khedo, 2020; M. Jiang et al., 2014; Justicia De La Torre et al., 2018; Usai et al., 2018). In the context of sentiment analysis, the idea of opinion mining has been primarily addressed.

Pang and Lee (2008) explain that opinion mining has emerged in scholarly debates since 2001. Opinion mining and sentiment analysis aim to evaluate textual data for decision-making processes (B Liu, 2012; Pang & Lee, 2008). Previous studies have used various computer software for opinion mining and sentiment analysis. For example; 'R' (R.E. Caraka et al., 2020; Hudaefi et al., 2021; Islam & Kaur, 2018; Oza & Naik, 2016), 'NVivo' (Alcoforado & Dos Reis, 2020; Hai-Jew, 2016; Hudaefi & Badeges, 2021; Hudaefi & Beik, 2021), 'Orange Data Mining' (Marcu & Danubianu, 2020), 'KNIME' (Jović et al., 2014), 'Weka' (Jović et al., 2014), 'RapidMiner' (Jović et al., 2014), 'Python' and others to perform text mining. This study employs text mining via 'R' to perform opinion mining for sentiment analysis.

Analysis using RStudio

R is a free software environment for statistical computing and graphics (Caraka et al., 2021; R Core Team, 2008). R is an open data system; therefore, the authors' work in analysing the textual data is easier to be audited quickly than thematic analysis via human intelligence (e.g. deductive, inductive and abductive reasoning of content analysis) (Hudaefi et al., 2021).

In Islamic economics researches, R software at least has been used for various applications; including for regression analysis (Lee et al., 2017; Sanchez, 2013; Sutiksno et al., 2018), cluster analysis (Militino, 2010; Müllner, 2013), classification (Andrew, 2001; R.E. Caraka et al., 2020; Sani et al., 2018), time series (Hornik, 2009; McLeod et al., 2011; Suhartono et al., 2019) data mining (Caraka et al., 2021) and others. In a specific context of zakat studies, Nailah and Rusydiana (2020) use R Biblioshiny to evaluate the publication of scholarly articles of zakat. The finding provides critical information about the development of zakat literature.

In this study, the authors' text mining analysis via RStudio was done. In addition, the R language programming codes for R Shiny Twitter sentiment analysis developed by Pandey (2019) was used. The following R libraries are used for the analysis; twitteR, stringr, ROAuth, RCurl, ggplot2, reshape, tm, wordcloud, gridExtra, and plyr.

Data Collection Via Automated Web-Scrapping

This study sampled 100 tweets via an automated web-scrapping in R Studio using the Web Shiny App developed by Pandey (2019). Twitter application programming interfaces (APIs) codes are mandatory and pre-requisite in this step. The Twitter API can be gained from https://developer.twitter.com/. Table 1 is the example of 10 selected sampled tweets from 1000 sampled tweets.

Table 1. Example of 10 Tweets from 1000 Sampled Tweets Containing #Zakat

Sampled Tweets containing #Zakat
Give your #Zakat for #Orphans and other #charity #services. /EfyfBFC7vq
RT @daldabak: #arte #art #painting #ArtLovers #Orientalism #Islam #cityscape Offering of the #Zakat by Cesare Biseo, 1870. /M
RT @UKEFF_HQ: It really does happen to anyone, regardless of their background. /X7Xls7vS5A https://t.
The benefits of donating are priceless - please support your local charity supporting local people in need. /1s4R3yuPMJ
Our youngest client for #webtherapy is as young as 8 years old. Together, with the support of @PennyAppealCa we are /iOw2CY0qzR
RT @RadioChinar: This month focuses on Sawm (fasting - one of the five pillars of #Islam). As fasting helps instill compassion for the food
The only two #NGOs in #Pakistan woryh giving donations and #zakat #fitra are #LRBT and #SIUT
RT @SaveAFaoundati1: #July distribution done by the grace of God 2year completed we r serving from 24rd month 31 families benefited
#July distribution done by the grace of God 2year completed we r serving from 24rd month 31 families benefit /ciRsmPS43T
Brother Tahir from Bhiwandi is 43 years old & suffering from urinary bladder disease. It needs to undergo surgery a /c13q97sLUs

Source; Sampled Tweets using automated web-scrapping via Web Shiny App developed by Pandey (2019).

Visualisation of the Sampled Tweets

R Web App Shiny developed by Pandey (2019), is used for visualising the collected data tweets. Figure 1 is the wordcloud visualisation of the sampled 100 tweets containing #Zakat. The size of each word represents its occurrence in the sampled texts. The word zakat is depicted in the biggest size given it is the used keyword for the analysis.

Figure 1 also shows the word ‘donations’ in green colour that is primarily associated with zakat. Furthermore, the words ‘Islam’, ‘Tax’, and ‘Support’ are in the same colour representing their occurrences in the sampled texts. These words are primarily associated with the word zakat. In addition, the words like ‘socioeconomic’, ‘redistribution’, ‘justice’, and others are mainly related to the fundamental of zakat. Our word cloud visualisation best describes the fundamentals of zakat.

Source; Sampled 1000 Tweets containing #Zakat using automated web-scrapping via Web Shiny App developed by Pandey (2019).

Figure 1. Word Cloud Visualisation of 100 Tweets Containing #Zakat

RESULTS

Sentiment Analysis Score

The supervised sentiment analysis was done to explore the netizens' opinions on zakat. Supervised sentiment analysis means that the lists of negative and positive words are pre-determined (Hassan et al., 2021). Then, machine learning uses this pre-determined list to evaluate the sampled textual data. In the context of this study, the textual data is the 100 sampled tweets.

Table 2 is the example of the score given by the machine learning to the sampled tweets. The analysis results in an overall score of 78. This score is from the overall positive score (i.e. 84) reduced by the overall negative score (i.e. 6).

Table 2. Example of 10 Tweets with Sentiment Scores From 1000 Sampled Tweets Containing #Zakat

Text	Positive	Negative	Score	PosPercent	NegPercent
The benefits of donating are priceless - please support your local charity supporting local people in need. /1s4R3yuPMJ	4	0	4	100	0
Our youngest client for #webtherapy is as young as 8 years old. Together, with the support of @PennyAppealCa we are /iOw2CY0qzR	1	0	1	100	0
RT @RadioChinar: This month focuses on Sawm (fasting - one of the five pillars of #Islam). As fasting helps instill compassion for the food	1	0	1	100	0

The only two #NGOs in #Pakistan woryh giving donations and #zakat #fitra are #LRBT and #SIUT	0	0	0	0	0
#July distribution done by the grace of God 2year completed we r serving from 24rd month 31 families benefit /ciRsmPS43T	2	0	2	100	0
Brother Tahir from Bhiwandi is 43 years old & suffering from urinary bladder disease. It needs to undergo surgery a /c13q97sLUs	0	1	-1	0	100
RT @daldabak: #arte #art #painting #ArtLovers #Orientalism #Islam #cityscape Offering of the #Zakat by Cesare Biseo, 1870. /M	0	0	0	0	0
RT @akkerahman: All my brothers at @kick_sonic have had my back from the start along with others. Thanks for your support and good influenc	2	0	2	100	0
RT @emanuel_scha: Why is taxation based on Islamic #zakat such an attractive paradigm for rebel groups setting up decentralised forms of go	1	0	1	100	0
Accidentally found someone showing that he needs financial help without putting up a #whiteflag. #Zakat #Malaysia a /cK8v45MzUO	0	0	0	0	0

Source; Sampled Tweets scored based on sentiment lexicon analysis via machine learning.

Results Visualisation

The overall sentiment analysis score (i.e. 78) is described with a pie chart in Figure 2. The red colour represents the positive score, while the light blue colour depicts the negative score. It shows that the positive word takes the highest portion of the overall score compared to the negative words analysed by machine learning. Furthermore, the histogram visualisation (i.e. Figure 3a, 3b, and 3c) explains the frequency distribution of the sentiment score.

Figure 3a explains that the range of the overall sentiment score is from -1 to 4. The machine learning analysis finds the highest frequency of the given score is in the range -1 to 1, with -1 to 0 is the range that takes the highest score. The 0 score means that the data tweets are given 0 as no word is found to be matched with either positive or negative list words as pre-determined (i.e. supervised analysis). Figure 3b shows the range of overall positive scores is from 0 to 4. It shows that the range from 0 to 1 takes the highest positive score. Figure 3c shows that the negative sentiment score is in the range from -1 to 0.0. The highest negative score is found in the range -0.2 to 0.0.

The machine learning analysis identified that the 100 sampled tweets with a positive score are higher than the negative ones. Several implications can be gained from this score, particularly the role of zakat in times of the pandemic. The positive score may best describe the contribution of zakat in times of the pandemic. Some sampled tweets containing the

information about zakat distribution received a positive score. For example, a tweet from @SaveAFaoundati1 (i.e. *#July distribution done by the grace of God 2year completed we r serving from 24rd month, 31 families benefit*) received a positive sentiment score.

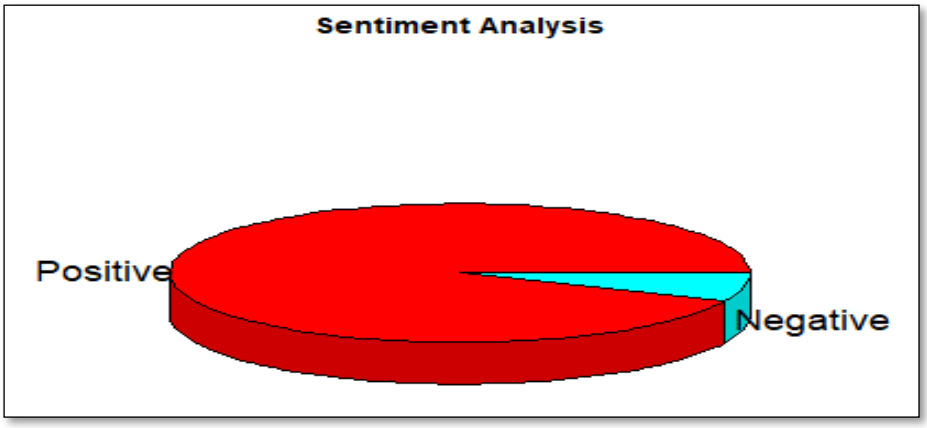


Figure 2. Pie chart of overall sentiment score

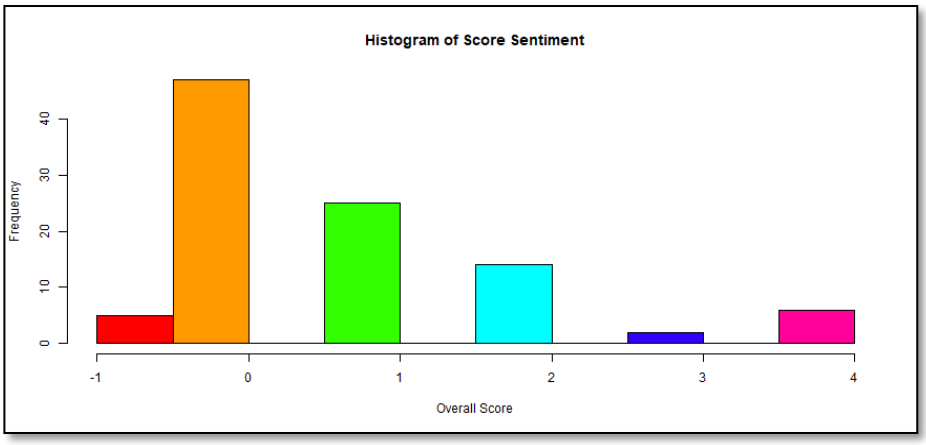


Figure 3a. Histogram of overall sentiment

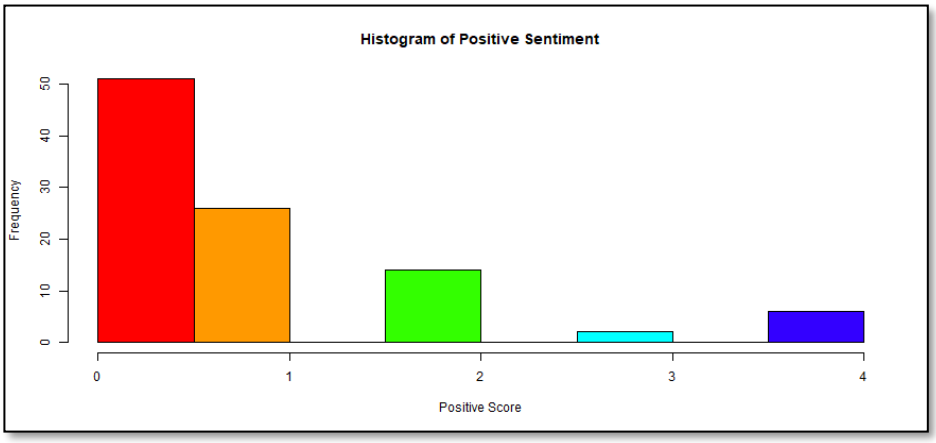
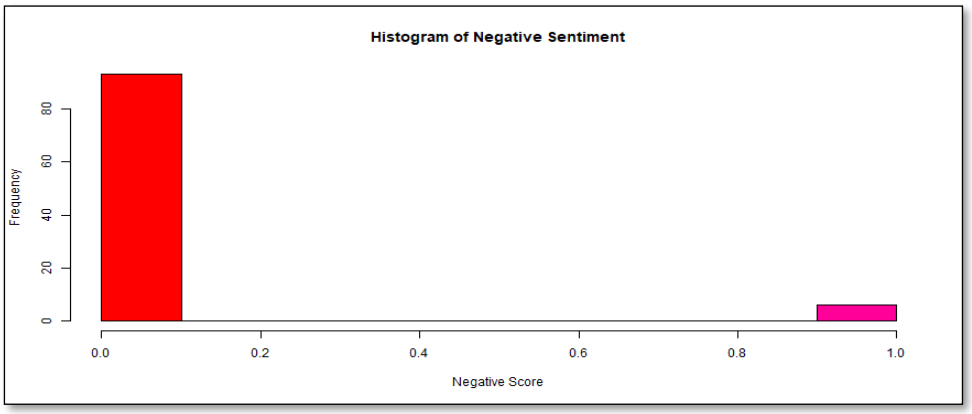


Figure 3b. Histogram of overall positive score

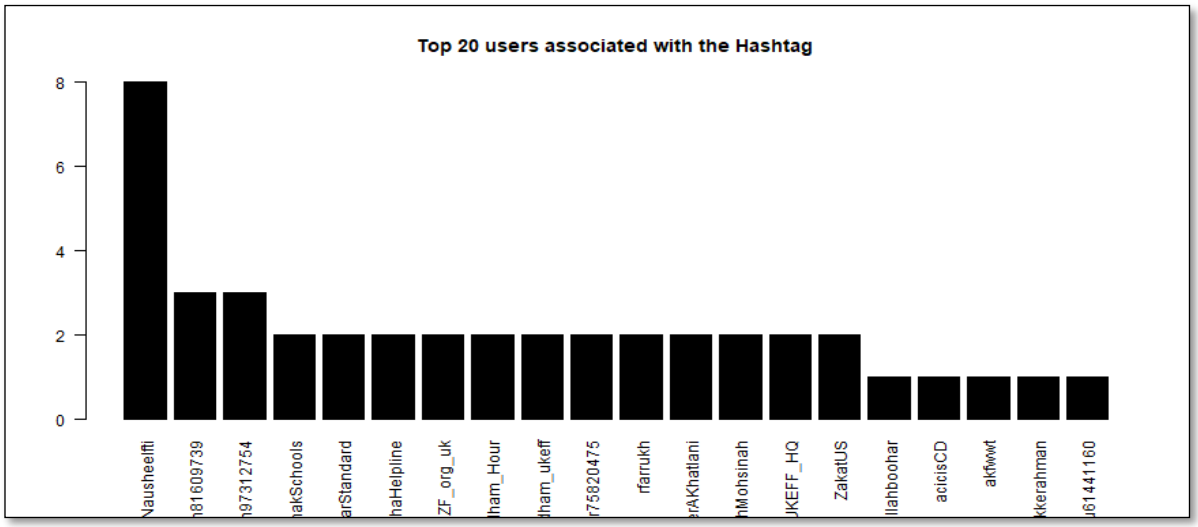


Source; Sampled Tweets with sentiment score analysed via Web Shiny App developed by Pandey (2019).

Figure 3c. Histogram of Overall Negative Score

The top 20 users

Who are the top users associated with #zakat in the 1000 sampled tweets? Figure 4 visualises the top Twitter users that post #zakat in the English language. The user @NausheeIfti is found as the user with the highest frequency in tweeting with #Zakat. Other top users are; @Abdulgh81609739, @Faizan97312754, @BaithakSchools, @DinarStandard, @NaseehaHelpline, @NZF_org_uk and others. The user @DinarStandard, based on its account, is a strategy research and advisory firm empowering organisations for profitable and responsible global impact. Meanwhile, @NZF_org_uk is the official account for the national zakat foundation of the United Kingdom. These accounts lead the #zakat posts on Twitter using the English language.



Source; authors' analysis via Web Shiny App developed by Pandey (2019).

Figure 4. Top Twitter Users associated with #Zakat

CONCLUSION

This study asked a research question; What are netizens' opinions on zakat as they communicate via Twitter posts? To answer this question, this study has employed supervised machine learning analysis to do sentiment analysis. An automated web-scraping for data collection was made to sample 100 tweets containing #zakat in English. The lexicon-based sentiment analysis is done under two lists of sentiments (i.e. positive and negative words). The analysis finds that the overall score for the positive word is higher than that of the negative word from the sampled 100 tweets. The positive words may describe the social implications of zakat contributions in times of the pandemic.

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