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AMAZON WILDFIRES FROM A TWEET CIRCULATION PERSPECTIVE

INCÊNCIOS NA AMAZÔNIA A PARTIR DE UMA PERSPECTIVA DE CIRCULAÇÃO DE TWEETS
INCENDIOS FORESTALES EN LA AMAZONIA DESDE LA PERSPECTIVA DE LA CIRCULACIÓN DE TWEET

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ABSTRACT:
Forest fires are one of the main threats to biodiversity in the Amazon region. Official data revealed record numbers in the volume of fire outbreaks in the year 2022. This worrying scenario reverberates not only in political and governmental issues of environmental preservation, but also in social networks, where society exposes and debates its views and opinions. This paper presents an exploratory study on a set of tweets in Portuguese related to the fires in the Amazon. Computational solutions are used to generate results that allow the thematic identification of the content conveyed by Twitter users on the subject. The results revealed a polarization on the issue, going beyond environmental problems and going against political and affective issues.

KEYWORDS: Wildfires; Amazon; Twitter; Data analysis.

Introduction

The damage caused by forest fires comprises a series of factors, which range from issues directly related to the environment, such as impacts on fauna and flora, and issues related to economic activities, such as ecological tourism, rural activities and the quality of human life (Strand et al., 2018). After ten years of existence, the reformulated Brazilian Forest Code (Law 12,651) - the main regulator of the environmental situation of rural properties in the country - is the subject of questions about its real application in the Brazilian context. Enacted on May 25, 2012, the legislation that modified the rules for protecting vegetation in private areas has been implemented relatively slowly.

For a better understanding of the completeness and complexity of this Law, it is necessary to highlight that Brazil had three Forest Codes: in 1934, 1965 and 2012. The 1934 legislation limited the right to use property in order to avoid the unrestrained exploitation of Brazilian forests. The 1965 Code created Permanent Preservation Areas

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(APP) and Legal Reserve Areas (ARL), present in the current law, and determined the rational use of forest resources. In 2012, Law 12,651 was enacted, which established general rules on: protection of native vegetation, forest exploitation, supply of forest raw materials, control of the origin of forest products, control and prevention of forest fires and forecasting of economic and financial instruments.

The Forest Code has become the main Brazilian national public policy for the protection of native vegetation on private properties. It is essential to point out that Brazil has several other environmental laws, such as Law 6.398/91, which deals with the National Environmental Policy, constituting the National Environment System (Sisnama) and the Environmental Defense Registry (Law 9,615/1998) which deals with issues related to Environmental Crimes, Law 5,197/1967, known as the Fauna Law. Brazilian legislation is vast on the protection of the environment in its territory.

The various bureaucratic processes that permeate the implementation of the legislation, in addition to the obstacles related to inspection, contribute to the high rates of deforestation in Brazilian forests. As an example of this catastrophic scenario, the 10,781 thousand km² devastated indicated by the Deforestation Alert System (SAD) of the Institute of Man and Environment of the Amazon (Imazon), during the period from August 2021 to July 2022, can be highlighted, equivalent to seven times the city of São Paulo (Amorim et al., 2022). One of the regions with the highest rate of deforestation in Brazil is the Amazon region.

The significant increase in the process of human occupation in which the Amazon region has suffered in recent decades has had a significant impact on land use change and deforestation in the region. This situation, for the most part, happens using fire as a tool in the process of converting forests into areas for agricultural activities (Artaxo, Silva-Dias & Andreae, 2003).

According to Granemann and Carneiro (2009), technological advances have brought the possibility of studying the behavior of fires through images from orbital sensors, in order to detect and locate fire outbreaks. This technology constitutes an important step towards prevention, allowing the detection of hot spots and the study of the behavior of burnings and fires through images from orbital sensors.

Deforestation and fires are among the main environmental problems faced in Brazil, which leads to the cutting down of vegetation and, in sequence, the burning of plant material resulting from the use of fire (Gonçalves, Castro & Hacon, 2012). The deforestation fire that occurs in the Amazon involves slash and burn, being the most critical form of anthropic modification in a forest. Consequently, fire entirely destroys the

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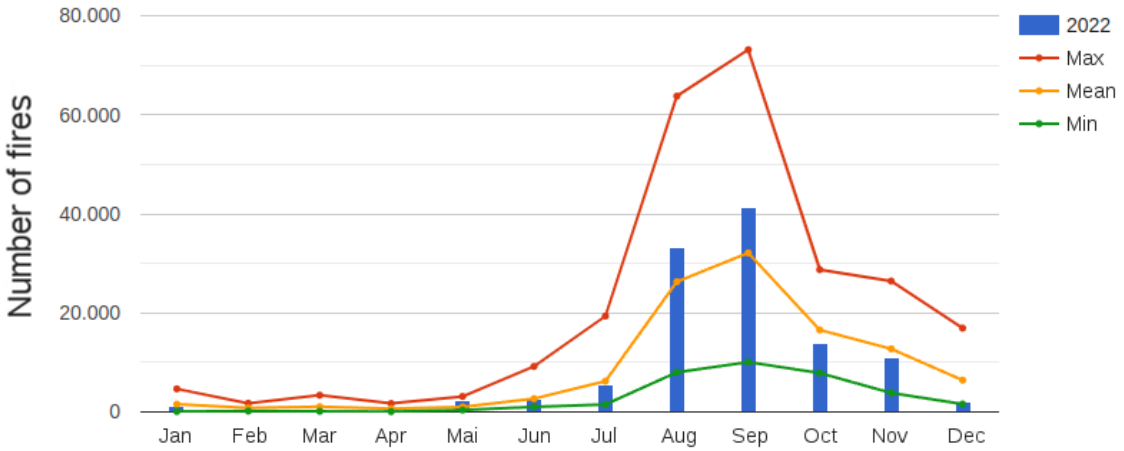
aerial parts of plants, disturbs fauna and expels nutrients and carbon in forest biomass into the atmosphere (Liesenfeld, Vieira & Miranda, 2016).

Forest fire happens when the environment is in a vulnerable state and is exposed to some threat factor, in other words, the combination of flammable fuels exposed to a heat source (Oliveira, 2002). Data made available by the National Institute for Space Research (INPE) show, for example, that the month of September, as it is a time of low rainfall, has a high rate of fires in the Amazon (Figure 1).

Figure 1 Fire outbreaks in the Amazon



Source: adapted from INPE (2022).

Forest fires are involved in several factors and all this problem is reverberated and manifested in society in the most diverse communication channels, among which social networks stand out. Han (2018) highlights that digital communication favors symmetrical communication, where those who take part in communication do not simply consume information passively, but become an active part of its generation. Everyone involved in the communication process becomes, simultaneously, senders and recipients, as well as consumers and producers.

This paper investigates what discourses Twitter users produced about forest fires in Brazil in the first half of 2022, using a data mining based analysis. The objective is to understand what problems are being raised and what the user's point of view is from this problem.

Social Networks

Throughout history, the society has adapted to the current means of communication to communicate in its community. The 21st century evidenced the use of the Internet as a communication tool, mainly with the phenomenon of globalization, as it

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increased the communication potential of the entire world. The worldwide computer network is no longer just a tool that represents innovation, but has become a common good. D'Andréa (2020) points out that studying networks in this context is synonymous with studying the internet, mainly due to the possibility of formalizing user interconnections through tools such as: follow, share, like and save. It is necessary to point out that the meaning of networks is multidisciplinary, having concepts in the areas of the exact sciences as well as in the social sciences. The term social network, as Ferreira (2011) explains, is originally attributed to John Barnes (1954) to refer to social ties and relationships.

Social networks can be understood as the interconnection between actors, which can refer to people, groups or institutions (Recuero, 2009), being guided by their own dynamics and flexibility (Martino, 2014). In the context of the Internet, social networks can be explicitly visible in social networking applications such as Facebook, Instagram, TikTok, Twitter and Linkedin. Such applications enhance the approximation and contact between different actors, overcoming existing geographic barriers (Ferreira, 2011).

Social networks are widely known as an efficient tool for promoting communication, which, according to Martino (2014), has an intrinsic relationship with cyberculture, which, in general terms,

> Designates the meeting of social relations, artistic, intellectual and ethical productions of human beings that are articulated in interconnected computer networks, that is, in cyberspace. It is a continuous flow of ideas, practices, representations, texts and actions that occur between people connected by a computer — or some device similar to other computers (Martino, 2014, p. 27, our translation).

Cyberculture is not ground zero in the culture of humanity, but it brings a series of particularities because it happens simultaneously in the offline environment and in the space connected to computers, in a very simple way, it is culture understood in a broad sense with human production, whether material, symbolic or intellectual (Martino, 2014).

Evidence of this digitized social phenomenon was the impact that even potentiated the political and cultural processes that gave rise to the Arab Spring (Howard & Hussain, 2013). This political movement had its beginnings linked to a popular uprising in Tunisia, which began at the end of 2010. The apex of the movement occurred when Mohamed Bouazizi set himself on fire as a protest against police corruption in the country. A highlight occurred when protesters appropriated social networks as a space for mobilization and confrontation against censorship imposed by local authorities (Puddephat, 2011; Castells, 2011; Castells, 2012).

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According to Martino (2014), virtual space can be understood as an unlimited environment, where one observes the transformation, duplication and transformation of situations in the physical world. The author also points out that the virtualization of spaces does not mean an imputation of the unreal. However, it is the communication between individuals in a social network that will play a key role in ensuring that it continues to grow, including an unlimited growth that is based on interaction and exchanges of information. Furthermore, as punctuated by Castells (1999), it is in this type of interaction that networks emerge as sources of social transformations.

Lévy (2010) argues that the Internet is changing Humanity, as there are mutations in social relations and in the connection between man and the urbanized world. The internet enhances the flow of information in a socio-technological geography (Castells, 1996). It is noted that the Internet allowed communication and interaction collectively, modifying and restoring the way people communicate with others.

It is worth noting that over time the internet has undergone changes and the characteristics of Web 2.0 are necessary, which consists of a new generation of applications and services that are born with social platforms based on different supports that are not only and exclusively the browser (O'Reilly, 2005). Furthermore, in the context of Web 2.0, the internet can be understood as a platform where content is created collaboratively, in an environment of collective intelligence (Romaní & Kuklinsky, 2007). These digital platforms present forms of publication, sharing and communication oriented to a collective structure, thus modifying the way people communicate and interact online.

The rapid technological advances of the 21st century contributed to the emergence of the phenomenon called Big Data, consolidating itself in 2013, when the phenomenon of social networks exploded, the increase in broadband and the reduction in the cost of Internet Connection, Internet of Things and cloud computing. Therefore, Big Data consists of a phenomenon characterized by a volume of data that exceeds the capabilities of traditional computational tools in terms of extraction, storage, manipulation and analysis (Manyika et al., 2011), but which, at the same time, inserts the society in a reality where the need for speed in exchanging information has become something everyday and necessary.

According to Castells (2010) this whole scenario corroborates the consolidation of a so-called network society. The shortening of distances, the interconnection of markets, the globalization of communication, the flexibility and adaptability of networks, technological convergence and mediation of personal relationships mediated by such technologies characterize such a society.

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Recuero (2011) states that networks are the means and messages of the Hyperconnection Era in which, in addition to being permanently connected, people generate new forms of circulation, filtering and dissemination of information.

> Social networks have become the new media, over which information circulates, is filtered and passed on; connected to conversation, where it is debated, discussed and thus generates the possibility of new forms of social organization based on collective interests (Recuero, 2011b, p. 15, our translation).

Recuero (2009) points out that social networks have changed the communication process by transforming the classic vertical model (few senders – many receivers) to a horizontal model (many senders – many receivers). For the author, this transformation represents a democratization in the production and access to information.

Virtual environments have enhanced easy access to information, thus providing greater citizen participation in issues that were previously only debated at the level of the National Congress, as previously mentioned, top-down decisions, thus excluding a good part of the people from the process of citizenship. By sharing audios, photographs, videos and texts, a democratic environment is developed, with debates available 24 hours a day.

Ortiz (2012) states that social networks bring to society the possibility for citizens to assume their voice and manifest themselves autonomously, enabling a mobilization that goes beyond the virtual to the physical. It can be highlighted that social networks have provided changes in the forms of social interactions, since face-to-face interactions are not excluded, in fact, they are strengthened due to the creation of several points of contact between individuals, since they have more access to information possibilities and are politically more active (Castells & Cardoso, 2005). These networks foster new forms of relationship between users (Canclini, 2008), as they allow "the creation of local, community and even planetary social bonds. The emission principle is thus coupled to the generalized connection principle of information exchange" (Lemos, 2009, p. 40-41). It is also worth mentioning the richness and diversity of feelings, phenomena and stories present in social networks, which enhances the importance of analyzing data from social networks (Paulino, 2021).

Materials and methods

The present study is an applied research, of a quantitative nature, aiming to analyze in detail the transmission and circulation of information about fires in the Amazon from the point of view of the user of the social network Twitter. The development is supported by the use of the methodological instrument Knowledge Discovery in Databases - KDD.

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KDD was originally proposed by Fayyad, Shapiro-Piatetsky and Smith (1996), and seeks to provide an approach for generating information from large volumes of data. KDD consists of five steps, listed as selection, pre-processing, transformation, data mining and evaluation/interpretation. One of the advantages of KDD is its interactivity and iteractivity, enabling interventions in accordance with observations about the quality of the data and the assertiveness of the methods employed.

From this, in the data selection phase, the data set to be explored in the research is established, in this case, tweets containing, simultaneously, the Portuguese terms "Amazônia" (Amazon) and "incendio" (fire). The defined time is the first half of 2022, in order to allow a broader assessment of possible fluctuations and external influences on the subject. The data was recovered through the Twitter API, which refers to a computational solution provided by the social network itself that allows access and recovery of data in an automated way.

The originally retrieved data are evaluated and subsequently subjected to pre-processing procedures, for which routines based on regular expressions are used (Fitzgerald, 2012), enabling the identification and removal of occurrences of links, mentions and hashtags. The removal of these occurrences occurs due to the fact that in the analyzes carried out the interest is in identifying the themes related to the circulating contents, therefore such types of occurrences would represent "virtual garbage" for the models employed.

The data retrieved through the Twitter API are originally in json format (JavaScript Object Notation), which refers to a compact format for exchanging data between systems (Fernandes & Cordeiro, 2016). However, for the procedures carried out, it is necessary to transform the data into two different formats. Initially is used the csv format (comma separated values) in order to allow the numerical and grouping analyzes to be carried out, and later for the textual corpus format, necessary for the use of the Iramuteq textual analysis software, used in one of the adopted data mining solutions.

Data mining consists of the development of algorithmic solutions that allow the identification of patterns, behaviors and prediction of values from data sets (Shmueli, Bruce, Gedeck & Patel, 2019). Considering the characteristics of the data to be explored, a set of tweets related to fires in the Amazon, one of the intended steps is to identify possible thematic groups based on the textual similarity of the messages. Therefore, it becomes necessary to obtain a set of characteristics (features) that can be used by grouping methods.

One of the classic techniques in the context of generating features for textual data is known as term frequency - inverse frequency (TFIDF). The TFIDF technique measures

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the importance of terms present in documents based on their relative frequency, that is, the more a document occurs, the more importance it will have. However, extremely frequent terms may end up causing a loss of significance for terms that could be relevant in the grouping process, so the technique incorporates the inverse of the frequency of terms in the documents in order to weight their representativeness, increasing the relevance of rare terms (Ibrahim, Zeebaree & Jacksi, 2019).

From the construction of the matrix of characteristics for the tweets, it is necessary to apply a method for grouping, in order to allow the delimitation of the thematic groups. There are different classical methods for grouping textual data, among which is the one known as k-means (Blömer, Lammersen, Schmidt & Sohler, 2016). K-means can be described as a grouping method that is based on the distance between elements. One of the main advantages of using the method for the present study is the fact that it is an unsupervised algorithm, that is, a priori labeling of the data is not necessary (Sinaga & Yang, 2020). However, in order to apply k-means, it is necessary to define the number of groups. For this purpose, metrics to assess the effectiveness of k values can be used. This study uses the silhouette score metric, which generates a graphical representation of the consistency of data grouping, indicating how well the elements were organized (Shahapura & Nicholas, 2020).

After grouping the tweets, a textual corpus is generated for each of the groups. By using the Iramuteq textual analysis software, similarity graphs are generated, in order to enable the indication of the most relevant terms and their semantic interconnectivity. A similarity graph refers to a visualization strategy based on graph theory that, by quantifying the frequency of terms and their semantic associations, returns a structured visualization of the data (Cordeiro, Leal, Vieira & Da Silva, 2022). The results are evaluated against environmental issues concerning deforestation and fires in the Amazon. Figure 2 presents in more detail the general architecture of the proposal.

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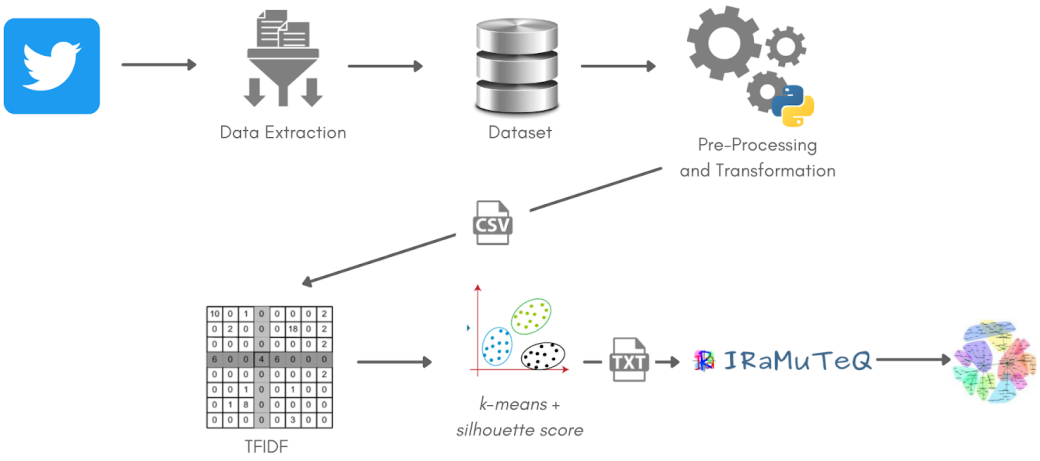
Figure 2 Solution architecture

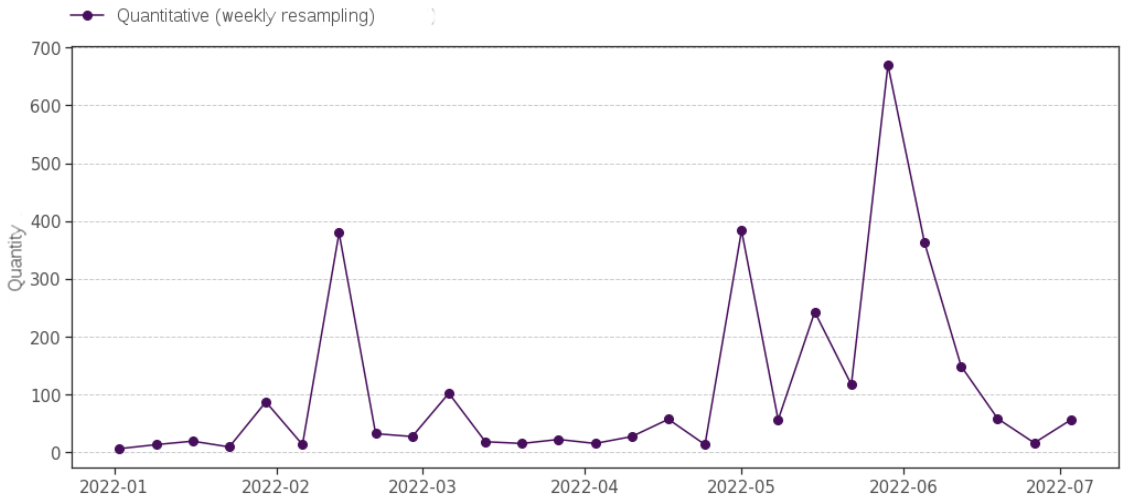


Source: authors.

Results and discussions

From the application of the steps listed in the methodological aspects, a total of 2,429 tweets were retrieved containing the terms "incendio" (fire) and "amazônia" (amazon), comprised in a period of six months, between January and June 2022. With reference to the presence of retweets, a quantity of 2,429 messages was identified, which represents 82.59% of the entire data set. Figure 3 shows the quantitative distribution over the analyzed period, considering a weekly resampling.

Figure 3 Quantitative time series of total tweets



Source: research data.

The first quantitative peak observed in the time series of Figure 3 is related to the posting of tweets with high engagement that refer to the arrest of a businessman on

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suspicion of ordering an attack that resulted in the fire of two helicopters of the Brazilian Institute of Environment and of Renewable Natural Resources (IBAMA). The crime, which occurred in Manaus, would be associated with retaliation after carrying out operations against illegal mining (G1 Amazonas, 2022). It is interesting to note that, in this case, the texts of the tweets in question, presented in Chart 1, do not mention the issue of forest fires in the Amazon, but because they have both search terms, they are persisted in the database. Although such tweets showed high engagement in terms of republication, their presence, excluding retweets, does not affect the final analysis of the study.

Chart 1 Clipping of tweets with the highest engagement (February/2022)

Date	*Tweet*
05/02/2022	Guys, the fire of 2 IBAMA helicopters is very serious! The PF has already arrested a playboy who claims to be the mastermind of the crime. But I think this angu has a lump. The Federal Government is fighting narcotics and has increased surveillance in the Amazon. 'Is it external reprisal?
05/02/2022	@MaxGuilhermeOfc @eloarcastelaci The fire of IBAMA helicopters is very serious! Will it be an international reprisal, since the government of PR Bolsonaro is combating trafficking and has increased surveillance in the Amazon against the smuggling of wood and minerals? This angu has a lump. Attention.
07/02/2022	Businessman is arrested in a high-end house in Goiânia suspected of having 'burned Ibama helicopters in AM' https://t.co/w7hQ2RYvqe This crime is part of the systematic weakening of environmental inspection and incentives for mining and the illegal use of the Amazon.

Source: research data (translated from Portuguese).

During the month of May 2022, two engagement peaks are observed. In the first week, a number of close to four hundred tweets are observed, most of which are related to comments on demonstrations made by personalities and international authorities about the fires in the Amazon. The referenced demonstrations originally took place in

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2019, when a photograph by American photographer Loren McIntyre, who died in 2003, was published on social media profiles of celebrities and authorities referring to the situation of the fires that occurred in the Amazon. It so happened that at the end of April 2022, the president of the republic, Jair Bolsonaro, used the same social network to reply to one of the messages, the subject being reverberated on the network, as can be seen in the clipping presented in Chart 2.

Chart 2 Clipping of tweets with the highest engagement (First week of May/2022)

Date	*Tweet*
03/05/2022	@LeoDiCaprio You should take care of your birth state where every year is devastated by fire. Leave BRAZIL alone THE AMAZON IS OURS!!!🇧🇷🇧🇷🇧🇷
04/05/2022	@PedroRonchi2 Does Leonardo speak the truth? Are you cattle? Leonardo posted fire from another era as if it were from 2019. "Macron, Gisele and Leonardo Di Caprio 'publish old photo to criticize Amazon fires | Mundo | G1" https://t.co/aTBpr3JoZ4
06/05/2022	Talk about the null vote and watch the fire kill the giraffes in the Amazon
09/05/2022	Very rare photo. It was only possible to remove because 'Macron' let the PF save it after putting out a fire in the Amazon....
13/05/2022	Just saw Fire destroys the equivalent of 110 football fields and consumes at least 20 California mansions - Click to see also ☛ https://t.co/ZFV9Qf6cuC via @TerraBrasilnot Where is Dicabrito??? Or does he only take care of the Amazon???

Source: research data (translated from Portuguese).

The second peak observed in May 2022 is mainly linked to messages that address the partnership signed between the Brazilian government and the company SpaceX, responsible for the development of a satellite constellation project, with the proposal to

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provide connectivity and monitoring in the Brazilian Amazon region. Chart 3 presents a selection of the messages published for that period.

Chart 3 Clipping of tweets with the highest engagement (Third week of May/2022)

Date	*Tweet*
20/05/2022	Amazon in the Bolsonaro Government. Leftists Expectations: Deforestation, Fire, Giraffes, even Dinosaur being burned! Reality: 19,000 schools in the rural Amazon area CONNECTED. There's no way, Papa Elinho Musk + Bolsonaro = Success. Forget it! Hold on!
20/05/2022	@LorenzoMalcon @Cardoso @SpaceToday1 He stated the same in 2021: "With Starlink, we can discover fires and illegal deforestation. Some of Musk's satellites even have the capacity to capture the noise of the chainsaw", explains Faria https://t.co/YPG3A9eVLC
20/05/2022	@luiz_orrico @BlogdoNoblat He wants to put a satellite into orbit for 24-hour monitoring of the Amazon, with identification of fires and mining!

Source: research data (translated from Portuguese).

Finally, the highest peak of publications occurred in the first week of June 2022, with a quantity close to 700 tweets. The messages, for the most part, mention the report on forest fires released by the National Institute for Space Research (INPE), pointing to a record number of fires in the Amazon for the month of May in a period of 18 years. Chart 4 presents a clipping of the most engaged tweets.

Chart 4 Clipping of tweets with the highest engagement (Third week of May/2022)

Date	*Tweet*
02/06/2022	Bolsonaro effect: record fires in the Amazon for the month of May. Data from @inpe_mct show that the world's largest

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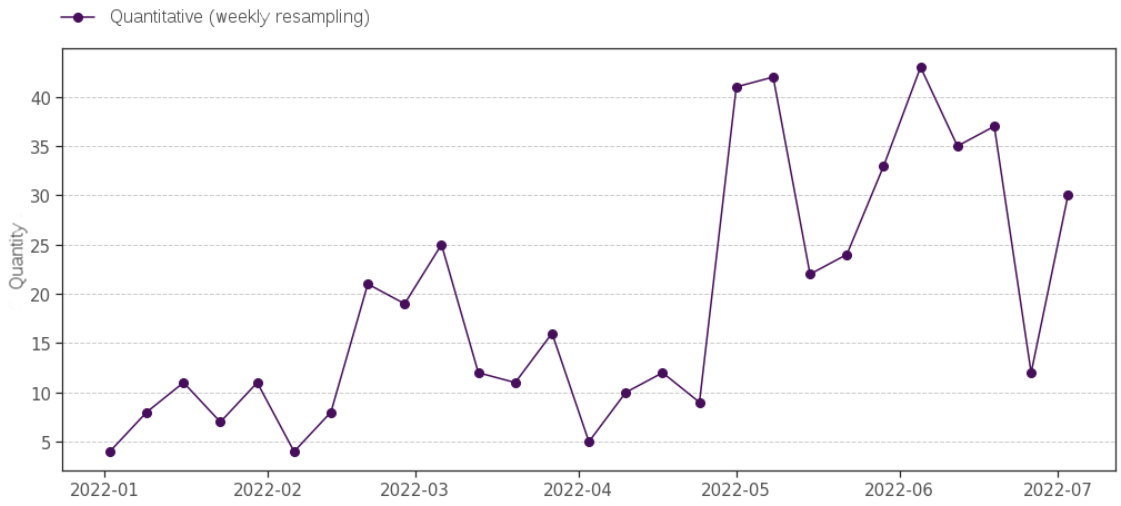
	rainforest had 2,287 fires in May, the highest number for the month in 18 years.
03/06/2022	The #Amazon recorded 2,287 fires, a 96% increase over the same month in 2021.
03/06/2022	The records published by INPE of 2,308 and 3,578 fires in the Amazon and Cerrado, respectively, are worrying, as they show that we are using setbacks and greed to destroy our chances of adopting the sustainable development model.
05/06/2022	🔥🌿 According to INPE data, the Brazilian Amazon had 2,287 fires in May/22, the highest number for the month in 18 years. ➡️Majority of fires come from agricultural fires in illegally deforested areas #DiaDoMeioAmbiente50Anos #AmazoniaÉAgora

Source: research data (translated from Portuguese).

From the initial analyses, the original tweets were filtered, removing the retweets, in order to guarantee fairness in the generation of textual analyzes in terms of the frequency of the present terms. Figure 4 shows the quantitative historical series for this new set of data, where it is possible to observe a behavior slightly similar to the general set of data, with the weeks with the highest number of published messages having a value close to forty.

Figure 4 Filtered time series



Source: research data.

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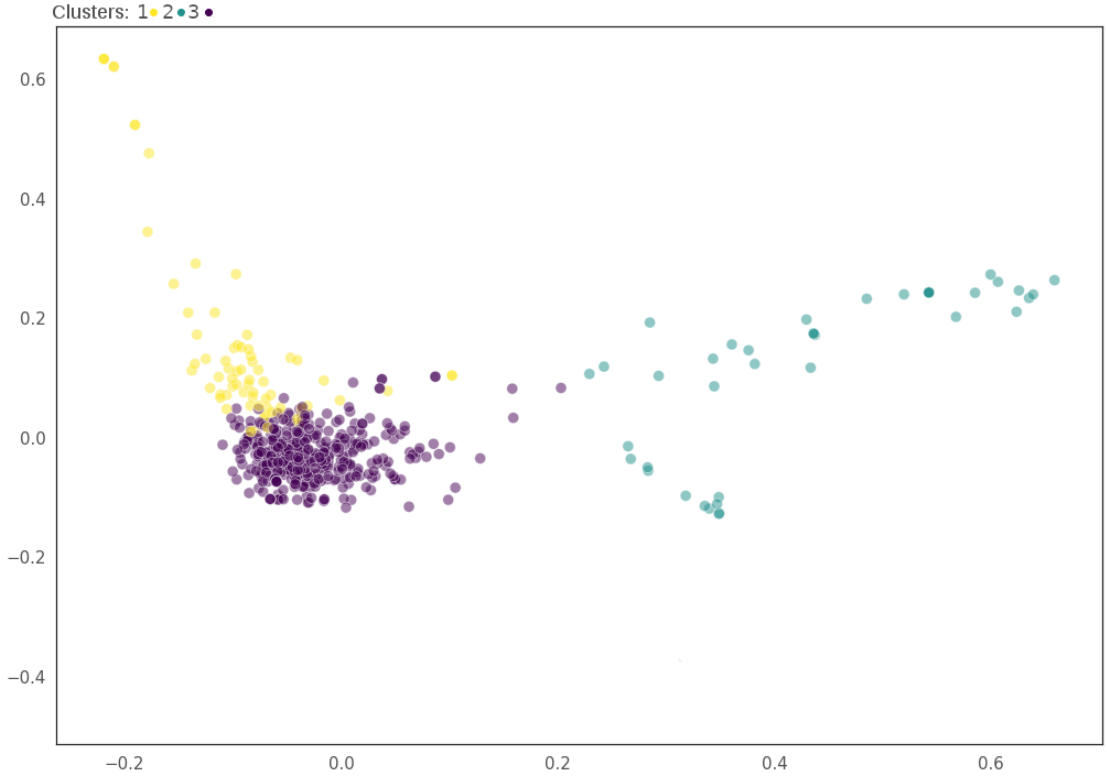
The filtered data were submitted to the grouping procedures, initially through the application of the TFIDF technique for the generation of characteristics (features), and later using the k-means method for the effective grouping of the tweets. It should be noted that initially the silhouette score technique was used to identify the ideal number of groups, since for the present set of data there is no prior indication of such value, or even labeling indications. The value found for the number of groups was *k=3*, that is, according to the analyzes there are three main thematic groups within the set of tweets. Figure 5 shows the distribution of tweets according to their similarity. From this, for each of the groups, textual corpus were generated individually, allowing more detailed analyzes on the present and more relevant terms.

Figure 5 Distribution of tweets regarding similarity (Clusters/Groups)



Source: research data.

Group 1, represented in Figure 5 by the color yellow, has its similarity graph demonstrating a strong association of tweets with the statements attributed to actor Leonardo DiCaprio (Figure 6). In the graph it is possible to notice a strong relationship between the terms "foto" (photo) and "leonardo", referring to the publication of the photograph by Loren McIntyre. Other authorities and celebrities, such as French President Emmanuel Macron and model Gisele Bündchen, also shared the photograph. This behavior reveals an intrinsic characteristic of social networks, where influential individuals

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end up generating a chain of information dissemination (Tsugawa & Kimura, 2018), which eventually ends up promoting the strengthening of ideas only in the sense of reproduction, highlighting an absence of disagreement by specific groups (Soares, Recuero & Zago, 2018). Along with this, terms such as "girafa" (giraffe), "selva" (jungle) and "california" are observed. This demonstrating a character of criticism and irony on the part of the tweets aligned with a particularism of cause (Machado, 2007) observed in the speeches of the users, revealing a protection about what is considered, by the latter, specifically as a matter of character and national interest.

Group 2 reveals terms of mostly expository and informative publications, referring to the various occurrences of fires that occurred during the period to which the data collection refers (Figure 7). It is worth mentioning the occurrence of the term "lula", referring to comparisons with the fires registered in the first year of the second term of President Luiz Inácio Lula da Silva, in 2007.

Figure 8 presents the similarity graph for Group 3, which refers to the one with the greatest representation of tweets, as can be seen in Figure 3. It is possible to observe terms that reveal a character of polarization that goes beyond the problem of fires, going against political and governmental issues. On the one hand, there are terms such as "foto" (photo), "falso" (false) and "girafa" (giraffe), referring to situations more densely typified in Group 1, on the other hand, terms such as "genocídio" (genocide), "crime" and "destruição" (destruction) stand out. The terms are connected directly or indirectly to the terms "presidente" (president) and "governo" (government). The differences observed in this theme go against the creation of echo chambers (Bessi, 2016) by users who seek to reinforce their opinions and points of view in groups that think in a similar way. Much more than an environment to discuss the problem itself, in this case, the issue of forest fires, it is perceived as a frivolous environment for discussions and debates between individuals who have little or no communication.

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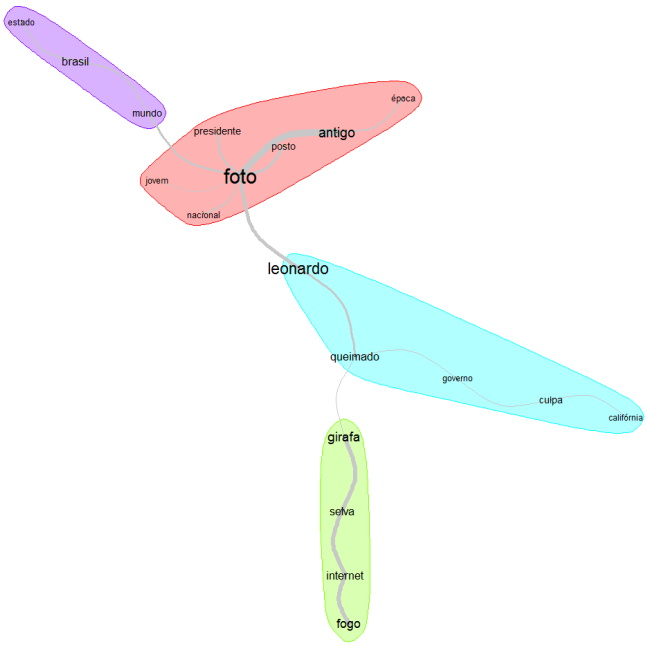
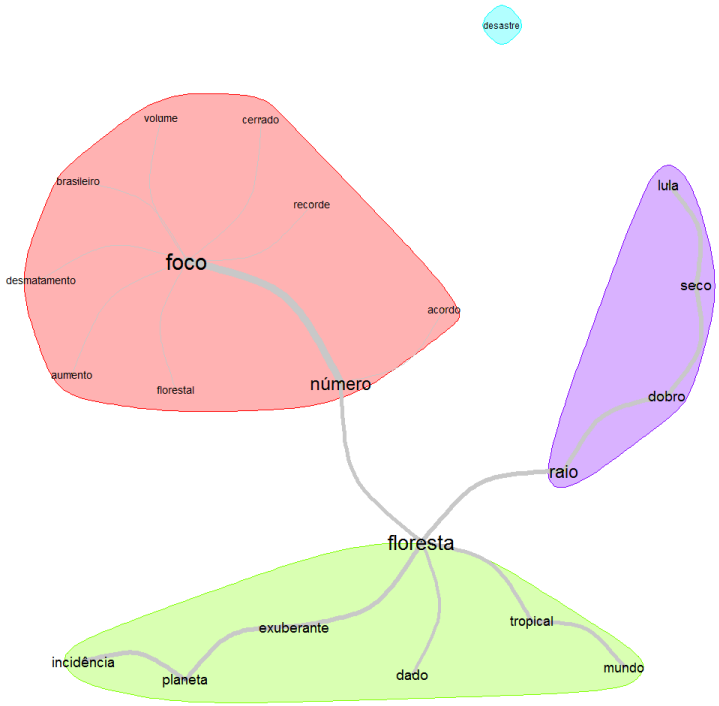
Figure 6 Group 1 similarity graph



Source: research data.

Figure 7 Group 2 similarity graph



Source: research data.

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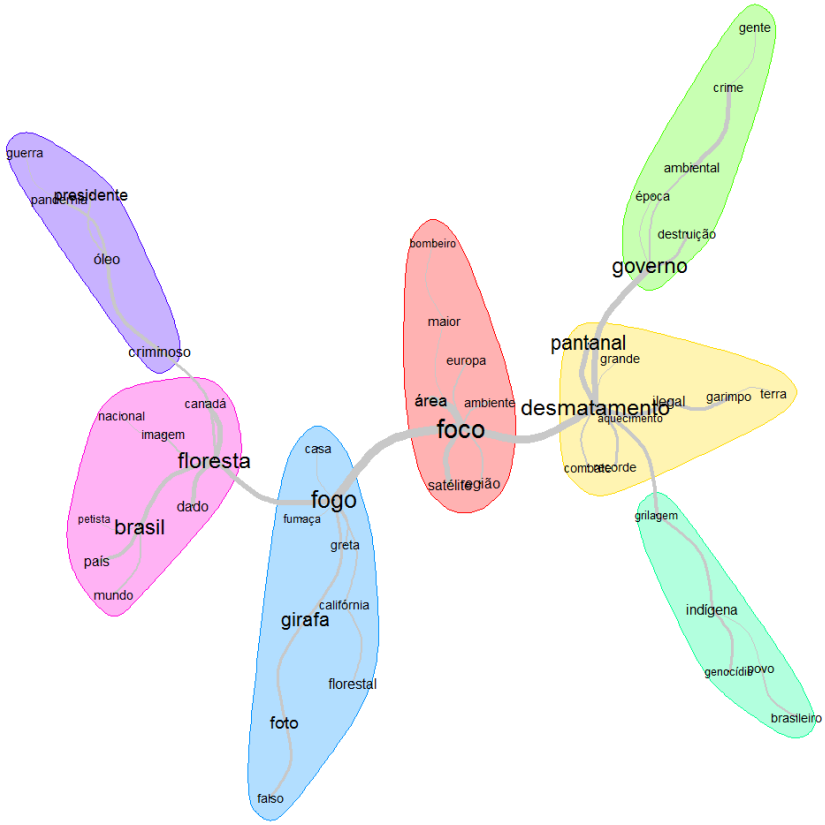
Figure 8 Group 3 similarity graph



Source: research data.

Conclusions

In this paper, the problem of forest fires in the Amazon region was considered from the perspective of analyzing publications in Portuguese published on the social network Twitter. Using a computation solution based strategy, it was possible to extract the data set and analyze the present themes and how they were related. Despite the environmental issue, one of the main contributions refers to the identification of the issue of fires as being mainly a point of political polarization, potentiated by the growing antagonism between different political groups in Brazil.

In addition to the issues of political polarization identified, it is worth highlighting the engagement involved in the manifestations carried out by authorities and celebrities, which revealed the feeling of affection and patriotism of users for what they identified as being a national responsibility, distancing themselves from the rationality of the popular expression "mind your business". Furthermore, as pointed out by Braga and Marinho (2021), an argumentative opposition is observed that blurs the problem of damage caused by environmental fires and emphasizes the supposed threat to democratic values.

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RESUMO:
Os incêndios florestais são uma das principais ameaças à biodiversidade da região amazônica. Dados oficiais revelaram números recordes no volume de focos de incêndios no ano de 2022. Esse cenário preocupante se reverbera não apenas nas questões políticas e governamentais de preservação ambiental, mas também nas redes sociais, onde a sociedade expõe e debate suas visões e opiniões. Neste artigo é apresentado um estudo exploratório sobre um conjunto de tweets em língua portuguesa relacionados aos incêndios na Amazônia. São utilizadas soluções computacionais para a geração de resultados que possibilitaram a identificação temática dos conteúdos veiculados pelos usuários do Twitter sobre o assunto. Os resultados revelaram uma polarização sobre a questão, extrapolando os problemas ambientais e indo de encontro a questões políticas e afetivas.

PALAVRAS-CHAVE: Incêndios; Amazônia; Twitter; Análise de dados.

RESUMEN:
Los incendios forestales son una de las principales amenazas para la biodiversidad en la región amazónica. Datos oficiales revelaron cifras récord en el volumen de focos de incendios en el año 2022. Este preocupante escenario repercute no solo en temas políticos y gubernamentales de preservación ambiental, sino también en las redes sociales, donde la sociedad expone y debate sus puntos de vista y opiniones. Este artículo presenta un estudio exploratorio sobre un conjunto de tuits en portugués relacionados con los incendios en la Amazonía. Se utilizan soluciones computacionales para generar resultados que permitan la identificación temática de los contenidos transmitidos por los usuarios de Twitter sobre el tema. Los resultados revelaron una polarización sobre el tema, yendo más allá de los problemas ambientales y yendo en contra de lo político y lo afectivo.

PALABRAS CLAVE: Incendios forestales; Amazonas; Twitter; Análisis de datos.