

Treball de Fi de Grau

Títol

Infrastructuralization of social media:
The effects of fragmentation, the filter bubble
and echo chambers on the perception of
history in the current state of social media

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Grau

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|----------------------------------|-------------------------------------|
| Comunicació Audiovisual | <input checked="" type="checkbox"/> |
| Periodisme | <input type="checkbox"/> |
| Publicitat i Relacions Públiques | <input type="checkbox"/> |

Tipus de TFG

| | |
|----------|-------------------------------------|
| Projecte | <input type="checkbox"/> |
| Recerca | <input checked="" type="checkbox"/> |

Data

18 de juliol de 2022

Full resum del TFG

Títol del Treball Fi de Grau:

| | | | | |
|---------------------------|---|--------------|---|---|
| Català: | Infraestructuralització de les xarxes socials: Els efectes de la fragmentació, els filtres bombolla i les cambres d'eco sobre la construcció històrica del present | | | |
| Castellà: | Infraestructuralización de las redes sociales: Los efectos de la fragmentación, los filtros burbuja y las cámaras de eco sobre la construcción histórica en el presente | | | |
| Anglès: | Infrastructuralization of social media: The effects of fragmentation, the filter bubble and echo chambers on the perception of history in the current state of social media | | | |
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| Professorat tutor: | FERNANDA PIRES DE SA | | | |
| Curs: | 2021/22 | Grau: | Comunicació Audiovisual | X |
| | | | Periodisme | |
| | | | Publicitat i Relacions Públiques | |

Paraules clau (mínim 3)

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|------------------|--|
| Català: | Filtre bombolla, algoritmes curadors, detecció de comunitats |
| Castellà: | Filtro burbuja, algoritmos curadores, detección de comunidades |
| Anglès: | Filter bubble, curator algorithm, community detection |

Resum del Treball Fi de Grau (extensió màxima 100 paraules)

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| Català: | Amb l'objectiu de demostrar els fenòmens de la fragmentació i els filtres bombolla a les xarxes socials. El treball recerca continguts i detecta comunitats a la xarxa juntament amb els perfils disseminadors fent servir Rstudio. |
| Castellà: | Con el objetivo de demostrar los fenómenos de la fragmentación y los filtros burbuja en las redes sociales. El trabajo investiga contenidos y detecta comunidades en la red junto con perfiles diseminadores usando Rstudio |
| Anglès: | Aiming to prove fragmentation and filter bubble phenomena in social media. This research project looks into content and detects communities in the network and identifies dissemination profiles using Rstudio |



**Universitat Autònoma
de Barcelona**

Infrastructuralization of social media: The effects of fragmentation, the filter bubble and echo chambers on the perception of history in the current state of social media

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Comunicació Audiovisual

"all stories are true, but this one really happened"

- Patrick Rothfuss, *writer*

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INTRODUCTION

The March 2020 lockdown generated a situation where everyone was practically locked in their rooms. The first quarantine supposed a physical fragmentation of society comparable to that of each individual's access to information and entertainment. The cusp of platforms seemed to be achieved through people being targeted and identified as users over any other quality as humans. Lovink (2019) makes a reference to this phenomenon saying that “intelligence has come apart from consciousness”. Seeing that today’s digital ecosystem relies heavily on screen use and shareability, the new primary source of influence and power is screen time. Nieborg & Poell (2018) also talk about how cultures are reliant on screen usage. That is to say, it happens at the same time when media outlets and individual accounts have the same access to people’s attention and most importantly, screen time. The democratization of screen access combined with the Covid-19 crisis brought a load of new users into the platformized systems of communication.

Remembering the first day of Spain’s quarantine, and how it was made significantly important to tune into official channels to have access to curated information set apart from unofficial channels that made their way into people’s social media timelines. Homogenizing users’ attention span into one current of thought may cause catastrophic events. This can lead us to ask if all the things that happened when new technologies emerged during empires and other sovereign orders of human history. Were they the same for everyone? Of course not. I remember asking the four people who lived with me at the time of the quarantine about the use of technology and social media. At this moment, we exchanged views on the nature of a pandemic, some considerations on current society’s structure and debate around some big and supposedly meaningful words that shape our society like democracy, justice, freedom and equality and the ways they were being implemented. In the end, not a single agreement was achieved during or after that friendly conversation.

This final Bachelor's thesis aims to research the effects of fragmentation along with other characteristics of today's societies' immersion in screens. Moreover, it explores how the use of technologies during the construction of meaning has developed communities beyond the masses and beyond ideologies. This bachelor's thesis will especially focus on the construction of meaning related to historical events in the present through clustered communities in the network and see what nodes act as disseminators of information. It also wants to determine the main topics that are discussed and identify the users/accounts with more influence in these communities in terms of tweets and retweets.

When choosing specific events, the focus will be on alternative narratives of history, and how the public sphere is contaminated with a limitless amount of diverse narratives. An example of this is "Black History Month". This movement has shed light on omitted events throughout colonialism and provides different readings on historical events giving more attention to the black individuals and communities that lived in those times (*About Black History Month*, n.d.). It is an example of how history is written by the victorious after conflict, or the hegemonic communities throughout human development. Also, it showcases the struggle of correctly representing a subculture and taking it into the mainstream of narratives.

The study aims to understand the characteristics of hegemonic, negotiated and counterhegemonic readings of current events considered potentially historical. Also, it seeks to identify the communities and individuals that are creating these narratives and the ways they perform their discourse in the current digital ecosystems. Moreover, it searches for the actors who are the ones in charge of this dissemination of information when speaking about the public sphere and how social media shapes peoples' behavior. This thesis makes reference to Michael Warner's (2002) *Publics and Counterpublics* work as well as Habermas's (1989) *The structural Transformation of the Public Sphere*. Another focus of this research is on the newer channels of dissemination of information. One specific theory that is related to the object of study is *The Filter Bubble* by Eli Pariser (2011), that

essentially explains the causes of a fragmented way of consumption of content caused by the personalization algorithms used by social media. Furthermore, this thesis explores the rise of Twitter and TikTok as public sphere networks that have different approaches to personalized timelines of information content.

In order to achieve results, the research of this thesis is laid out to gather fragments of content related to the current events potentially considered historical and how they are represented within online environments like social media. Therefore, different communities and dissemination actors will be identified and analyzed regarding their reading of current events as well as relevant events that may be part of public discussion at the time of this research. In some cases larger communities like fan communities, broadcasting organizations or political actors will be identified. In order to do that, the research will focus on identifying communities and their main dissemination actors through a method using Rstudio software, and will take into account different network measures and community detection methods. At the same time, it aims to homogenize the results through filtering users' analysis exclusively through the content that they have provided into the network.

LITERATURE REVIEW

THE PLATFORM SOCIETY

In this bachelor's thesis, the concept of platform society and its current state is crucial to identify how news and most importantly, information, are spread. Gillespie (2008) has perfectly summarized the functionality of the platforms that are taking over our daily life by affirming that "In a technical context like this, the use of the term "platform" certainly harkens back specifically to its computational meaning: an infrastructure that supports the design and use of particular applications" (Gillespie, 2008, p.5).

In order to understand the way in which platforms affect society's behavior, the moment when computers became communication devices must be considered. Once the Internet was well established and into its second decade of existence, already in the 21st century, the development of the consequent platforms and their networks of users scaled up and transformed into an ecosystem of its own. As more platform-oriented companies were built, more and more of daily life and habits were aimed at bringing into the platforms' ever-growing user base (Van Dijck, 2013, p.13). Nowadays, society finds itself in this context of a global sphere of communication in which all users are collectors and individual distributors of data and content on

different platforms. All of whom are reliant on the Internet's infrastructure and protocols, devices and their interfaces, and the grid from which it is all powered.

The penetration of connected environments within the economic, governmental, and cultural sectors has internalized various actors into platform ecosystems and gradually turned into a hybrid form "platform society" (Van Dijck, Poell & de Waal, 2018). When new technologies have brought both broadcast and intercommunication capabilities to society, the supranational sphere that has been assembled "affects news, affects politics, affects war" (Bratton, 2016, p.13). Benjamin Bratton (2016) uses the word "cloud" to define this sphere, a term that refers to the server infrastructure that holds information remotely and allows for the existence of networks. These interconnected databases are considered a newer layer of military logic, as the grid that overlaps all jurisdictions and "sovereignities" (Bratton, 2016). That is to say, it is considered "the space of planetary-scale computation is a new kind of "free soil", then that "soil" is land, sea, and air all at once, equally tangible and ephemeral (Bratton, 2016, p.33). Of course, the cloud infrastructure is fully dependent on user uploads. Since, it is where all user data is stored and handled.

The entire digital ecosystem is based on the principle of a network, so companies have to take on a role on it as they have a strategic position in this ecosystem. Nieborg & Poell (2018), Casilli and Posada (2019), Anne Helmond (2015) and others have referred to this concept as "platformization", a term used to describe this current reality where services and products are offered through a digital interface inside a certain operating system or digital ecosystem of the social web. This type of transformation has been observed continuously and on many particular occasions over the past two decades. Uber is an example of a specific type of platform. It embodies the principles of the platform, and how a company grows to become one, very illustratively. The first step is packaging a software that successfully operates and emulates a specific market, otherwise fulfilling a public necessity. In this case, private transportation. Afterwards, and the hardest part, the task is to introduce both

providers and users into the platform. In this case, drivers and passengers of private means of transportation. In the end, if successful, a platform is able to build a strong enough user-base to become a fully fledged market on its own.

These markets are multi-sided, which means that different actors fulfill and facilitate the roles that have been established for and by the platform terms and conditions. Therefore, it generates what has been called a “Network Effect”: a measure of success of all platform operating companies. This was first theorized by Metcalfe (1980) and obtained his name. This effect centers around the creation of value depending on the number of users, profitable only depending on the network surpassing a critical point. Once the number is beyond a certain threshold, the platform becomes profitable, and at the same time it starts to become a monopoly. When introducing this concepts into the cultural industry we can identify a shift caused by “(1) the inherent accumulative tendency of capital and corporate ownership and its subsequent effects on the distribution of power and (2) the precarious and exploitative nature of cultural and (immaterial) labor of both producers and end-users” (Nieborg & Poell, 2018, p. 5). Although the platformization of the public sphere is reliant on how noticeability behaves around current events. The focus is on finding social spheres that can be platformized, or creating new ones. “To whatever extent these intermediaries secure a prominent role in the distribution of information online, they find themselves subject to the rules that govern public discourse” (Gillespie, 2008, p.3). In order to engage in mining personal data, tracking and securing noticeable events on these platforms are key when aiming to introduce all sides of communication in a platform. As Zongyi Zhang summarized O’Reilly’s elaboration (O’Reilly, 2005),

“companies rely on the Internet as a platform for producing, distributing, and circulating their products by harnessing the ‘collective intelligence’ of the audience, which means extending the architectural notion of platform to a technical intermediary concentrating on the connectivity, programmability, interactivity, and collaboration with the users or others forms of third parties.” (Zhang, 2020,p. 4)

Zhang reflects on O'Reilly's idea of platforms and further dives into the implications of how these interactions facilitate user data extraction. The development of social media platforms are partly aimed at extracting important data from users into their cloud computing infrastructures. Platforms generate a multi-sided market where both end-users and complementors like advertisers or governments are dependent on the platform's infrastructure:

“Moreover, these interactions between different complementors and end users generate relevant data which are subsequent cleaning and modeling to calculate whether it will be profitable to optimize users' attention sources, customize personal ads, or engage in the social media circulation” (Zhang, 2020, p.4).

Personalization of content is a key aspect of today's digital ecosystem, fuelled by massive amounts of data collection and expanding algorithms. Eli Pariser (2011) talks about how any web interaction, even if it is a short one, starts with a tracking mechanism that consequently launches newer content based on people's behavior, specially targeted advertisements. Nevertheless, most importantly, *“Personalization isn't just shaping what we buy. For a quickly rising percentage of us, personalized news feeds [...] are becoming a primary news source”* (2011,p. 36). As the digital sphere of content-life matures, it becomes the key infrastructure that holds the layer of civilization.

Social media solutions are the first to act upon the "social" dimension. For instance, the interweb of viral videos that go back and forth on different platforms like YouTube, Facebook, Instagram, Twitter or TikTok is set up to interact with the respective procedures for content selection. It motivates the search for more connected and popular individuals and content that allow the platform to engage in more user's time. Established microsystems of prediction are aimed to follow equal bias from human social interaction and are broadly known as algorithms. (Burrell & Fourcade, 2021) These engines constantly predict what we like, generating a broader theory of who we are and what we will want or do next.

Some scholars like Yuval Noah Harari or Geert Lovink celebrate these platform features as "augmented humanity", but more critical approaches to this historic episode view it as "technological unconsciousness" (Van Dijck, 2013). Since , the platformization of society allows algorithms to control the daily lives of its users and maybe even enter their decision-making processes. Thus, it is a scary leap, even more when considering Bauman's words that precede platformization: "Do not confuse the network – a swirl of roads to glide over, with a net – that treacherous implement that feels from inside like a cage" (Bauman, 2003, p. 59). The network is both the most powerful tool since the mechanic press and the most powerful narcotic. We are living with the advantages of algorithm-based decision making, and at the same time receiving the most time consuming content based on the interests of the user. Currently all social media users are living in both worlds simultaneously, none can exclude the other. This double-edged technology has built an era of a global quantum state. An episode of human history in which stories in the network determine social interactions and even social movements. As Milan Kundera points out, episodes are "not an unavoidable consequence of preceding action, nor the cause of what is to follow" (Kundera, 1991). Although historical episodes are much different than narrative episodes. It seems like the current relationship between society and networks causes this border to disappear.

No one has changed the way we run the world through social media. However, social media has changed the way we run the world. Bratton (2016) says that platforms possess an institutional role that solidifies both cultures and economies. The integration of the GAFAM (Google, Apple, Facebook, Amazon and Microsoft) interwebs of platforms, which now would be AAMAM, taking into account Google's renaming to Alphabet and Facebook's renaming to Meta. This quintet has been completely introduced in everyday life of billions of citizens as a continuation and an intensification of corporate growth, ownership concentration, and institutional and corporate integration in the cultural industries trends, up to the point where "platform imperialism" is becoming a legitimate concern (Jin, 2015).

THE FILTER BUBBLE

Platformization of the communication industry generates a concentration of companies that hold the infrastructure on which all consumers' eyes are trained to stick their eyes to. A new type of watcher is trained to watch without looking “because personalization filters serve up a kind of invisible “autopropaganda”, indoctrinating us with our own eyes” (Pariser, 2012, p. 15). Both content and users are contributing to increasing the narcotic aspect of the network. Furthermore, by taking Bauman’s words “Given enough time, the mobiles would train the eyes to look without seeing” (Bauman, 2003, p. 50), concluding on a power dynamic that sets us apart in the process of common understanding. Collective mobilization is easily overwhelmed through the exclusion of every individual in this interaction with interfaces. It is an “unequal struggle over the means of digital production” (Burrell & Fourcade, 2021, p. 230). Pariser talks about how fragmentation is one of the main aspects of the reality of life in the network. (Pariser, 2012, p. 33) This concept defines the reality of the content stream to which individuals are exposed to when interacting with the network at any level. At this point the concept of the “filter bubble”, Eli Pariser (2012) must be considered. Pariser uses it to talk about the nature of this stream of content and how it is designed by the algorithm to appeal to individuals based on principles of performance of specific content. An example of metrics used is the number of views, likes, or time spent browsing an interface. Since the choice of contents is based on these principles, the algorithms will choose a specific design of contents, including news, entertainment and personal messages that best fits this performance bias, which will be delivered to the users.

Pariser (2012) explains the ways this approach conditions companies like Google or Amazon to build parallel services that need users to log in to collect as much information as possible. This way, the few results that are shown at first glance will

be assured to perform good enough at the very least. In the context of creating news content, most journalism is based on the decision of the "choice of who". As in, what story to cover, what angle to take and who to interview, based mostly on the performance of the content that is bound to take when delivered to the network. It is not the same to show a Trump rally to a republican leaning individual than to a democratic or apolitical leaning one. The first one might feel encouraged and proud of the words being spoken, while the other might feel afraid or angry. Both are legitimate ways to react to screen-based content. And both have very much performance intensive reactions. The hacking of people on the networks is done through a better understanding of narratives and how these affect human behavior. As an example, the war in Ukraine that started in the beginning of 2022, has become the main narrative during a few weeks, leaving the pandemic and other political developments in the shadows. Why? It must probably be because it is a more epic narrative, it allows journalists, professional or not, to tell stories that have two sides, a main character, and many more elements that generate a very intense reaction from the public. Thus , delivering the best performing content possible on social media platforms.

For the past decades, after industrialization concluded its decline in developed countries, humanity has been exposed to advanced technologies capable of shaping the postindustrial world. Exploring how the rise of online platforms affects cultural industries, researchers need to be attentive to the variation in trajectories of platformization. This can be clearly observed when comparing the platformization of news and entertainment. Since social media companies are essentially technology companies. Since social media companies create and manage component-based software, they are necessarily platform dependent. Consequently, contrary to news organizations, social media users are considered publishers, and have always followed platform-native distribution and publishing strategies based on dominating devices, which affected the organization of market structures (Jin, 2015, p.10). As a result of this market configuration, the social media industry has historically been

subject to strong winner-take-all effects with a small number of enterprises, such as Facebook or Twitter and now TikTok.

In front of personalized content and mindless scrolling there are different approaches that humans can take in order to have a healthier relationship with these technologies. The first and one of the extremes of this spectrum is to eliminate these technologies from their lives completely, throwing all screens away. Then, negotiated use of these technologies in different ways is what most people do in some way or another. Some might limit the amount of hours they use their screens, some will carefully choose what channels or apps they open and how public or private their use is. Others even approach scrolling through social media as a metacognitive experience, in some way of selection and revision in a context that prompts the individual to have a "feeling of knowing" (Kenton & Blummer, 2014). On the other end, there is the possibility to blindly follow all algorithm-based decisions that can configure our lives. Now that algorithms take advantage of the mass distribution of minable information from users. Moreover, this collection is set up as an interweb of invisible engineered intimacy codes. As a consequence, the social construction of reality and everyday-lives of some users can be engineered "intelligence has come apart from conscience" (Lovink, 2019, p.120). Most aspects of our lives like our diet, our sports routine, our cultural and social activities can be introduced into engines that will prioritize performance and likely improve our health and consequently our lives. On the other hand, a lot of other activities that may not be healthy in the long term, being it at an individual scale or a global one, are currently being pushed into users' timelines because they grant more screen time, which is ultimately, the algorithm performance indicator.

The filter bubble essentially explains the fragmented reality through the constant creation of content loops in which the user is put through. Content curation algorithms are one main aspect of this phenomenon, but the users, the public and how they interact with the technology, is particularly important. This ritual of consumption is perpetuated throughout the social media experience and overall

screen consumption. In the current state of the digital age, the user has a responsibility to train the algorithm of personalized content into a beneficial tool for handling day-to-day life. On the same hand, social media sites that used to be more focused on representing public life and with a more similar structure to broadcasting are falling into personalization bubbles. Twitter introduced the personalization algorithm and personalized timeline back in 2013. Just now, in 2022, users have the option of keeping their home timeline in chronological order as it is possible to observe in a Twitters' text:

“You can choose between viewing top Tweets in Home first, or the latest Tweets first in your timeline (available on Twitter for iOS and Android, and twitter.com). Home, or top Tweets, are ones you are likely to care about most, and we choose them based on accounts you interact with frequently, Tweets you engage with, and much more” (Twitter, n.d.)

The fact that all social media companies label themselves as “tech companies” is a symptom of how centric the curation algorithm is for these companies. Meta, Twitter, DouYin, Alphabet, Snapchat, Reddit, and many more have built their own data marketplace to have stronger networks and face clustering within their ecosystems. How these transactions take place, their volume and the effect on the overall interweb of networks is now under none of these companies' reach.

PUBLICS AND COUNTERPUBLICS

It is not the same to talk about *the* public or a public. A public is defined by Michael Warner as a total sense of a group that receives something and shares a limited space and sense of common existence (Warner, 2012, p. 74). But also, a type of public is determined by the interaction with texts and their circulation(p. 74). A

discourse is the object that generates an entity within the circulation of information, and “A public can be real as long as an object is directed to the possibility that a discourse grants it an existence” (p. 75). Thus, “Only the attention is necessary for a public to be established” (p.100). When a user posts a tweet about climate change, this tweet is included in a general discourse that has been developed and established for some decades. A community related to this discourse. A national identity, class or social group accounts for its members all of the time. Meanwhile, a public is a social space created for the reflexive circulation of a discourse. (p. 103) A bigger narrative is needed for a piece of information to be contextualized and, more importantly, directed.

Contents “are so designed that quickness, powers of observation, and experience are undeniably needed to apprehend them at all; yet sustained thought is out of the question if the spectator is not to miss the relentless rush of facts” (Adorno & Horkheimer, 2002, p. 4). Interaction with cultural products either inside a network, meaning shared amongst a community of people, or outside, also engaging in technology’s intervention on human apprehension of thoughts, creates an exposure to an “inaccessible identity”. Intersubjectivity, as a means of comparing each experience to one another (Berger & Luckmann, 1967, p. 23) is no longer safe from mediation from technology’s social ecosystem. This means that individual identities are shaped through exposure on social media and what content people engage with in their social everyday reality. In a context in which multi-screen media consumption and practices are clearly rooted in society, individuals live and determine their own reality, creating an heterogeneous day-to-day in which “ultra generalization”, as in excessive generalization through provisional judgements (Heller, 1984) is one key component of it. Warner (2012) describes Kant’s idea of illustration as the public exercise of reason, through different kinds of public. In a fragmented but massive public sphere we can identify different kinds of publics. The book-reading public has a different approach to reality and identity, somewhat different to the TV-watching public or the Instagram scrolling public. Warner summarizes “Some publics are more public than others” (Warner, 2012, p. 48). On

the same level, the power and capital that controls the broadcasting technologies have an easier way of distributing opinions (Warner, 2012, p. 54)

Moreover, when identifying the dynamics of the public sphere, Warner cites Habermas "As long as the public sphere is configured like public relations, civil society's public sphere adopts back a feudalistic structure" (Warner, 2012, p. 54). Today, this translates to who has the bigger online community, without taking into account other sovereignties. The emancipatory power of the public sphere was abandoned instead of being radicalized (Warner, 2012, p.54). The fact that all users have a saying means none have the power to transcend the public sphere. The closest that can be achieved is to be highlighted for a limited time. When something becomes "viral", it means that it has behaved in the network like a virus, spreading among users and communities until becoming assimilated by the majority.

Geert Lovink (2020) asks: "what type of speculative thinking do we need in this disaster era of climate change, growing inequality, Black Lives Matter and real existing geo-politics? Where are our radical think tanks that go beyond the institutional policy limitations of scenario thinking (and their critics)?" (p. 4). Warner's idea of counterpublic is related to that of subcultures, constantly delegitimized or disarmed of all transformative values once put through the public's idea market. The challenge is based on the fact that this way of creating a world through a deployment of a new public, beyond natural collections of people, not only being "communities" but mediated groups of people. (Warner, 2012, p. 70) Counterpublics are created through a conflict with the context and norms of a certain cultural identity. Which created an unavoidable distortion between the mass public and counterpublics. In other words, a damaged form of what is supposed to be public. (Warner, 2012, p. 72) A great example of this phenomenon is Black History Month, following Black Lives Matter in current social fronts for the amount of historical revisionism through a racial and ethnic based lens. This social media based movement is aimed at providing a new perspective on historical events, providing a focus on black people throughout. Black History has created a

counterpublic, a community, a mediated group of people, just like Warner talks about sexual and gender identities. These are the ones that have successfully deployed a new public and changed the world to some extent.

Going back to Lovink's question, in other words, what community will transform into a public and transcend the current structure of society? In most cases the answer is none. The fact that mediated publics are the ones responsible for the transformation brings most of the weight to screen-based narratives, limited by the structure of the network society. Fragmentation of the messages prohibits any counterpublic to change or set new rules for the general public. Hegemonic narratives will allow these messages to coexist and generate successful communities, further fragmenting the social structure, but never allowing transcendence of these communities into the "main" industry or market-based narrative. (Lovink, 2019) The end-user/platform relationship comprises detailed explorations of how the sociotechnical features of platforms allow and prompt end-users to afford particular types of activities, connections, and knowledge (Nieborg & Poell, 2018)

THE ROLE OF TIK TOK

Rhetorics depend on the nature of the conversation and the medium in which it is being held. Over the past years we have seen a diverse ecosystem of interwebbed social media outlets. But since the pandemic began, one has exponentially exploded and settled as a new social media giant. And that is TikTok, with over a billion users. With 612 million only in China, and with a 400% user growth year-by-year. (*TikTok Statistics & Facts, 2022*)

Nowadays "optimized algorithms can be small enough to fit on an index card or simple enough to be memorized" (Cruikshank, 2021). TikTok is an example of a technology centric company. Zhang Yiming, CEO of Bytedance, appreciated the

algorithm-driven approach and believed that machines could perform better than humans in distributing information. Once users work with algorithms and generate enough data for the platform to be more efficient and eventually evolve together with the users.

“Users must be treated as co-developers, in a reflection of open source development practices (even if the software in question is unlikely to be released under an open source license.) The open source dictum, "release early and release often" in fact has morphed into an even more radical position, "the perpetual beta," in which the product is developed in the open, with new features slipstreamed in on a monthly, weekly, or even daily basis.” (O'Reilly, n.d.).

DoYin and its occidental version, TikTok, are currently live in most countries, exclusive to smartphone, tablet and computer devices. Evidently platform dependent, TikTok has a young demographic generally. The formula for content-based scrolling and its adapted interface for this purpose is quite well explained by Zongyi Zhang (2020):

“Tik Tok, acting as an app for short video making and sharing, is used to create an online entertainment community since its inception. Video creators have all sorts of tools, filters, and Augmented Reality (AR) effects at their disposal to make their own videos or engage in various "challenges" duplicating other users' playing tactics. Instructed and organized by hashtags, actually consists of various "challenges", creators easily search for the people who have common interest and feature themselves lip-synching, dancing, or doing a trick, always with 15-second-long clips set to music.” (p. 3)

Zhang also describes the key element of TikTok that has already been exploited by other companies like Facebook, now called Meta, for Instagram: *“Different from users' habits in other social media platforms, users in TikTok navigate through videos by scrolling down through a news feed, but not taping side to side.”* (Zhang, 2020,p.

7). TikTok's user interface has been implemented, or copied, into the main competitors in the social media sector. The first big app to do so was Instagram with the introduction of Reels. After that, YouTube implemented Shorts into its GUI (Graphical User Interface). Both industry giants, Alphabet and Meta, were forced to copy the winning formula that would have otherwise crowned DouYin. TikTok becoming the "winner takes it all" through the network effect (Nieborg & Poell, 2018, p.5). This situation of a similar interface has happened a few times in social media history. One big example was Snapchat's stories and how Instagram did the same thing in order not to be bitten off the market.

Zhang (2020) explores DouYin's ambition of an infrastructural logic underlying the rhetorical discourse and its relation to the monetized and data-driven functionality entrenched in the algorithm. The interwebs of contents that navigate through the network are all similar now. Once a piece of content is introduced, its dissemination takes place simultaneously in different networks. With a different performance in each of them. When contents jump from one network to the other they leave a trace. Are algorithms having an easier time because of this? Contents that become viral do so through different channels simultaneously. Not to mention the fact that B2B (Business to Business) data transactions are one of the main activities of these companies.

Plantin et al. (2018) concluded that despite "platform" and "infrastructure" differ in scale and scope, they have more similarities in the age of digital super power as platforms become ubiquitous and traditionally nation-governed infrastructures become deregulated and privatized. Zhang Nan (2019), president of Douyin spoke about the approach of short video and the aim to reinforce interest in technology and science through this form of information broadcasting. Short video format information dissemination helps the algorithm to obtain better information on content performance. The aim of social media companies is not to allow users to communicate in an authentic and safe space but rather to develop the winning platform and get a hold of the infrastructure of global communication:

“Everyone knows that ByteDance is a technology company that distributes information. We are very concerned about the development of science and technology. Since the arrival of the mobile era and the popularization of large-screen mobile phones, our company has been very concerned about the direction of short videos. We feel that mobile video should be a very big opportunity, and it may bring very big changes to the dissemination of information.” (Zhang, 2019, p. 4)

Furthermore, Zhang (2019) says that the pursuit of authenticity is certainly valuable, but it shouldn't be an excuse for platforms to evade content curation. This almost ambiguous statement brings to light the logic behind TikTok about the necessity to improve content authenticity through better curation rather than no curation. Whether or not performance-based curation is better than personalized curation is another question. But the fact that personalization and performance have greater value than authenticity, in an information dissemination infrastructure, is detrimental to the functionality focus of algorithms. Networks act as this layer of computed communication, the materialization of which is bound to see its results on society.

The importance of authentic information in today's communication layout is key when inhabiting the last layer of Bratton's "stack" (2016). Although the role and significance of authenticity have dissolved in the mist under the interweb of KPI's (Key Performance Indicators) of each social media. Zhang (2020) talks about how DouYin's role is significantly different in China. Content curation is designed so it includes other aspects apart from performance oriented decision-making. Demographic aspects, educational purposes, and other “more related with indispensability and entanglement of platform in everyday life” (Zhang, 2020, p. 5). Furthermore,

“The metaphor of "video encyclopedia" has echoed the extension of TikTok into other public domains in online education, tourism, and

e-commerce. It implies that if any institutions or individuals want to get involved in the above fields, whether it is to obtain necessary information or to promote their products, the platform is the carrier they cannot cross and must rely on.” (Zhang, 2020, p. 8)

The fact that the aforementioned fields are being platformized by TikTok has yet to be proven. Markets have been platformized and that is played as markets evolving into better versions of themselves. But services, and specially public services being platformized is a shift on global sovereignties. Twitter, TikTok and Meta, in this thesis, are understood as the companies that have platformized the public sphere. Beyond visibility and performance, most activities have an echo in their networks. Other services will be taken over by platforms. Most importantly, how users interact with the algorithms will determine how successful the service is integrated into a platform. TikTok and its updates to come will likely swallow more and more services into it as well as integrating into the public sphere.

ACCESS AND DATA WARS

Fragmented access to the network is defined by the different ecosystems that each user interacts with. Some restricted areas of the Internet are separated from the rest. A good example of this is Apple’s closed digital ecosystem. Compatibility bridges are scarce and not pursued into the public by tech companies. Encryption is key for companies in order to keep and grow their technological advantages and maintain a gated digital ecosystem. Many other encryptions allow for most data to be channeled through the network without being actually published or leaving any trace. When talking about information dissemination and openness, Douyun’s CEO explains the importance of "information inclusiveness" and the change of direction from the nowadays mostly restricted era of the Internet:

“If we use video to do "information inclusiveness" to the extreme. I have imagined such a scene countless times, and I want to share it with you. You can imagine what it will be like in the city of Shanghai,

even in this building, in this room, 100 years from now, maybe this place will become an exhibition classroom of a history museum, where everyone is sitting. At the location, there are a bunch of lovely children sitting on the ground, and in the air, through "image projection", for example, "short videos" are projected, like a starry sky, flashing constantly, as the teacher keeps going. Zooming in and flipping through these videos, children laugh, grieve, cheer and even contemplate following these short videos... Yes, this may be a hundred years later, on an ordinary day. They may watch short videos shot by the creators decades or a hundred years ago. These videos may have records of daily life. There is also some professional teaching content." (Zhang, 2019, n.d.)

The information that is disseminated inside a network is protected through the network's security and encryption protocols. These access restrictions give value to the companies that own the network and its infrastructure. What Douyun is doing is lifting these digital walls through a collective effort of dissemination of information from other social media. The fight to take the "network effect" and the "winner takes all" (Nieborg & Poell, 2018, p.5) strategies as default makes the global layout of digital ecosystems a risky ground to lay all new knowledge on. A good example of this is, contributing to the new sovereignty dynamics aforementioned on Bratton's idea of *The Stack* (2016) the restricted access to tweets being withheld by countries for different reasons. The latest example of this phenomena was the banning of Russian state-affiliated media and other broadcasting networks from Twitter's networks in Europe, and other NATO affiliated regions. A way of limiting access to information legitimized by the country's administration or region's government to do so. Not to mention the most important actors when withdrawing content from the network, the network owners, managers and third party agents who follow content guidelines of each system. Terms of the network apply to different countries depending on the region or culture. Twitter understands that when content is removed it must be publicly notified. *"Transparency is vital to protecting freedom of*

expression, so we have a notice policy for withheld content. Upon receipt of requests to withhold content, we will promptly notify affected users unless we are prohibited from doing so” (Understanding When Content Is Withheld Based on Country, 2022). In other cases, when content is removed from the network, users do not have a way of seeing that content is missing. In some cases, the creator or creators manage to find a way around the content restrictions or find another channel in which the guidelines do not affect them. In other cases of state-affiliated media, political representatives and elected officials the network has a way of noticing the users through a special remark on the publisher’s content and profile.

THE ROLE OF TWITTER

Twitter is a platform that includes most media outlets, journalists, writers, and essentially all cultural production in one way or another. The concept of the public sphere is greatly represented in this platform. For this thesis, Twitter is considered as a mirror of this concept, a new version of it. Nieborg & Poell (2018) reflect on the importance of having editorial freedom in a heavily financially stressed press. Since Twitter’s timeline was made into curated personalized content, no longer immediacy was valued over other more monetizable options. Shifting the value for users while keeping the role that Twitter has taken over the years is clustering social networking sites into a homogenized stream of contents. Jean Burgess and Nancy K Baym summarize this phenomenon in *Twitter; a biography* (2020). Twitter stopped carrying the idea “of a public space that had once been represented by a global feed showing all tweets posted to the service” (Baym & Burgess, 2020, p.120). To become something more personalized, measured, and targeted, while simultaneously more organized around media industry advertising logics than interpersonal communication (Baym & Burgess, 2020).

Now Twitter finds itself fighting a lot of bot accounts that either can be automated fun accounts, spam bots or non-human agents that ignite and feed debates in

foreign countries or other sovereignties. Baym & Burgess (2020) also say that the life of Twitter is not over, since it's constantly evolving and being developed. If Twitter is successful with the integration of the personalization algorithm together with the war against malicious bots it is potentially the head of the social media platform infrastructure. Twitter is both the poison and the cure for social media platforms, exactly like TikTok. When the interweb of stacked intelligent platforms curates a healthy screen for its users there will be a social media platform infrastructure.

Users' rituals of consumption, as Lovink (2019) mentioned, are key for a good outcome from screen usage especially in a social media setting like Twitter. "The challenge for all of us is how to maintain the creative power users have to reshape the cultures of digital media platforms, especially when they seem to be veering precipitously toward interests that may work against their users' security, privacy, well-being, and civic agency" (Baym & Burgess, 2020, p.124). Nevertheless, cultural representation is the main element in the public sphere. Including entertainment, politics and everyday contents all in the same interface.

HYPOTHESIS

This thesis approaches the platformization of communities, publics and the public sphere in combination with the introduction of personalized networks. Bubbled and not confirmed human nodes represent and shape communities. Rituals of media consumption are bombarded by fitting narratives that seduce and satisfy the matching public. Thus, the construction of sense surrounding the course of world events deemed relevant or newsworthy is fragmented. No one has changed the way we run the world through social media. Yet, social media has changed the way we run the world. Platformization and globalization generate a dichotomy of hyper informed individuals and digital illiterates. Fragmentation may evolve from communities into alienation. Subcultures and countercultures may be deemed financially exploited bubbles. Gatekeeping and access restrictions in the platforms will have an important role in the coming conflicts. Taking into account that both human and non-human nodes or bots affect communities and have a role in the network. The performance of targeted nodes on networks determines the current narrative that ignites engagement between polarized communities.

When seeing how technologically deterministic this thesis may come across, a question arises that is far too important to ignore. Is the platform society approach building communities broken? Will any attempt to fight for a specific set of rights fall into an isolated online community? How will online movements translate into global or local changes of legislation? Will platforms act as gatekeepers across all sovereignties?

This thesis aims to show how the current state of social media is hyper fragmented and how relevant political events, conflicts and other newsworthy accomplishments are being downplayed or have less impact in the network. On the same hand, how communities are clearly bubbled and sources of information have dissipated into the mist of human or non-human users that inhabit social media networks. The topics that arise as more important are also important when trying to determine potentially historical events and if these are disseminated through the network or not. If they are, what strategies are successful and what users are associated with these topics.

RESEARCH QUESTIONS

The main question of this thesis is:

- Are social media platforms hyper fragmented?

Other aspects of this thesis will focus on similar aspects related to the main topic:

- Are social media platforms polarized?
- How do communities achieve better networks?
- How do nodes affect and represent a community?
- What nodes perform better in the network?

RESEARCH METHODOLOGY

Visualizing networks defining the nodes of the network, points that represent users, usually small circles. Edges are the lines that represent an interaction between the nodes, this can be different things depending on the social network and how it works. (Amir Haeri & University of Twente, 2021, n.d.) For example, for Instagram, edges are more likely to mean comments on a user's post. Other meanings range in the engagement spectrum and other performance indicators, all the metadata used to track user's capability to obtain, maintain and keep engaged other user's attention. Usually edges are represented as lines between nodes, but depending on the type of metadata that they represent they may also be drawn as arrows if the network is directed.

When a network is undirected the interaction between the nodes is mutual, meaning that the user's connection is without a determined direction. Most common in social network analysis are directed edges though. Given the functionalities of social media and their virtual representation and hierarchization of relationships as well as the fact

that the nodes represent users, in other words, people. Identifying and tracking communities are done through different criteria depending on the network that is being looked into.

A community is formed by individuals such that those within a group interact with each other more frequently than with those outside the group (Amir Haeri & University of Twente, 2021, p.9). Detecting communities consists of discovering groups in a network where individuals' group memberships are not explicitly given. In social media, there are two types of groups:

- Explicit groups: formed by user subscription
- Implicit groups: formed by social interactions

Some social media sites allow people to join groups. For example, Reddit users join subreddits, usually related to a specific topic. But not all sites provide a community platform. Network interactions are a rich source of information about the relationships between users and can provide a network visualization (Amir Haeri & University of Twente, 2021, p.13).

In order to objectively identify communities' networks, measures are taken into account. The importance of where to cut a network and isolate a community is vital. Separating groups of nodes and calling a cluster is a task done through various methods. Centrality measures are taken into account when identifying key nodes in the network. Once the most important nodes are identified, the networks that they are clustered in are determined. How central a node is comes from where the cut is placed. All networks are formed through connecting nodes, but not all connections have similar importance. Clustering coefficient, modularity and other measures are all taken into account into calculating and identifying communities in a network. (Amir Haeri & University of Twente, 2021)

The communities are the new masses, the different kinds of public with their respective counterpublics. Online identities determine whether a user is part of, or

not, a community. Network communities try to establish their narrative above others in the day-to-day public discourse and are represented by different actors in the network. When these are identified, the community can be analyzed. Not only that, but relationships between communities have importance when looking into public discourse and how it evolves within the interweb of networks.

This research is based on Twitter content and especially the key users in the network that generate immediate content regarded as potentially historical events. The study is based on a quantitative research approach based on community detection and social network analysis. This research aims to identify key actors that have importance in disseminating content, and tag these content in different types of narratives, determine whether the content can be disseminated through other, maybe more generic, communities and confirm or deny the aforementioned hypothesis.

In order to identify relevant bubbles and loops within communities that may be generating this "autopropaganda" type of consumption it is important to take into account different aspects such as tags, headlines, content structure, etc. The importance of identifying communities and relating them to content loops with key users that generate a certain narrative is imperative in order to understand what contents are surfacing in the interweb of social media at a certain point in time. Of course, the vastness of the media channels does not allow for a broad analysis of a full spectrum of users, content loops and communities. However, the main purpose of the research is to prove that this is a real phenomenon, and has a magnitude as big as the networks that allow it.

In order to do that, a first approximation to community detection is done through Rstudio. A tool that will be used to scrape data from the network. In this case, Twitter was chosen, since it allows access to this type of data for research purposes. The first step is to scrape a certain number of tweets, all containing

different metadata like the author of the tweet, the time of publication, internal and external links it may contain, content embedded among others as well as referentiality inside the network. Some categories of metadata like favorite count, retweet count, reply count are also important when exploring the importance of each tweet, and specially when identifying key users in the networked communities. After this, a plot of the network will allow us to visualize certain aspects and will aid us to detect communities, as well as identify the actors of the network that act as hubs. The tweets are represented as edges, visualized as lines that connect each of the users, referred to as nodes in this context. In a social network, not all nodes have the same importance. For example, some nodes play a role like a hub when transmitting messages, and some users act the same as a bridge (Amir Haeri & University of Twente, 2021, n.d.). Centrality measures are defined at the level of nodes. They reveal the importance of each node from different perspectives. This measure is used to identify highly connected users, popular actors, users who are likely to obtain the most information or who can connect with more new nodes in the network faster (Amir Haeri & University of Twente, 2021, n.d.). In this way, online communities and main disseminators of information around a specific topic can be identified.

In this case, communities were identified using Rstudio using different methods of community detection and network measurements. The code used for this thesis starts off by downloading the sample off the Twitter network at a specific time. In this case, the research was conducted for fifteen days between march and june 2022. Later the sample is examined and the different plots are developed. Every calculation is done in order to investigate the network and get the insight it has been designed to do. In order to understand the different methods and what plots are then used, here is a walkthrough of the Rstudio code:

Loading the libraries:

```
library(tidyverse)
library(ggplot2)
```

```
library(vosonSML)
library(rtweet)
library(igraph)
```

Collection of 800 tweets from twitter which contain the keywords we want, in english. In this case, in order to find potentially historical events the keyword chosen was history.

```
twitter.data <- search_tweets("history", n = 800, lang='en', include_rts = TRUE)
```

A first check of the first 3 rows is done for readability purposes:

```
twitter.data %>%
  head()
```

In order to prepare the scraped data for the network creation we need to update the class of the object with the datasource:

```
class(twitter.data) <- append(class(twitter.data), c("datasource", "twitter"))
```

Using the data scraped we create the actor network:

```
network.twitter.actor <- twitter.data %>% Create("actor")
```

The actor network now contains two data frames: nodes and edges.

```
network.twitter.actor$nodes %>% head(10)
network.twitter.actor$edges %>% head(10)
```

A graph is created to store the data frames into:

```
network.actor.graph <- network.twitter.actor %>%
  Graph()
```

A first plot of the network is done extracting the data from the graph into it:

```
plot(network.actor.graph)
l.actor <- layout_with_kk(network.actor.graph)
plot(network.actor.graph,layout=l.actor)
```

The labels of nodes are removed for better readability of the communities

```
plot(network.actor.graph,layout=l.actor, vertex.size=degree(network.actor.graph)*0.1,
vertex.label = "", edge.arrow.size=0.4)
actor.network.tweets <- twitter.data %>% Create("actor") %>% AddText(twitter.data) %>%
  Graph()
```

A check of the edges is done in order to see that they have been correctly stored in the network, then some are counted to list them as more connected nodes:

```
E(actor.network.tweets)$vosonTxt_tweet %>% head(3)
important.nodes <-
  tail_of(actor.network.tweets,grep("history",tolower(E(actor.network.tweets)$vosonTxt_tweet)))
length(important.nodes)
```

The network is simplified removing the multiple edges and self loops:

```
actor_net_sym <- actor.network.tweets %>% igraph::simplify(remove.multiple = T)
```

```
plot(actor_net_sym,vertex.size=3, vertex.label="", layout=layout_with_kk, edge.arrow.size = 0.3,
edge.curved = .3)
```

Then degree of the node is determined as the size for the visualization (plot):

```
plot(actor_net_sym, vertex.size=degree(actor_net_sym,loops=F)*0.5, vertex.label="",
layout=layout_with_kk, edge.arrow.size = 0.3, edge.curved = .3)
```

The first steps to community detection is to transform the twitter actor graph into an undirected graph:

```
net.simple <- actor.network.tweets %>%
as.undirected() %>%
igraph::simplify(remove.multiple = T)
```

Using the fast greedy method first clusters of nodes are identified:

```
communities.fg <- cluster_fast_greedy(net.simple)
communities.fg
```

The first preliminary results are listed and checked:

```
communities.fg %>% length
sort(sizes(communities.fg),decreasing = T)
```

Then the modularity of the network is calculated:

```
modularity(communities.fg)
```

The first plots of the communities are done taking into account the last calculations:

```
plot(communities.fg,net.simple,vertex.size=degree(net.simple,loops=F)*0.8,
vertex.label="", layout=layout_with_kk, edge.arrow.size = 0.3, edge.curved = .3)
```

Colors and labels are added for the important nodes (degree greater or equal to seven):

```
V(net.simple)$color <- communities.fg$membership
V(net.simple)$label <- V(net.simple)$screen_name
plot(net.simple, vertex.color = V(net.simple)$color, vertex.size=degree(net.simple,loops=F)*0.8,
vertex.label="", layout=layout_with_kk, edge.arrow.size = 0.3, edge.curved = .3)
```

After this other methods are used in order to prove that the communities identified are computed correctly:

Newman-Girvan method uses edge betweenness in order to compute communities. Repeating computations until communities of nodes can be identified. (Amir Haeri & University of Twente, 2021, n.d.)

```
net.simple1 <- as.undirected(actor.network.tweets)
communities.ng <- cluster_edge_betweenness(net.simple1)
communities.ng
communities.ng %>% length
sort(sizes(communities.ng),decreasing = T)
modularity(communities.ng)
```

```

plot(communities.ng,net.simple1,vertex.size=degree(net.simple1,loops=F)*0.8, vertex.label="",
layout=layout_with_kk, edge.arrow.size = 0.3, edge.curved = .3)
V(net.simple1)$color <- communities.ng$membership
V(net.simple1)$label <- V(net.simple1)$screen_name
plot(net.simple1, vertex.color = V(net.simple1)$color,
vertex.size=degree(net.simple1,loops=F)*0.8, vertex.label="", layout=layout_with_kk,
edge.arrow.size = 0.3, edge.curved = .3)

```

Louvain Method: The algorithm at first looks for small groups or communities and then continues to cluster by merging small groups and generates larger communities in a way that leads to increasing modularity. These steps are performed repeatedly to reach the maximum modularity value. Therefore, this method can find a hierarchy of communities. (Amir Haeri & University of Twente, 2021, n.d.)

```

net.simple2 <- as.undirected(actor.network.tweets)
communities.lv <- cluster_louvain(net.simple2)
communities.lv
communities.lv %>% length
sort(sizes(communities.lv),decreasing = T)
hist(sizes(communities.lv))
modularity(communities.lv)
plot(communities.lv,net.simple1,vertex.size=degree(net.simple2,loops=F)*0.8, vertex.label="",
layout=layout_with_kk, edge.arrow.size = 0.3, edge.curved = .3)
V(net.simple2)$color <- communities.ng$membership
V(net.simple2)$label <- V(net.simple2)$screen_name
plot(net.simple2, vertex.color = V(net.simple2)$color,
vertex.size=degree(net.simple2,loops=F)*0.8, vertex.label="", layout=layout_with_kk,
edge.arrow.size = 0.3, edge.curved = .3)

```

After the measurements the first network and community analysis is done:

```
net.simple1$communityClass <- communities.ng$membership
```

The number of communities is reduced to only keep the bigger ones:

```

length(communities.ng)
sort(sizes(communities.ng),decreasing = T)
comm.ng.reduced <- communities.ng[which(sizes(communities.ng)>11)]
length(comm.ng.reduced)
subcoms <- data.frame()
important5 <- data.frame()

```

An inspection is made of the eight communities detected, of this eight, one will be chosen for its analysis:

```

for (i in names(comm.ng.reduced)) {
  subgs <- induced_subgraph(net.simple1, v = which(net.simple1$communityClass == i))
}

```

```

btwn <- betweenness(subgs,normalized = T)
degr <- degree(subgs)
top_betw <- names(which(btwn==max(btwn)))
plot(subgs,vertex.size = btwn*10,vertex.label.cex=0.8,main=paste0("Community Class ",i))
top_deg <- names(head(sort((degr), decreasing = TRUE), 5))
topfv <- data.frame(commClass = i, rank = 1:5, users = V(subgs)$label[which(V(subgs)$name
%in% top_deg)])
important5 <- important5 %>% bind_rows(topfv)
subcoms <- subcoms %>% bind_rows(data.frame(commClass = i,
n_members=gorder(subgs),
important_user = V(subgs)$label[(which(V(subgs)$name %in%
top_betw))])
))
}
subcoms

```

And in the end the most important users in each network

```
important5 %>% pivot_wider(names_from = rank, values_from = users)
```

ANALYSIS OF THE RESULTS

For the first extraction through Rstudio scraping Tweets that contained the word “history” for up to 800 results. After the first dataset is obtained the dataset is further plotted through the identification of another keyword. In this case, “anti” was used as a prefix for different subculture communities that we are trying to identify. After this, the first plot (Figure 1) gives us a general overview of what a “history” search in Twitter looks like, identifying in red those users that used “anti” in their tweets ¹.

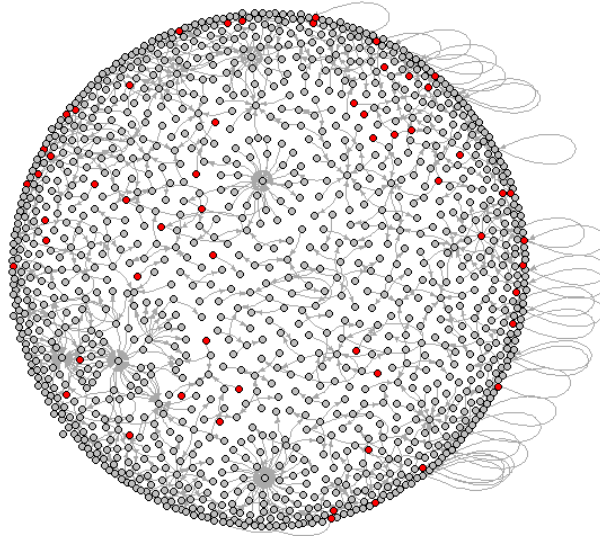


Figure 1. Plot from twitter network on “history” with 800 results. 22nd of march 2022

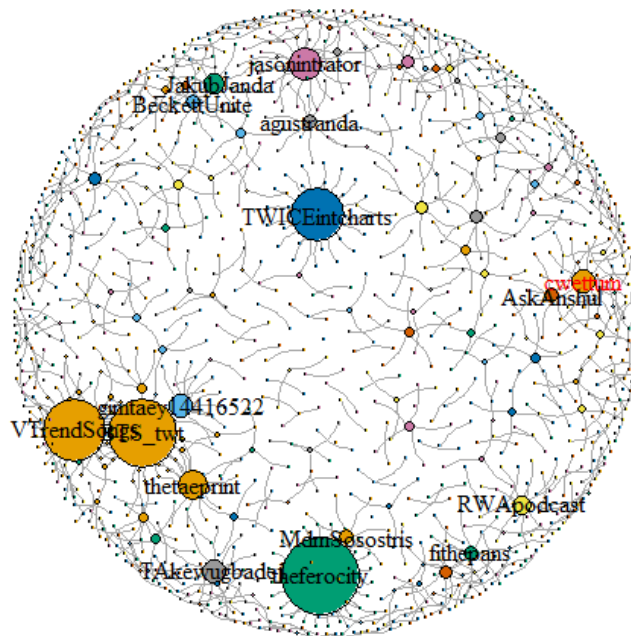


Figure 2. Plot from twitter “history” search with important nodes highlighted

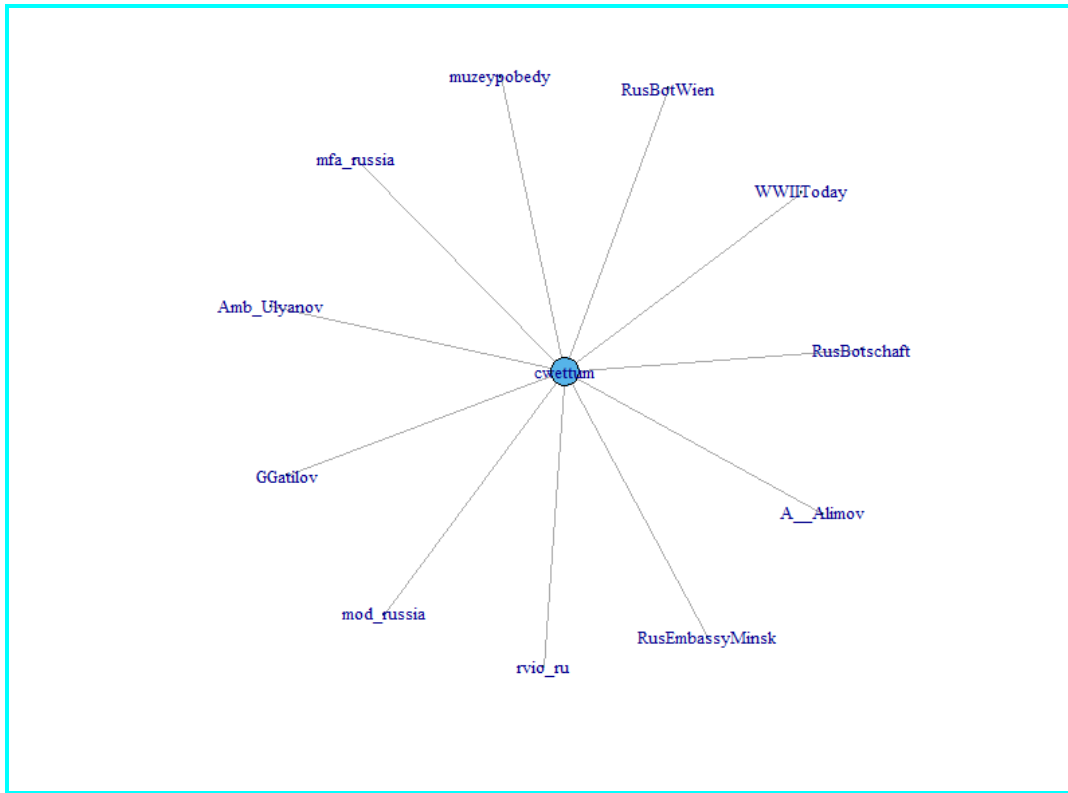


Figure 3. Plot of first community detected, 7th more connected node (username) with all users that engaged with

The community detected as the more connected and with more possibilities to gather more connections is a community with a lot of users that are Russia related, mainly pro-russian accounts (Figure 3). This is no surprise, since this analysis was done during the war in Ukraine that involves Russia. And after the censorship of state affiliated media channels in social media platforms, Twitter included. This community can be identified in the network. Centrality measures determine what nodes are more important. @swettum can be seen highlighted in the important nodes (Figure 2). Connections are taken into account as nodes For this extraction, degree centrality as well as closeness centrality were taken into account to determine the best performing node, and its community. Some accounts are clearly bot accounts and that may be a hint that the information is being pushed from performance systems that allow for better performing tweets.

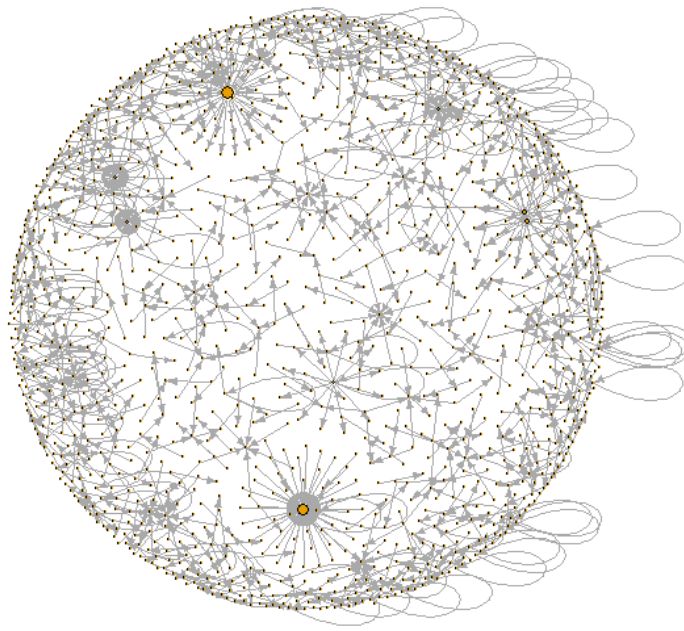


Figure 4. Plot from twitter network on “history” with 800 results.

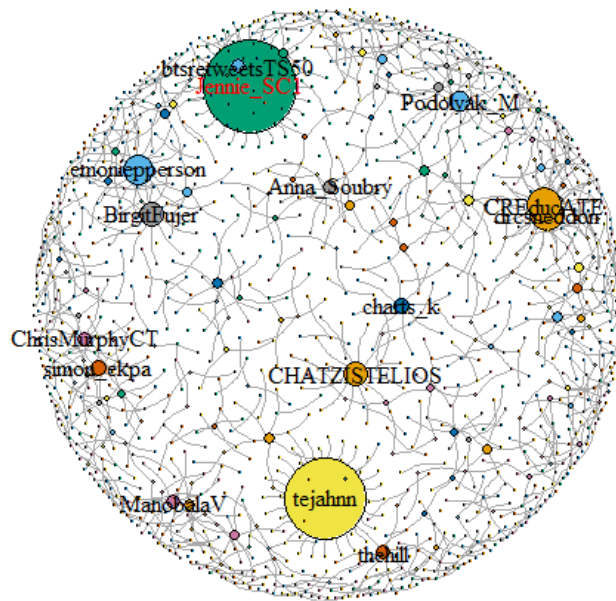


Figure 5. Plot from twitter “history” search with important nodes highlighted

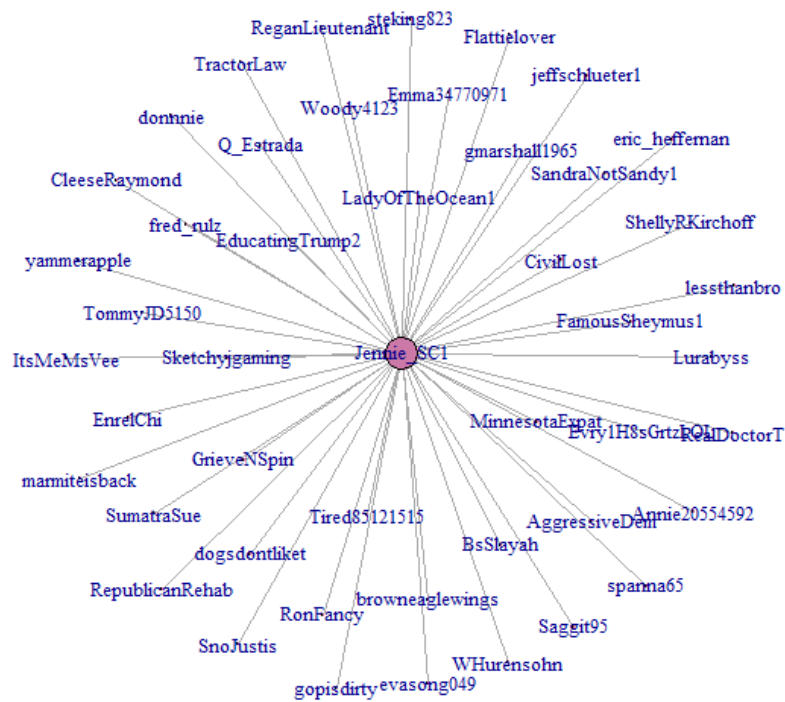


Figure 6. Plot of first community detected, 7th more connected node (username) with all users that engaged with

The community detected in this case was generated from a specific piece of content. A discussion that arose from a publication of a picture of the suspect of a shooting in the United States of America. The discussion that proceeded generated by the tweet was diverse and touched upon topics like slavery, government violence and inflation to later get into the Ukraine invasion. The node detected: @Jennie_SC1 (Figure 6) was found to be better positioned among the communities and is the one that introduces the weaponized conflict into the debate. Inside the community we can see a general interpretation and debate on the current public sphere considered of importance by this community, like gun control regulation, racism, economy. All participants that appear in this plot have a different say and post their views or repost others, which goes against the idea that this community is isolated. In this case, the disseminator is a user under that identifies itself as a “Married, independent voter. We are more than our political beliefs, we should always be able to find common ground” [@Jennie_SC1], Twitter.

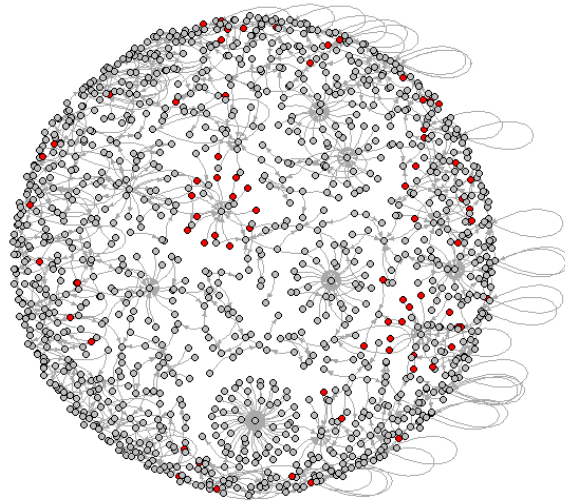


Figure 7. Plot from twitter network on “history” with 800 results with some highlighted, more connected nodes. 17th may 2022

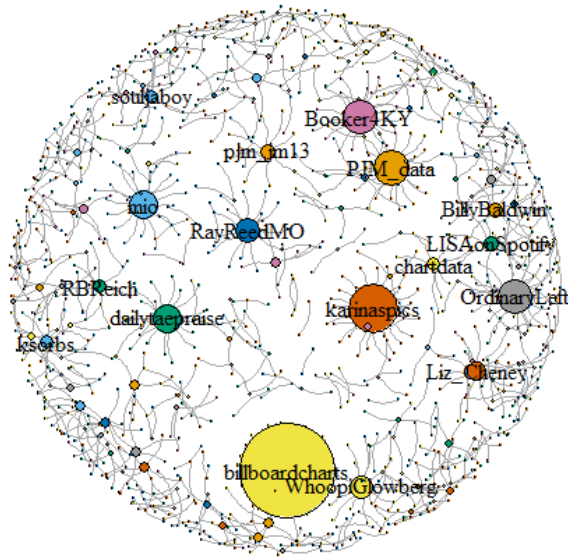


Figure 8. Plot from twitter “history” search with important nodes highlighted

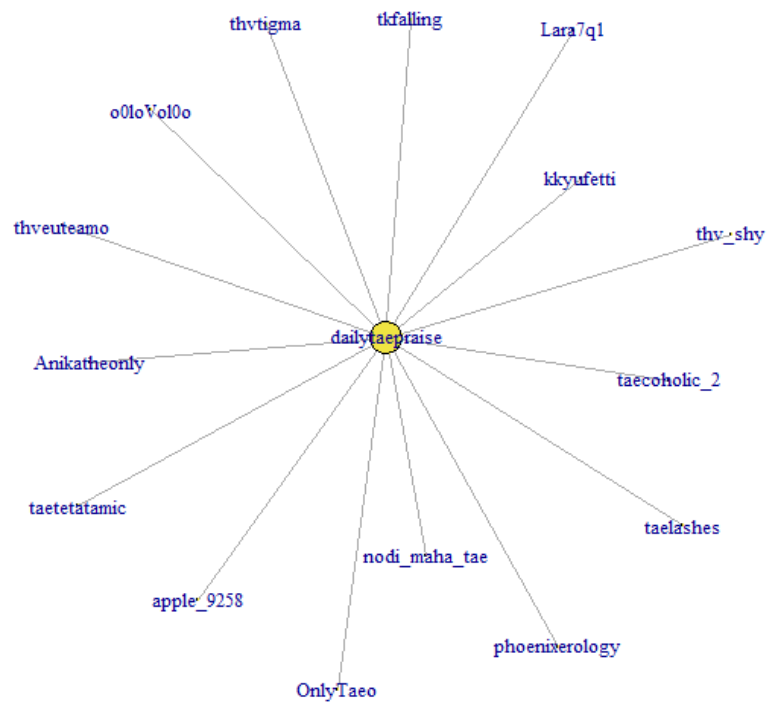


Figure 9. Plot of first community detected, 2nd more connected node (username) with all users that engaged with

The community that was detected in this plot (Figure 7) is related to K-Pop icons. In this case, the account that managed to get the most engagement, taking into account degree centrality and other community measures, was @dailytaepraise. An account dedicated to publishing news and content related to Kim Taehyung, one of the most followed K-Pop idols as we see from the publications made by this account. Only this fan account has more than ten thousand followers on Twitter. K-Pop artists are mostly based in Korea but have been finding success globally, specially through social media. It is no surprise that such a well performing type of content is identified as important (Figure 6) during this research. Some nodes in the community selected (Figure 7) seem to be non-human retweeting users that bring user metrics up in order to help improve engagement.

K-Pop is one of the most successful communities to have brought up their narratives into mainstream social media timelines and viral networks.

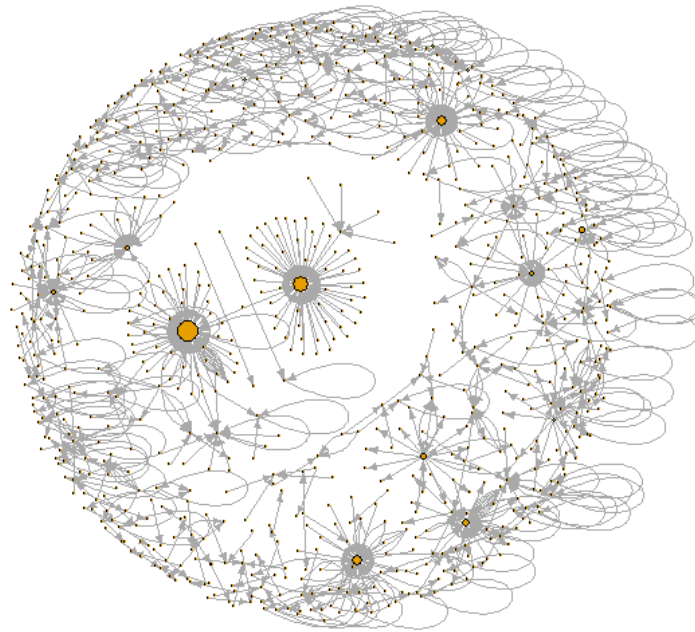


Figure 10. Plot from twitter network on “history” with 800 results. 1st june 2022

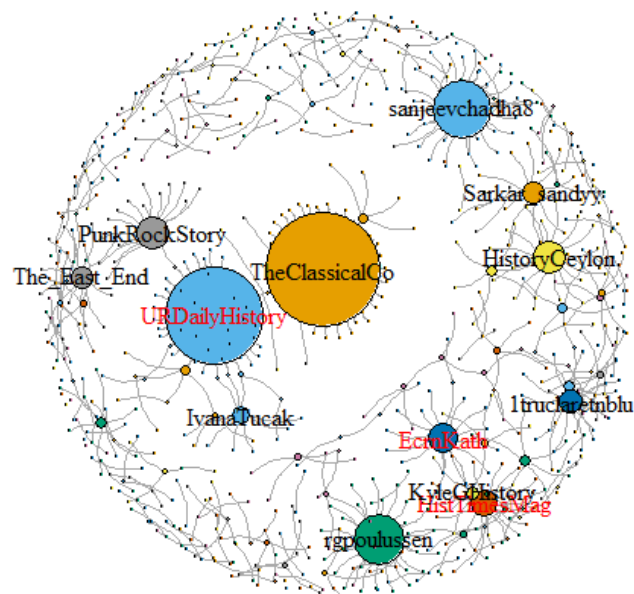


Figure 11. Plot from twitter “history” search with important nodes highlighted

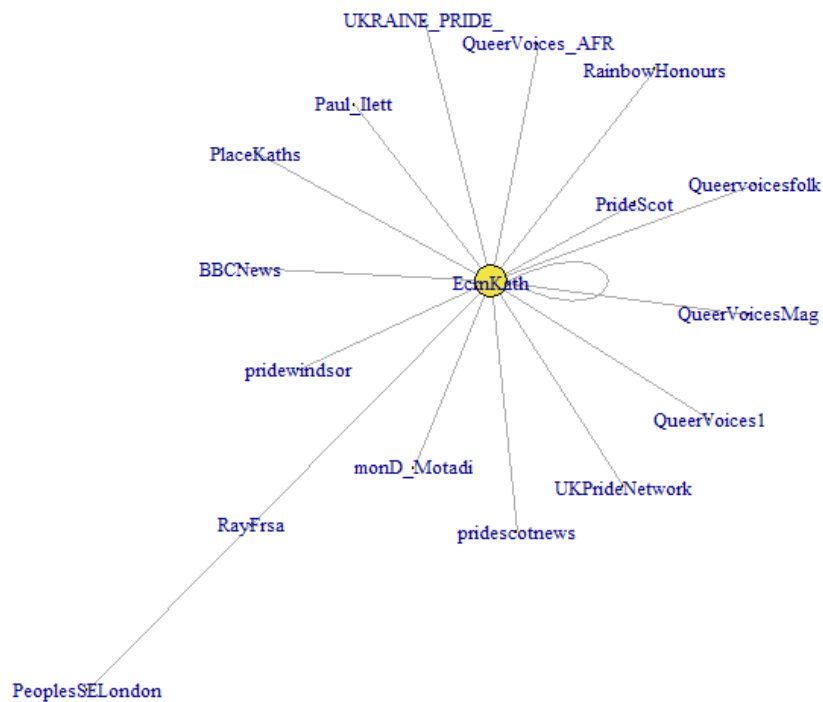


Figure 12. Plot of first community detected, 4th more connected node (username) with all users that engaged with

The community that was detected (Figure 12) in this case is a response to a @BBCNews tweet and seeing the usernames of the accounts that generated the transit it can be easily identified as an LGBTQ+ community. Interestingly enough, we find that the quoted tweet that arises this discussion is the next:

Paul Ilett [@Paul_Ilett] (2022, June 1st) “This is STILL on the @BBCNews website despite a 2nd round of major edits following complaints. This time the edits include a replacement for the misleading headline, but it retains the “survey” the complaints unit found to lack “statistical validity”” Twitter, https://twitter.com/Paul_Ilett/status/1531895595782311937

The author of the text quotes an article from the BBC titled “Lesbians who feel pressured have sex and relationships with trans women”. Complaining mainly

about the fact that the headline is misleading and does not match the outcome of the conducted survey that the article would have referred to. Another important outcome that must be observed is that the tweet comes out at the beginning of June, known to be the pride month. The node that is guessed by the algorithm to be better performing is directly related to the start of a calendarized event that is intensively represented throughout. The selection of this community implies the predictability of social network behavior, since other more connected nodes were in the same sample.

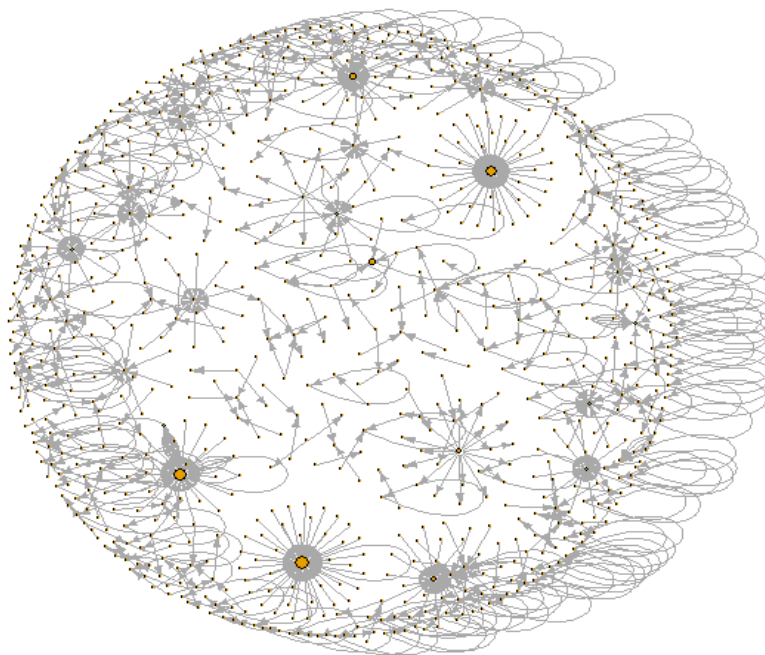


Figure 13. Plot from twitter network on “history” with 800 results. 2nd june 2022

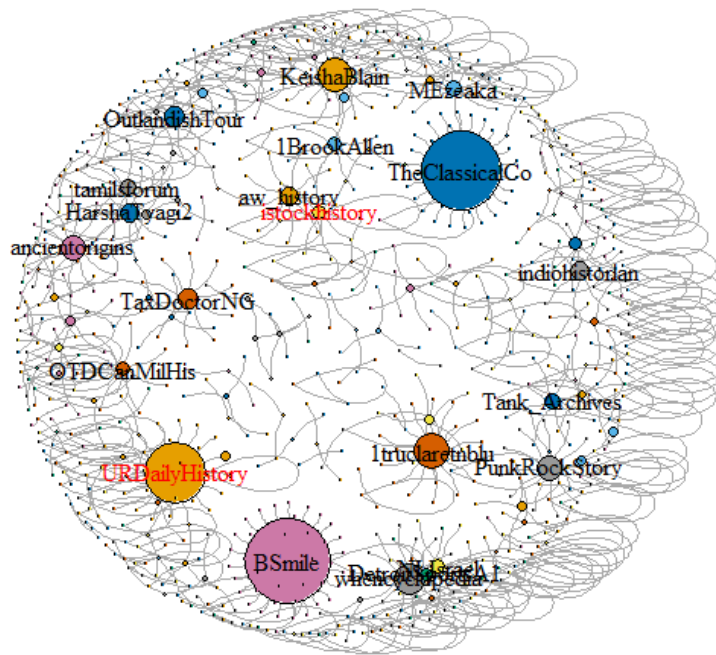


Figure 14. Plot from twitter “history” search with important nodes highlighted

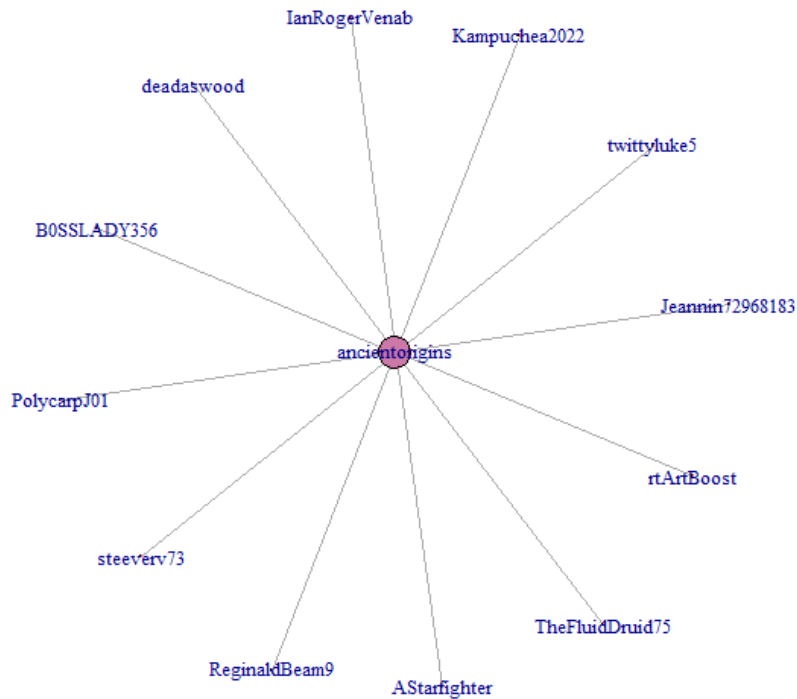


Figure 15. Plot of first community detected, 8th more connected node (username) with all users that engaged with

The node that Rstudio determines as the more likely to have the most interactions is identified in this community (Figure 15). The first thing that can be seen when looking into the username is that it is an account specifically dedicated to humanity’s ancient history. It has more than a hundred eighty thousand followers. The sample of content extracted from this search is a quote: “Gratitude is not only the greatest of virtues, but the parent of all others - Cicero” [@ancientorigins] (2022, june 2nd) Twitter, <https://twitter.com/ancientorigins/status/1532331281014456320>

This account is dedicated to reconstructing the story of humanity’s past. In a way, an account that takes into account archaeology, lost civilizations, sacred texts, ancient places, artifacts, mysteries and unexplained phenomena to provide a unique perspective on the history of human development. This Twitter account is

more visible and is very useful as a gateway to alternative narratives surrounding history. To some extent, it can serve the purpose of offering the user its first steps into the known bubble of conspiracy theories and myths that have a significant following in social media. When similar accounts similar to this one are combined into one narrative experience a biased user is necessarily created.

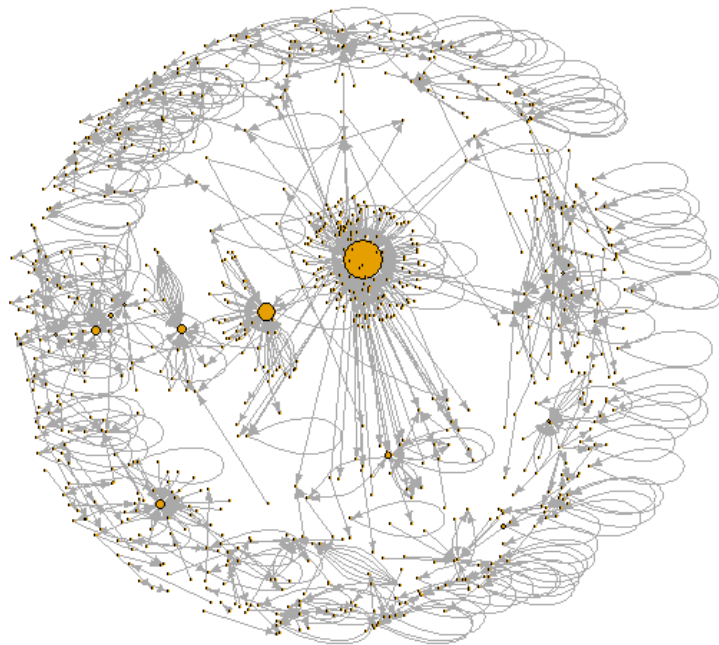


Figure 16. Plot from twitter network on “history” with 800 results. 5th june 2022

This node that can be clearly identified as the most connected (Figures 16 & 17) from the previous plots is the best performing tweet out of the search. The content of the tweet can be described as a baseball throwback that includes a video with over 1.2 million views at the time of consultation.

“Today In 1989: Kansas City #Royals outfielder Bo Jackson makes an amazing throw to get Seattle #Mariners baserunner Harold Reynolds out at home plate! #BoKnows #MLB #Baseball #History” [@BSmile] (2022, June 5th) Twitter, <https://twitter.com/BSmile/status/1533417941672280067>

The main element of the tweet is the video. The text works as a title and short description of the event that took place and is being relived. This tweet falls into the category of fan related community content and is regarded as entertainment. In any case, it showcases the impact of fan communities that have been identified in past network analysis and their big presence in user’s timelines. It is important to highlight the magnitude of impact that this tweet has generated in 5 hours since it was published. In a way, engaging with a known and established community as an audience contributes to this accomplishment.

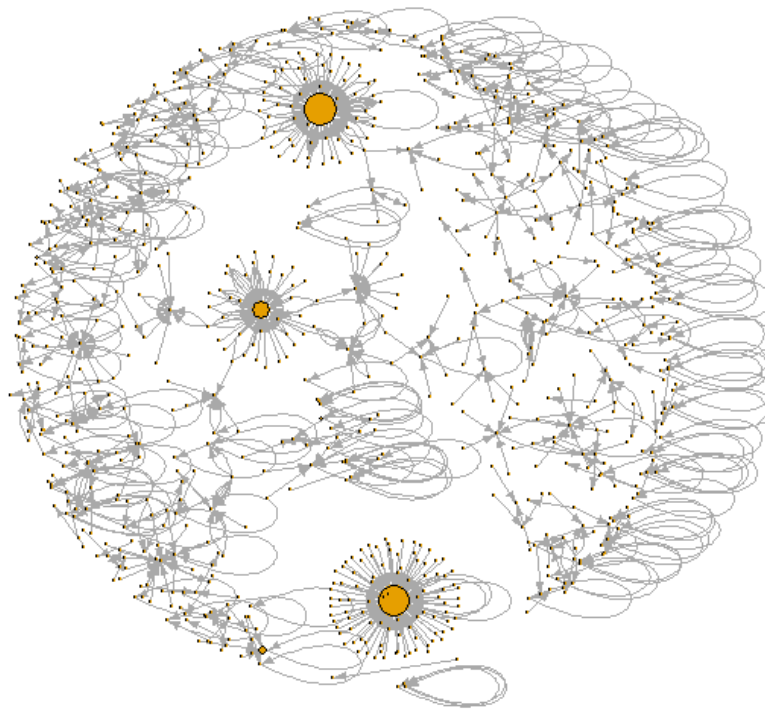


Figure 19. Plot from twitter network on “history” with 800 results. 6th june 2022

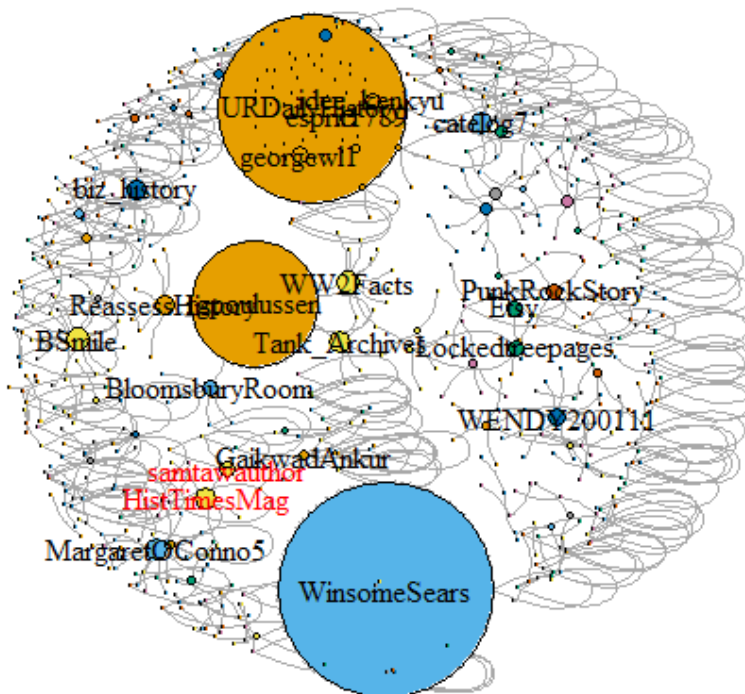


Figure 20. Plot from twitter “history” search with important nodes highlighted

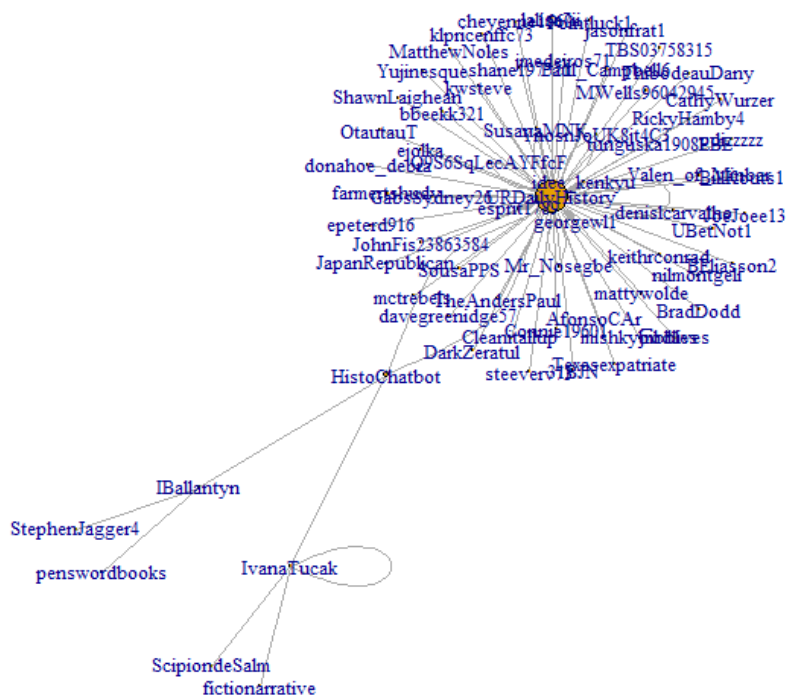


Figure 21. Plot of most connected node (username) with all users that engaged with and biggest community

This is the first community that has been detected with a subcommunity (Figure 21). In this case, it is a parallel conversation sparked through a bot. The tweet’s publisher account is directly related to history and like the previous analyzed tweet the account main content is “on this day...” type of content. This type of content generated a big impact throughout the network (Figure 20). Adding to this fact, the most important node in this analysis has over 150 thousand followers. Which gives an edge over other accounts when sparking conversations and becoming communities.

In this case, the content of the tweets published by this account are restricted to registered events and are explained through short and descriptive headlines that

usually include a picture. In this case, since D-day was on the 6th of june, the tweet talks about this event.

“6 June 1944: At 7:35 am, #Canadian forces were scheduled to land at #Juno Beach in Normandy, #France during the Allied D-Day invasion of Western Europe. #WWII #WW2 #history #HistoryMatters #DDay #ad <https://amzn.to/2UfAJF8>”
[@URDailyHistory] (6th of june 2022) Twitter,
<https://twitter.com/URDailyHistory/status/1533728902346067968>

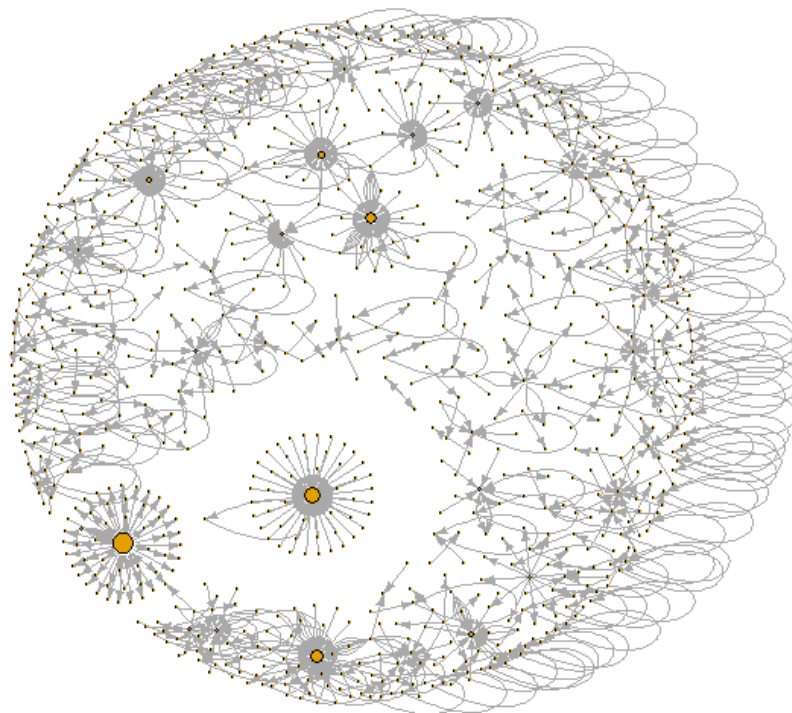


Figure 22. Plot from twitter network on “history” with 800 results. 7th june 2022

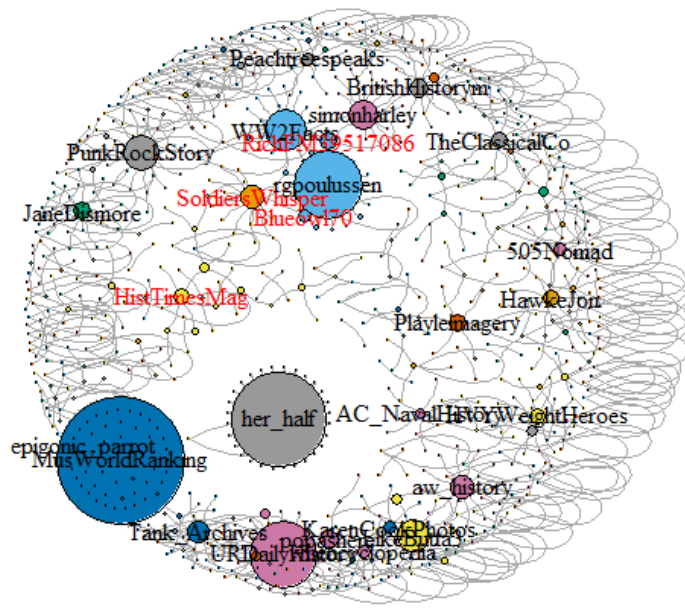


Figure 23. Plot from twitter “history” search with important nodes highlighted

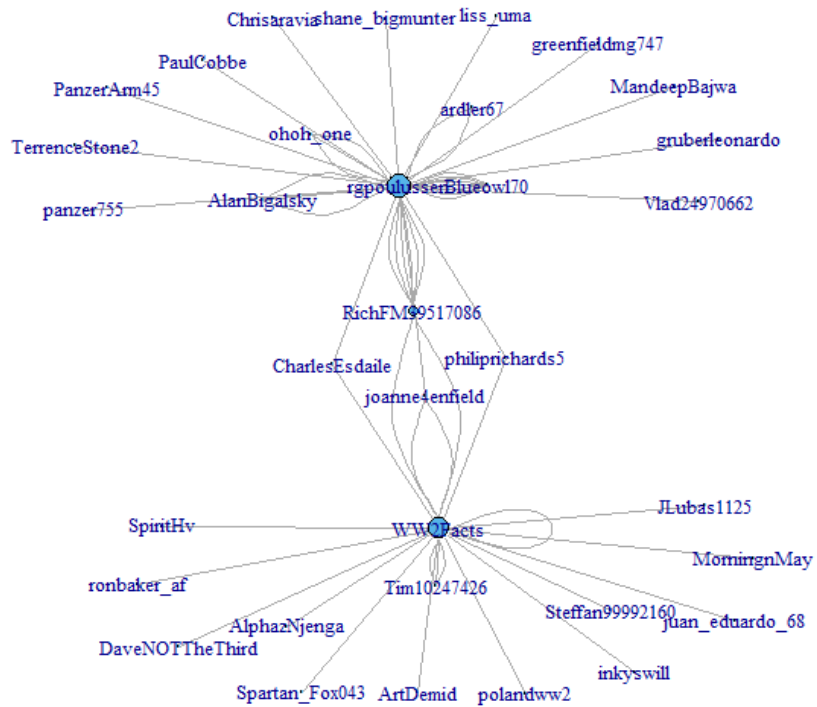


Figure 24. Plot of three connected nodes that form a community

This plot (Figure 24) shows a different network behavior and community links. Three connected nodes that shape this conversation, again, related to D-Day. In this case, the account that sparks the conversation is again directly related to historical contents. The next nodes are accounts that retweet the initial content but have an impact in the successive community.

This community is highlighted in this analysis essentially because of the behavior it represents. It is explained by the changing topic of the conversation. It starts as the description of the event of D-Day but then users come in to talk about the vehicles that were used for the operation. The different nodes link the evolution of the conversation into different topics, linking the communities of history enthusiasts with the community of fans of war technology and vehicles.

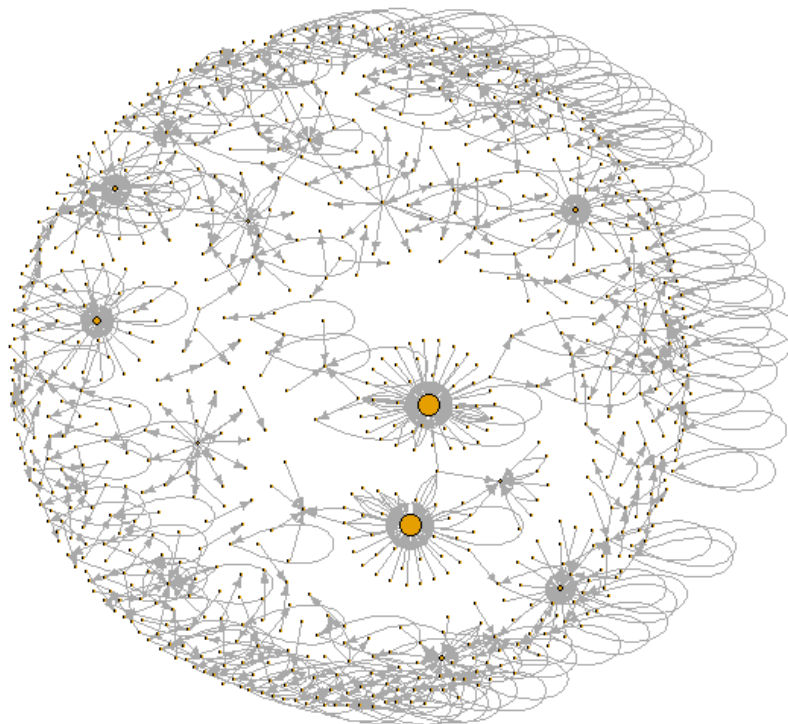


Figure 25. Plot from twitter network on "history" with 771 results. 8th june 2022

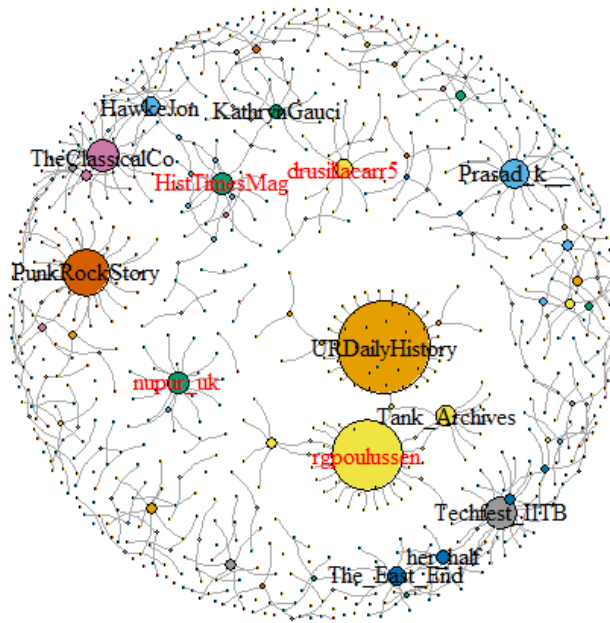


Figure 26. Plot from twitter “history” search with important nodes highlighted

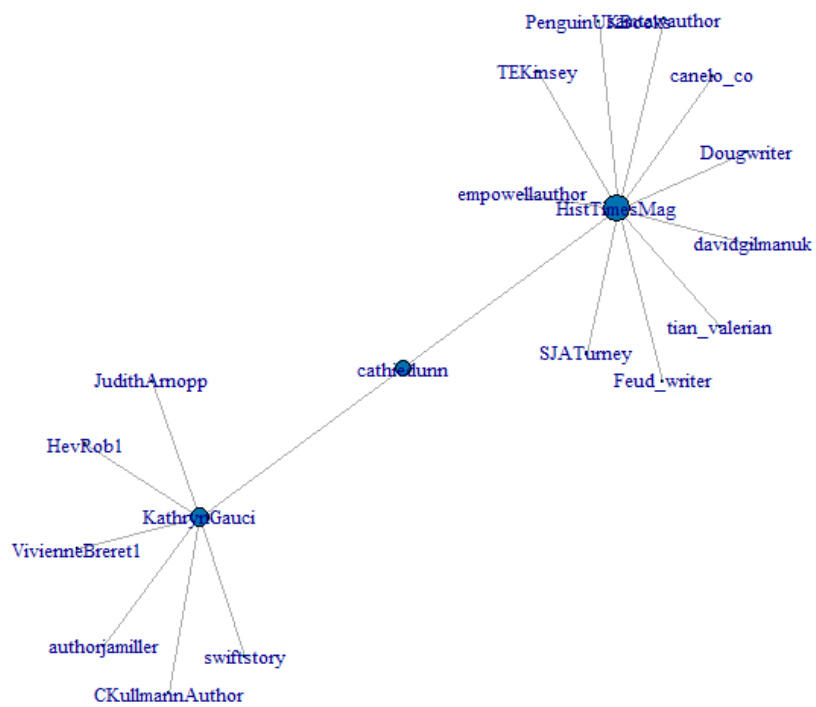


Figure 27. Plot of three connected nodes that form a community

This detected community (Figure 27) is observed with a similar structure of 3 nodes that connect different communities that share some interests. The user @cathiedunn acts as a bridge between @HistTimesMag, an account for the interactive magazine and community website for historical fiction fans with the same name, and @KathrynGauci, a historical fiction writer. This chain of nodes is used to promote the new issue of the magazine and its collaborators, a useful way of connecting fan communities and integrating them to one and other.

These nodes have the better betweenness centrality detected during this analysis as well as the clearer subcommunities that take part in it. Because of this observed structure the algorithm detects this community as one of the most important, because of its structure it is able to connect to more and more users from different backgrounds but similar interests.

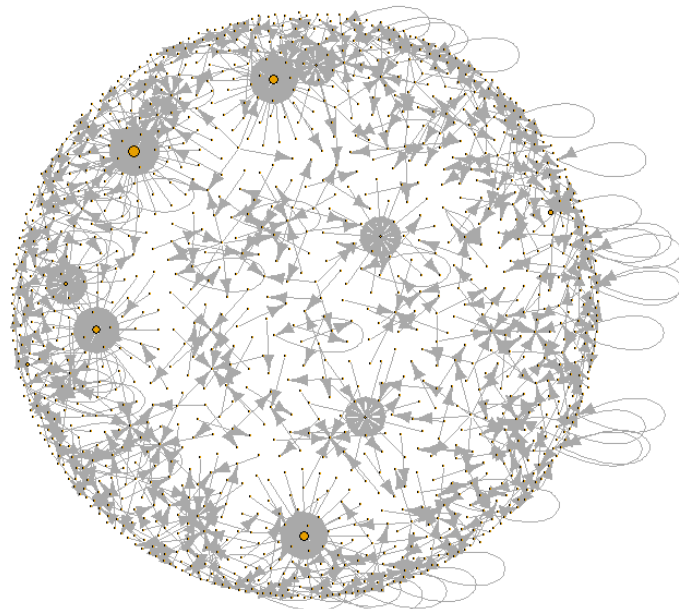


Figure 28. Plot from twitter network on “history” with 771 results. 14th june 2022

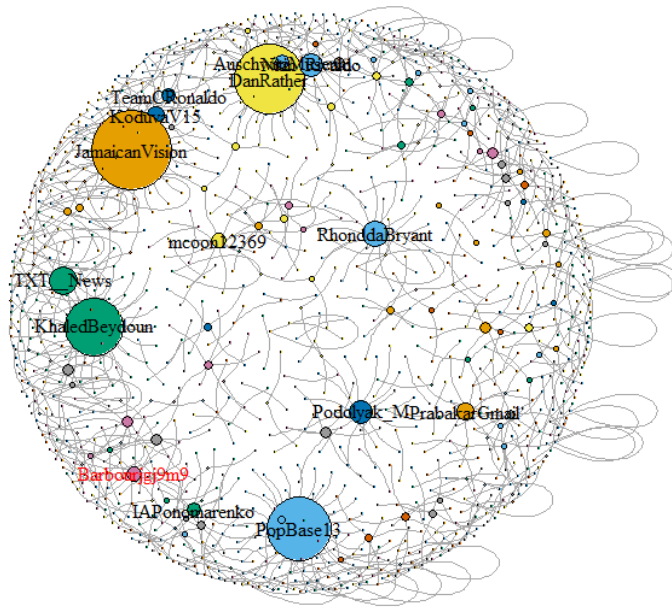


Figure 29. Plot from twitter “history” search with important nodes highlighted

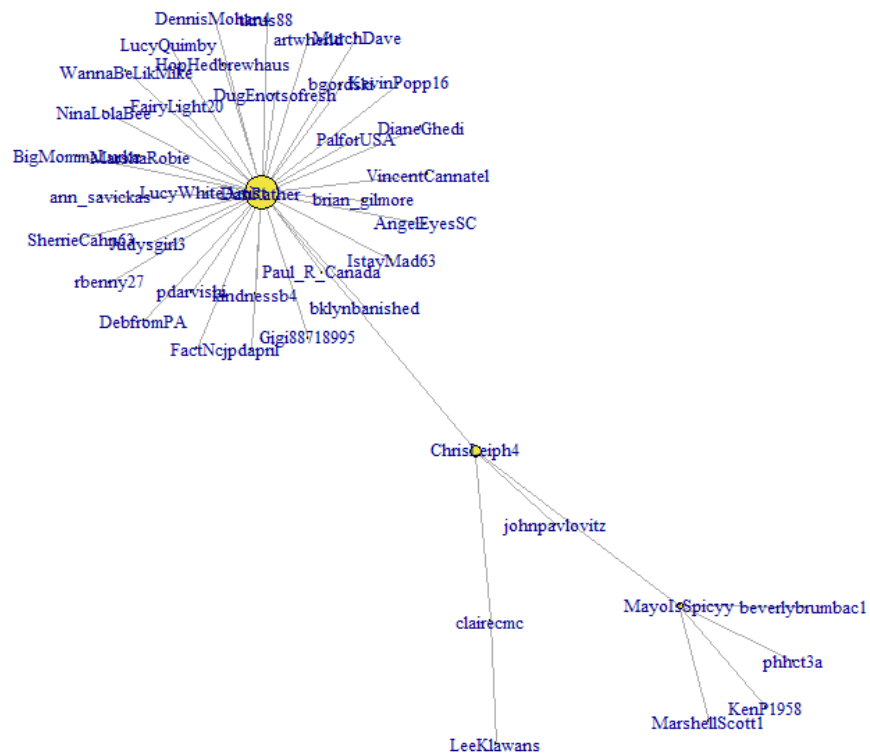


Figure 30. Plot of @DanRather tweet and subsequent discussion

The node with better centrality measures and spreadability was detected (Figure 30) from the next tweet:

“Funny what people will say when they’re under oath that they didn’t say earlier when it could have made a big difference. Actually, it’s not funny at all. It’s outrageous, a shame that will follow their names into history.” [DanRather], 16th june, 2022, Twitter. <https://twitter.com/DanRather/status/1536539444613767169>

Dan Rather is a journalist with more than 2.5 million followers. The reflection on the 6th january hearing over Trump’s intent of keeping himself in power and the subsequent events and decisions that affected the status quo of the United States of America and the rest of the world. In a way, this text reflects on the “medium is the message” idea from Marshall McLuhan (McLuhan, 1964, p.8) which aligns with the theories explained in this thesis. The fact that the narrative of transcendental events are controlled through social media channels alters the way in which the events take place in reality. As said before, no one has changed the way we run the world through social media. However, social media has changed the way we run the world. This tweet generated a conversation on this matter and had a lot of impact in the journalist’ network with over 200 quoted tweets and more than 8 thousand retweets at the time of consulting.

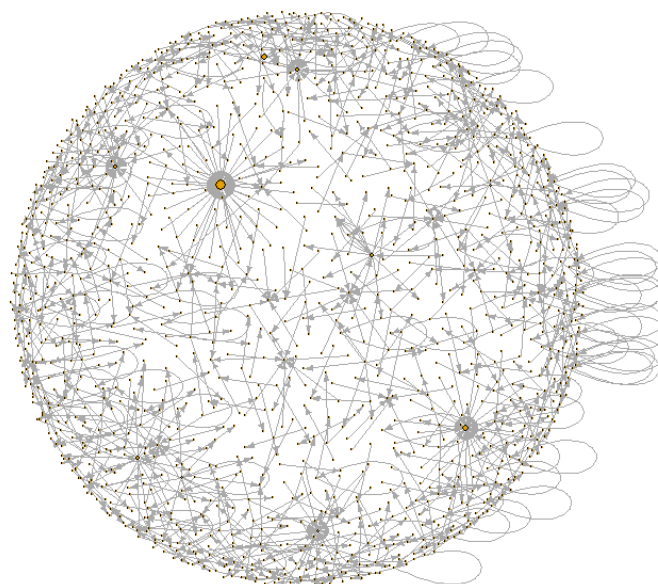


Figure 31. Plot from twitter network on “history” with 1374 results. 15th june 2022

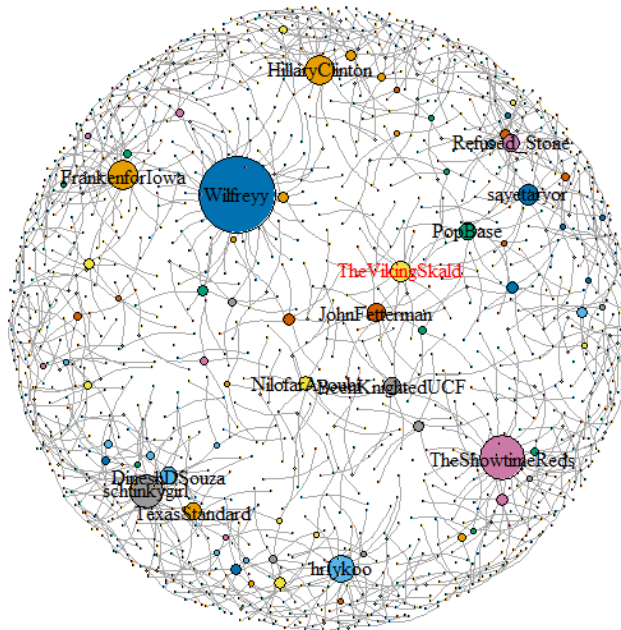


Figure 32. Plot from twitter "history" search with important nodes highlighted

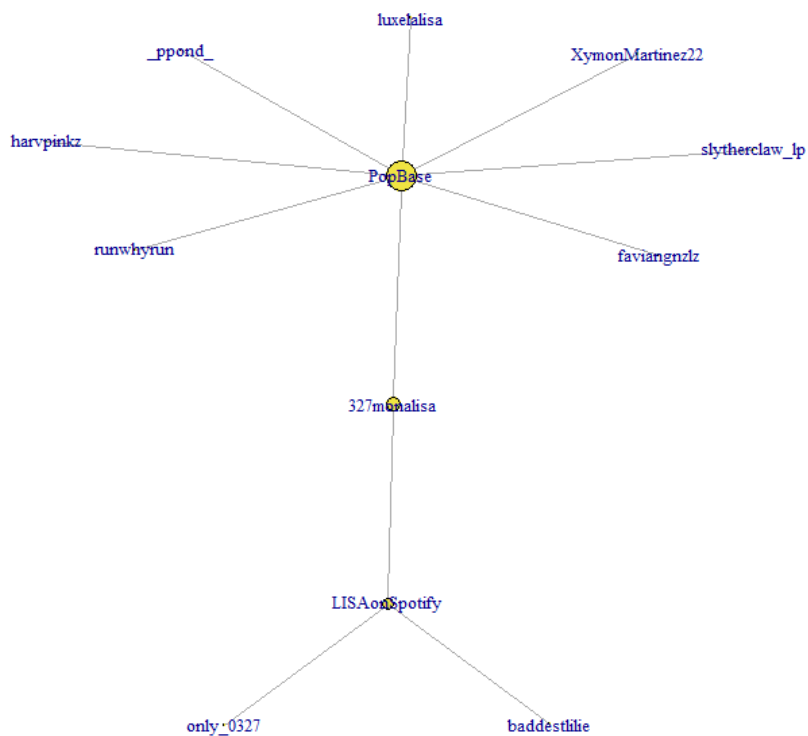


Figure 33. Plot of highlighted community (username) with all users that engaged with

This community highlighted (Figure 33) other conversations like the one started by @HillaryClinton around the hot topic of the events of the 6th of January. Instead, this community is generated by statsbots from K-Pop artist LISA, the quoted text is:

“#MONEY by #LISA has now surpassed 43M charted streams on Spotify India becoming:

The first and only song by a K-pop solo act to do so in history

First and only song by a K-pop female act in history

3rd song by a K-pop act in history” [@LISAonSpotify], 15th june 2022,

Twitter, <https://twitter.com/LISAonSpotify/status/1537043410837770241>

The tweet highlights the strong irruption of K-Pop artist LISA in India with newest single release. This community, as mentioned before, has a layout for strong performing social media fan-related community content that echoes through different high value accounts. This kind of network behavior allows its success and is one of the main reasons the algorithm picks it up as one of the better performing pieces of social media content. (Figure 32)

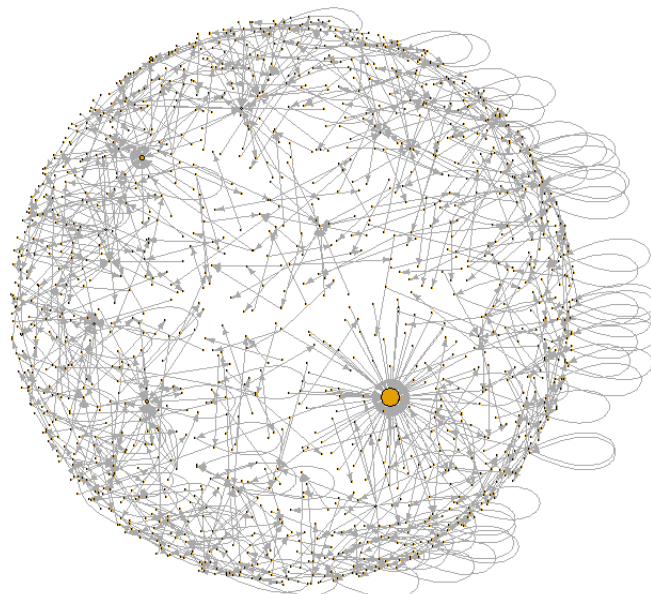


Figure 34. Plot from twitter network on “history” with 800 results. 16th june 2022

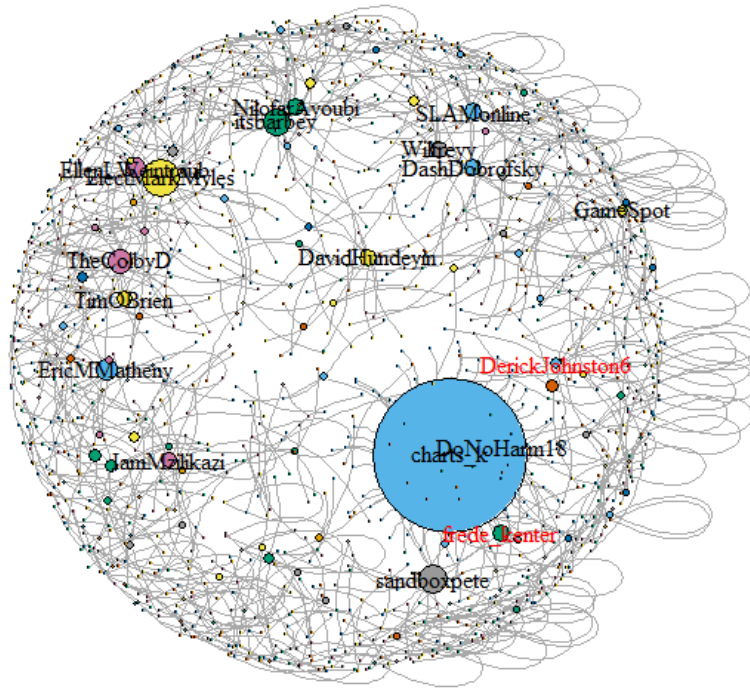


Figure 35. Plot from twitter “history” search with important nodes highlighted

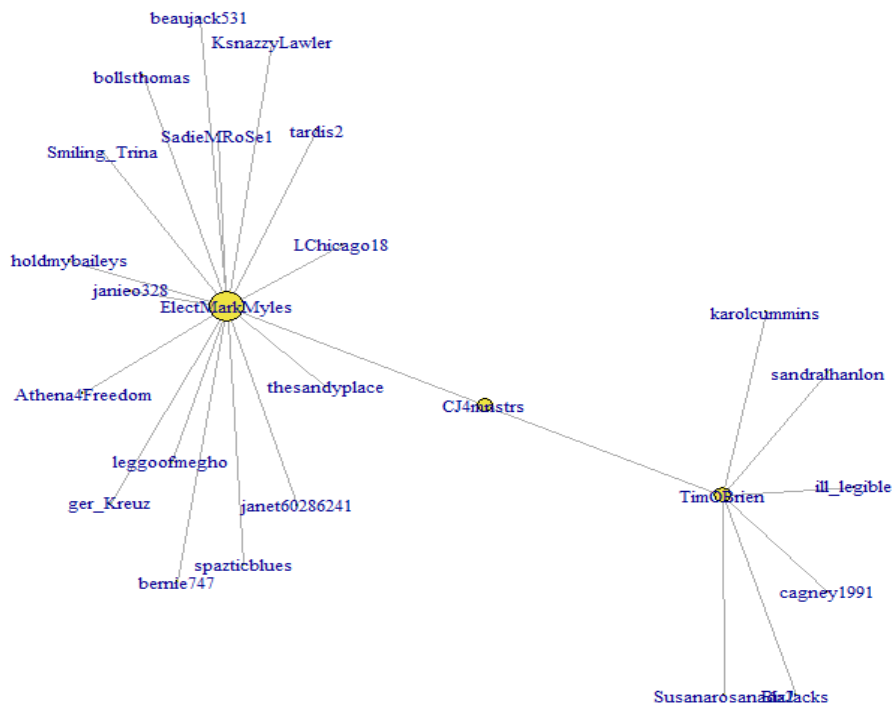


Figure 36. Plot of highlighted community

This tweet is highlighted as a good performing node (Figure 36). The tweets quotes:

“My name is Mark Myles. I’m running to be the Democratic nominee for OK County District Attorney.

As the 1st Black DA in OK history, I’ll put a moratorium on the death penalty and refuse to prosecute anyone seeking an abortion.

Can you help us get to 1000 followers?” [ElectMarkMyles] (16th june, 2022) Twitter, <https://twitter.com/ElectMarkMyles/status/1537226656376836097>

With more than 18 thousand likes and a lot of support from local and state political democratic community, Mark Myers presents himself as a candidate for Oklahoma County District Attorney through Twitter. In a short period of time he becomes very popular and participates in many scheduled political activities and broadcasts. In this case, we identify the social media dimension of the campaign. This tweet comes to show how the public sphere has shifted into a transmedia space where attention is needed to gain trust and following. As of the time this analysis is made, 15 hours after the publication of the tweet, the account has more than 8 thousand followers.

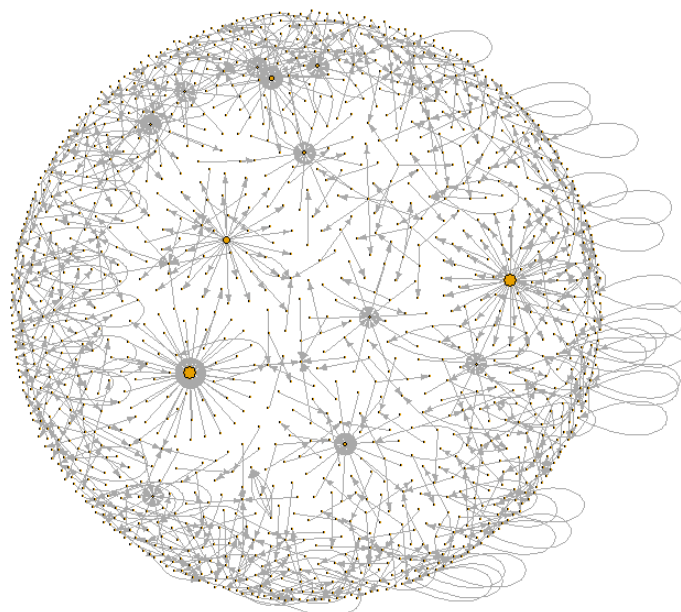


Figure 37. Plot from twitter network on “history” with 800 results. 16th june 2022

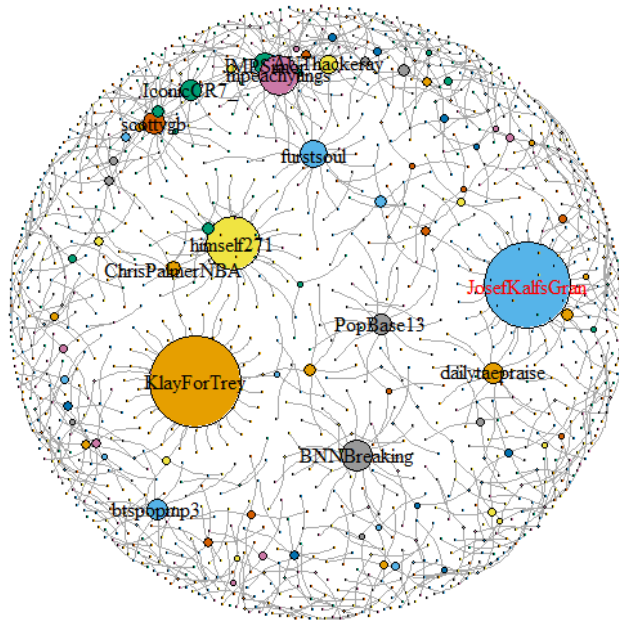


Figure 38. Plot from twitter “history” search with important nodes highlighted

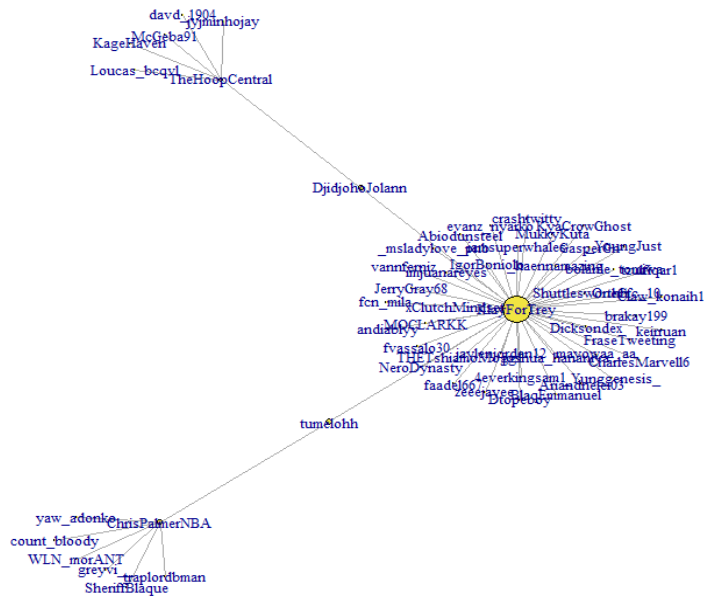


Figure 39. Plot of highlighted community

As of the 17th of June of 2022 the winner of the NBA was proclaimed. An event that has a huge impact within the basketball community and all satellite fan communities it comes into contact with. The finals conclude the season and with it come the acknowledgements to all the participants in all levels. In this case, the tweet praises Golden State Warrior's player Stephen Curry for winning all 3 MVP awards in the season as well as winning the championship.

The tweet (Figure 39) obtained more than 6 thousand retweets and 40 thousand likes in less than 6 hours after its publication. This comes to show the strength of the basketball community, taking into account other micronetworks of Warrior's fans and even Steph's fans (Figure 38).

As seen before in this thesis, the "main" events that are calendarized are the ones that pop up and are picked up as the better performing pieces of content. Even though these were not targeted. These events that take up a lot of the broadcasting space and audiences make it so other potentially reportable events become less reportable because of the loss of potential impact in the network. Newsworthy content might be omitted because this better performing content is eclipsing the network.

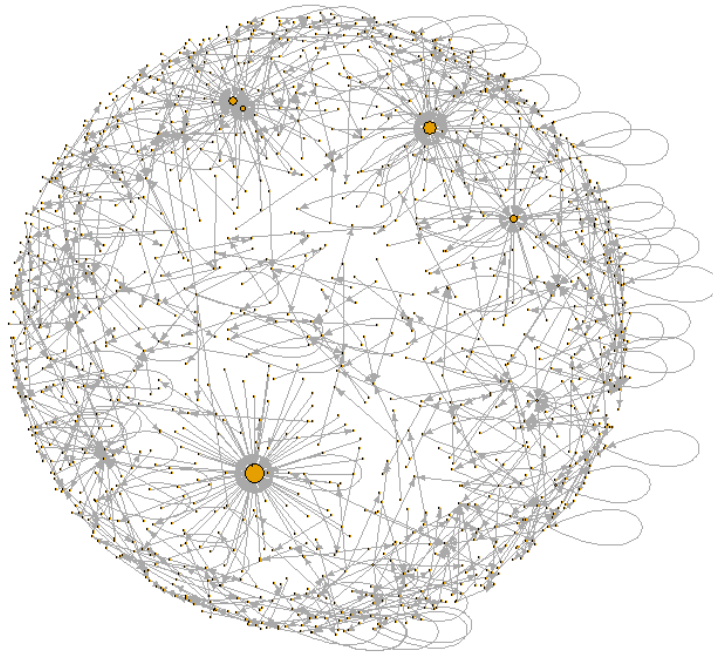


Figure 40. Plot from twitter network on “history” with 800 results. 20th june 2022

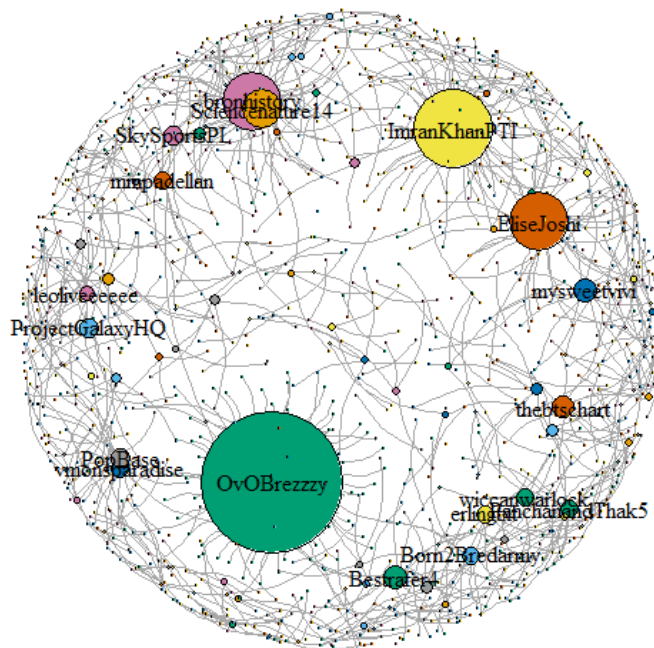


Figure 41. Plot from twitter “history” search with important nodes highlighted

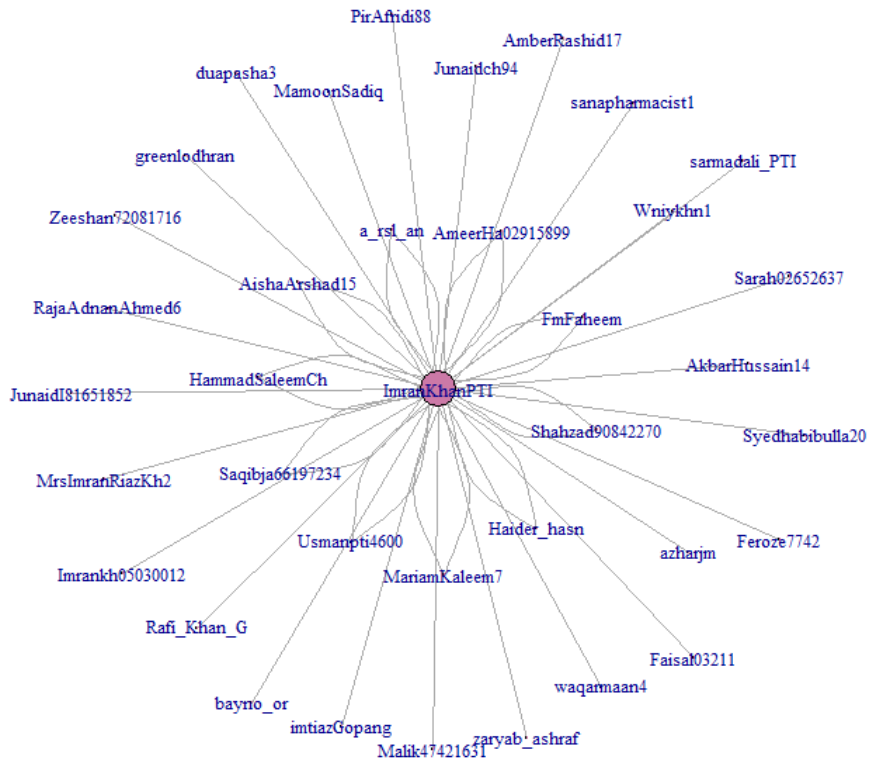


Figure 42. Plot of highlighted community

The community highlighted in this plot (Figure 42) is a Pakistan former prime minister call on his 17 million Twitter followers. The quoted tweet is the first of a thread that concludes in a video.

“Today is Black Day in Pak's history when Imported govt of crooks amended NAB law comes in ending accountability. Entire economy & pol system of Pak was derailed thru US-backed regime change conspiracy simply to give this cabal of crooks another NRO. PMLN's Dastgir confirmed this.” [ImranKhanPTI] (20th june, 2022) Twitter, <https://twitter.com/ImranKhanPTI/status/1538797155460206592>

We can relate this thread to access wars and media repercussions of public officials once they are out of office. Pakistan’s current multilateral geopolitical strategies and specially diplomatic relationships with the United States as well as its allies arise

different narratives surrounding this conflict of interests. Portrayal of this is determined by the communities that consume this type of news, especially from Pakistan. The counter narratives from US backed news agencies collide with this perspective in a direct manner, usually on the strategy of not highlighting this discourse in any way. This means that only this networks of affected by conspiracy and conspiracy narratives engage in this conversation. Ultimately concluding in conflicting polarized bubbled communities.

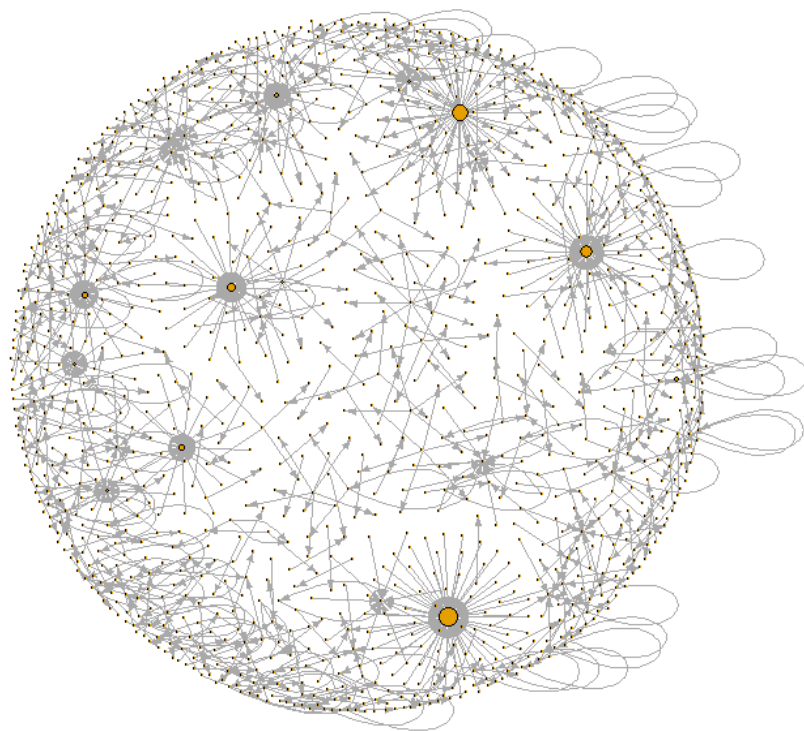


Figure 43. Plot from twitter network on “history” with 800 results. 21st june 2022

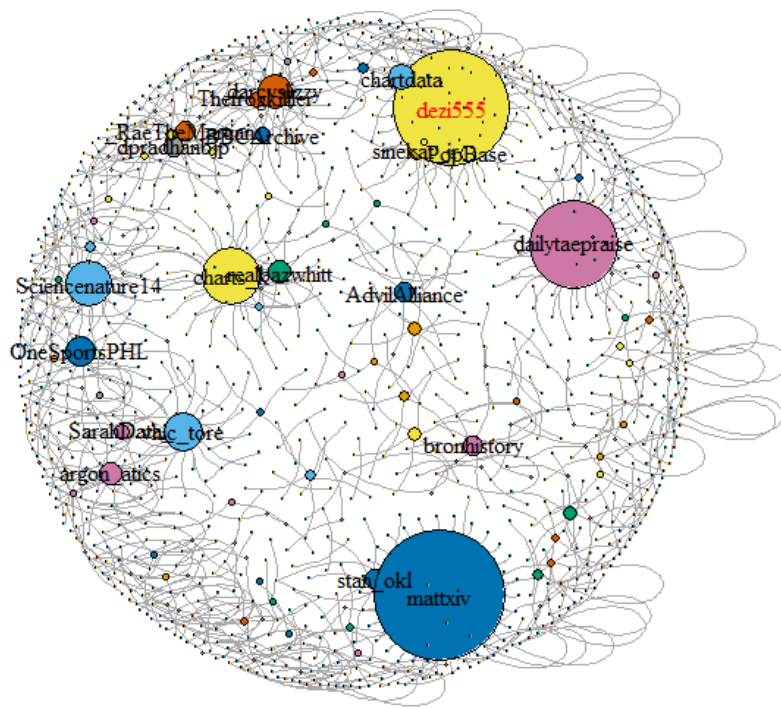


Figure 44. Plot from twitter "history" search with important nodes highlighted

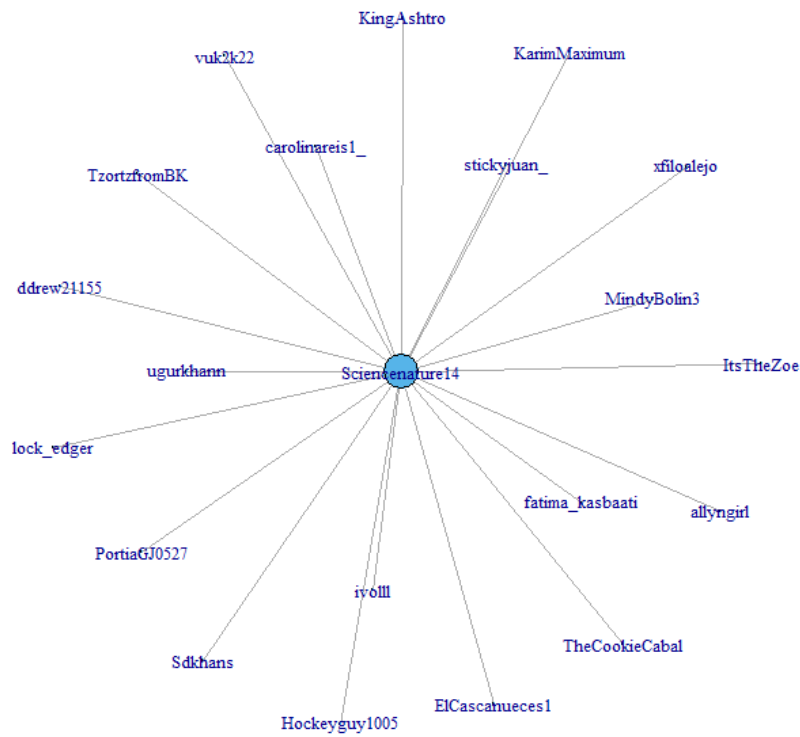


Figure 45. Plot of highlighted community

The community highlighted in this plot (Figure 45) is related to an account described as “amazing posts related to science and nature” hinting at what community it relates to. The quoted tweet has almost 200 thousand likes in less than 24 hours:

“Perhaps the most-terrifying space photograph to date. Astronaut Bruce McCandless II floats completely untethered, away from the safety of the space shuttle, with nothing but his Manned Maneuvering Unit keeping him alive. The first person in history to do so. Credit: NASA “ [@Sciencenature14] (21st june, 2022) Twitter,
<https://twitter.com/Sciencenature14/status/1538720322869936>
[129](#)

Of course the photo included in the tweet is the main part. The tweet does not relate to current events but a reminder of a very significant event for humanity’s development on space exploration and technological achievements. Even though it is not considered news, the tweet follows the headline structure and is aimed at being shared among different social media sites and other forums in order to further reach as many users as possible in the interweb of networks in which the scientific community resides as a liquid cluster. Although the highlighted node (Figure 45) is not a confirmed human user it represents the science and technology community in the network.

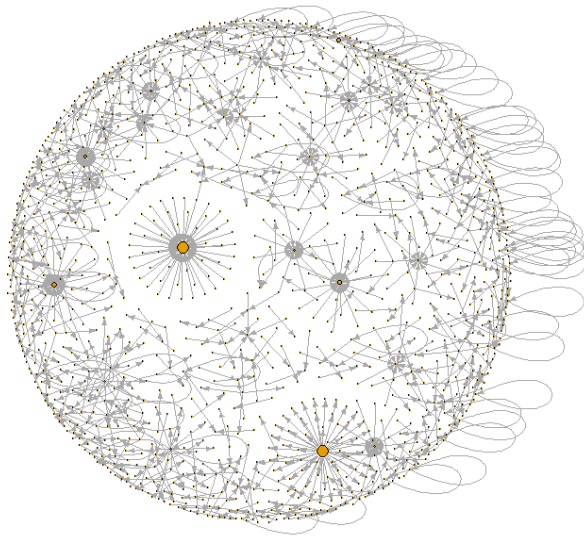


Figure 46. Plot from twitter network on “history” with 800 results. 22nd june 2022

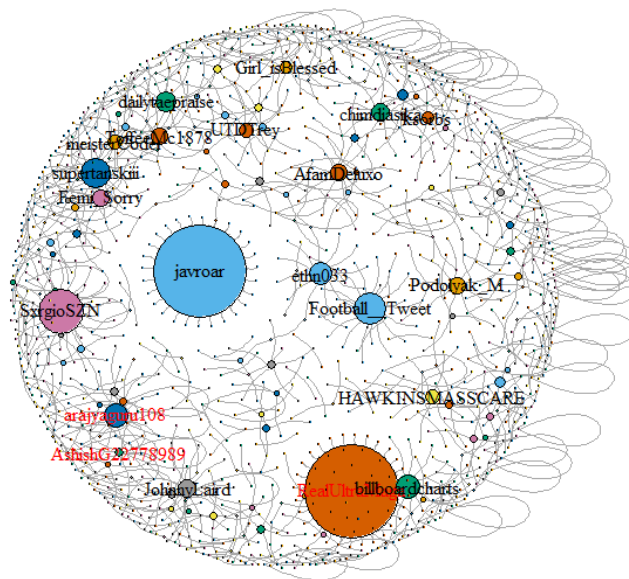


Figure 47. Plot from twitter “history” search with important nodes highlighted

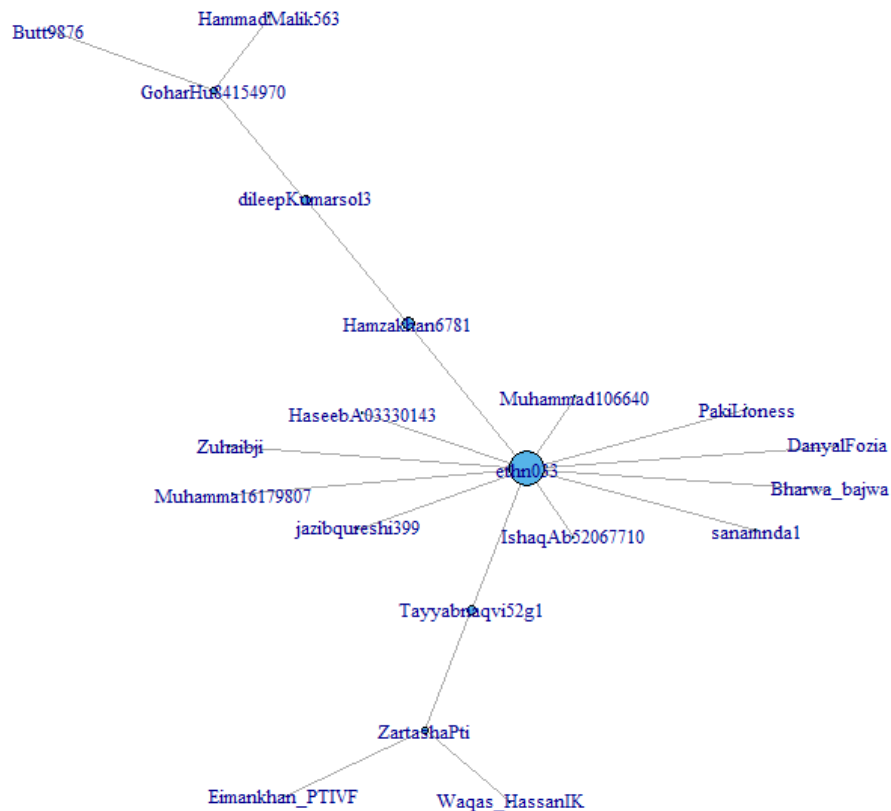


Figure 48. Plot of highlighted community

The community highlighted in this case (Figure 47) originates from user @ethnophobia33. An account with restricted access from followers. From the plot (Figure 48) it can be observed that it is a islamic oriented community. When looking into other, not restricted, nodes. These are identified as Pakistani accounts, and again diving into political conversations and following current events happening in Pakistan. On the previous plot of the different identified and important communities, Rstudio identified other new ones like a football related community and other more isolated communities. This community was selected because it's structure allows for further and rapid growth. The dissemination actors that propagate the restricted accounts' tweet generate a rapid, although not very popular, engagement and diffusion. Centrality and network measures indicate that this community is bound to be the better performing on this network extraction.

The fact that the network (Figure 46) has many isolated communities shows how isolated some communities are from the rest of the network. These we call bubbled communities.

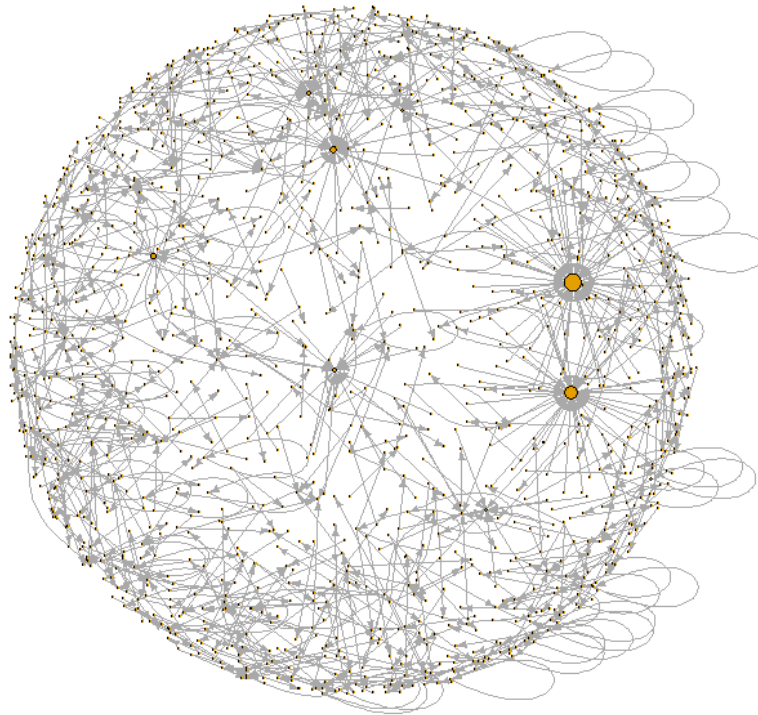


Figure 49. Plot from twitter network on “history” with 800 results. 23rd june 2022

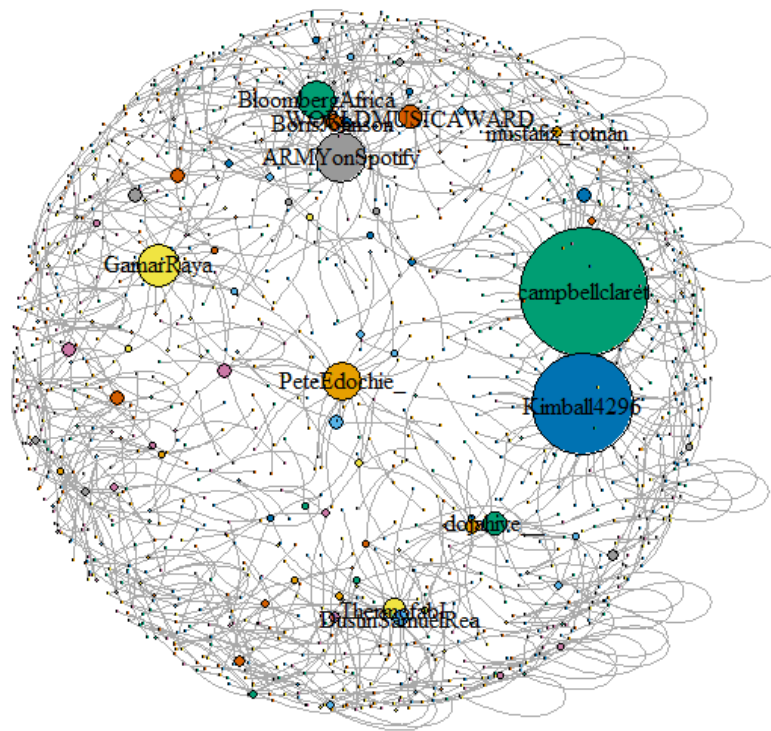


Figure 50. Plot from twitter “history” search with important nodes highlighted

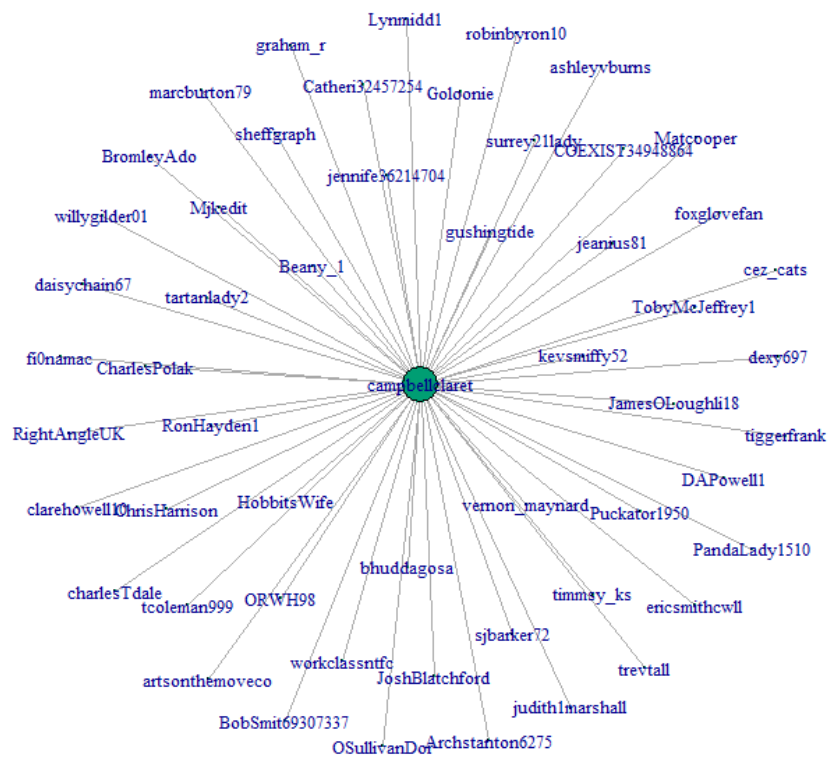


Figure 51. Plot of highlighted community

This community (Figure 51) was detected surrounding local elections in the United Kingdom. The dissemination profile found is Alastair Campbell (@campbellclaret) with over eight hundred thousand followers. The quoted tweet says:

“If you live in Wakefield please vote LABOUR. If you live in Tiverton please VOTE Lib Dem. This is the worst PM and worst government in history and any time any of us have a chance to weaken them and hasten their end we should seize it.”

[@campbellclaret] (23rd June 2022) Twitter,

<https://twitter.com/campbellclaret/status/15398467105617428>

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As seen in the plot (Figure 51), this community is directed and can be seen as broadcasting a call-to-action. The community is detected as isolated but still connected with the political community in the UK and so less isolated during electoral processes. In this case, the community does not extend further than this tweet and, although has a good engagement, with more than four thousand retweets. No other key user in the community follows-up on this call-to-action.

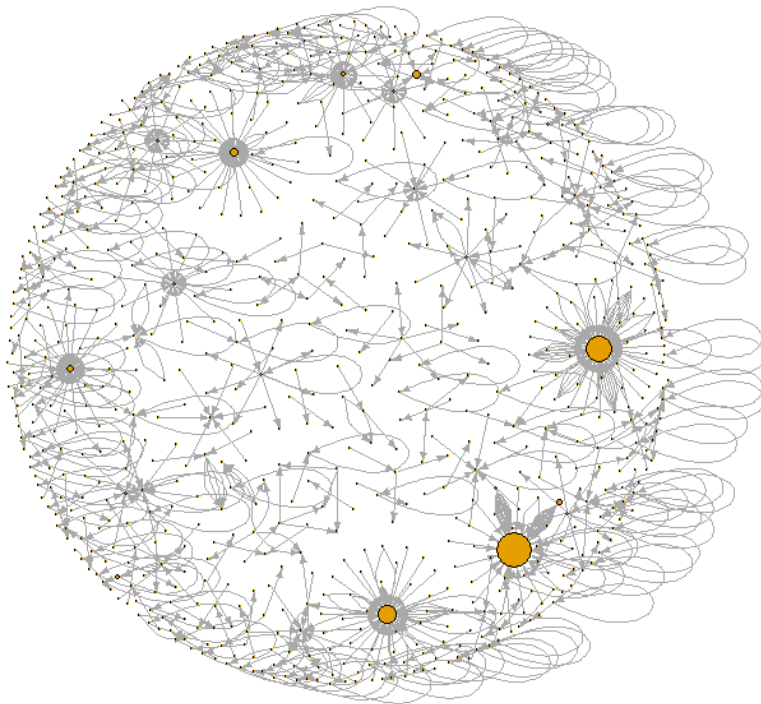


Figure 52. Plot from twitter network on “history” with 800 results. 27th june 2022

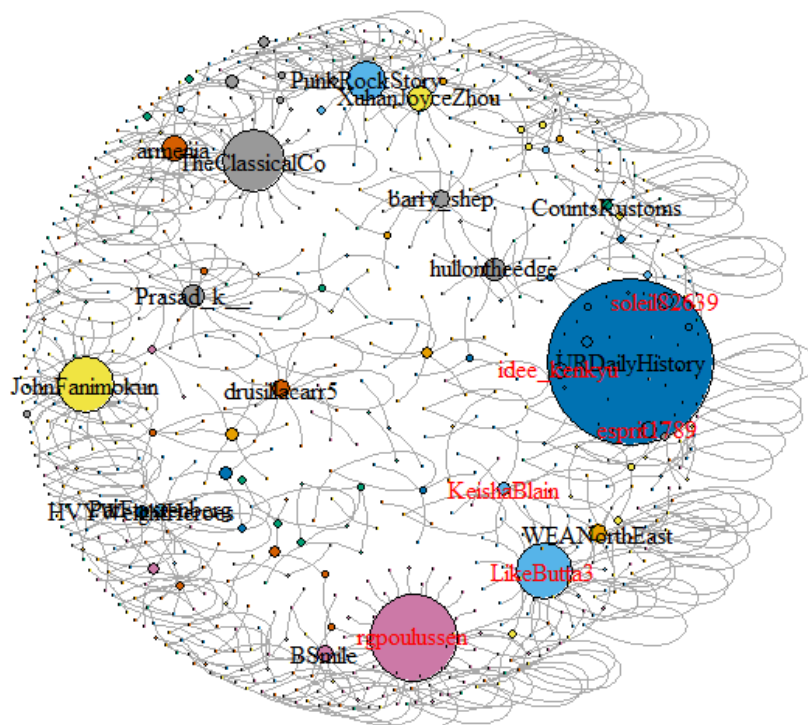


Figure 53. Plot from twitter “history” search with important nodes highlighted

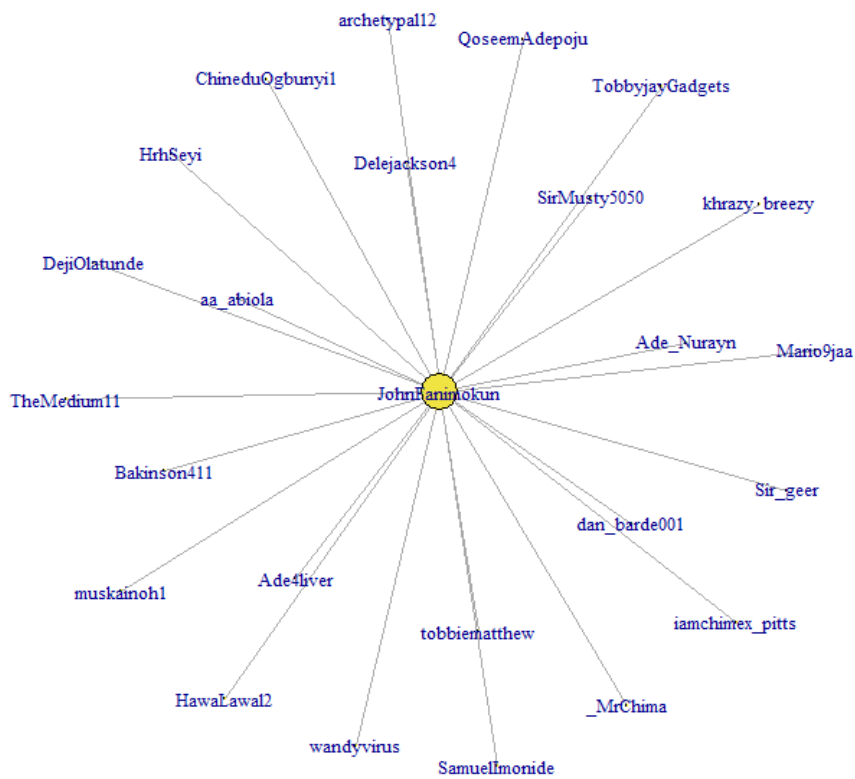


Figure 54. Plot of highlighted community

The highlighted community (Figure 54) is one of the most isolated in this search even though its centrality measures indicate a better position within the network. In this case, the content extracted from the search is the following:

“APC Presidential Primary Results:

Asiwaju Bola Tinubu - 1,271 votes (Been out of govt since 2007)

Mr Rotimi Amaechi - 316 votes (Minister)

Yemi Osinbajo - 235 votes (Vice President)

Dr Ahmad Lawal – 152 votes (Senate President)”

[@JohnFanimokun]

(27th of June 2022) Twitter,

<https://twitter.com/JohnFanimokun/status/154130708394511564>

The community detected is related to Nigerian elections for the All Progressive Congress (APC) happening the day of the research. The user publishing the content is @JohnFanimokun, an independent researcher and reporter. The value of this community stems from the immediacy of the content and its importance surrounding the events it's giving representation on the public sphere. Since no news organization echoed this independent account. And although Nigeria is a very populated country, this community and the disseminator of information is not representative of the true size of this community. Similar to this some network measures indicate that this community is likely to enlarge in the coming hours with more people engaging on the implications of the results of this election. All in all this information is based on the user's dissemination of data (voting results) and is related to no other community in this search. Clearly, the importance of the information relates to the Nigerian communities and political communities within this country and also the neighboring countries. At the same time, the international political community engages in this conversation.

CONCLUSIONS

In this thesis the main focus is to prove how personalized timelines have created a hyper fragmented network. The current state of screen consumed media is gated and clustered in communities that manage the dissemination of information. As news becomes relevant to the public that is mostly exclusively for the broadcaster. Looped in a filtered bubble of comfort and accommodated to one's perspective. At the same time, individual disseminators have a more relevant role in the dissemination of information through the network. When looking into how networks expand and communities are created it has been seen that many structures can be simulated into viral transmission of content. Although only a small number of companies have a relevant role in the current communication sphere. The interweb of networks is luckily not yet monopolized. It can be said that it is highly concentrated. But the fact that the different algorithms are connected among themselves, added to the fact that the extraction of data from users is intensive. Allows for a landscape where the roles of the companies that have control over the access to this ecosystem go beyond any modern sovereignty. Gatekeeping and actively looking for foreign perspectives will become a vital activity for current and future social network users and providers.

It can be said that mobilization through social media is futile. No movement so far has achieved real change further than symbolic acts and calendarized events of protest. Furthermore, none have transcended the platform to avoid being merchandised. Communities are gated in virtual clusters. Daily agenda is almost predictable unless some viral episode takes place. For any narrative to be relevant it needs to be successful in every network independently. Which is only accessible to entertainment formats or calendarized actions. The non-human user activity is constantly permanent while bot accounts improve selected nodes' performances. Which may distort the representation of some communities and shape cultural identities as well as enlarge bubbles.

Communities have many forms and are not restricted to a network. Although many platforms are designed to accommodate some communities more easily than others. For example, since Twitter emulates a forum, all political activities take place in that network. Not exclusively, but almost mandatorily. The TikTok format of short video has shown to be an effective way of platformization of culture snippets and e-commerce in some spaces. Both of these formats allow for personalized nodes to shape the public's ability to form communities. Furthermore, the algorithms work to prioritize screen time over effective and meaningful communication. The shift from functional directed networks to personalized bubbles is shaping the current social landscape globally. Some sovereign territories have taken action and empower this tool to maintain a healthy social platform. While others are leaving the responsibility to the platforms to have a healthy environment.

Access restrictions to networked platforms are changing as conflicts like the Russian invasion of Ukraine or the Trump intent of coupling the government. Propaganda works well on the networked public and this already affects war, affects politics and affects society. Non-human user nodes are constantly bombarding key communities related to affiliated publics and polarized bubbles to shape these same networks and thus have a specific set of topics that represent the overall conversation. Information wars are definitely being fought in this platforms and infrastructuralization of social media platforms to shape healthier communities and build more stable communities.

REFERENCES

- About Black History Month.* (n.d.). Black History Month. Retrieved July 16, 2022, from <https://www.blackhistorymonth.gov/about/>
- Adorno, T. W., & Horkheimer, M. (2002). *The culture industry.*
- Amir Haeri, M., & University of Twente. (2021). *Social Network Analysis & Community Detection.*
- https://canvas.utwente.nl/courses/8607/pages/community-detection?module_item_id=252299
- Bauman, Z. (2003). *Liquid Love: On the Frailty of Human Bonds.* Wiley.
- Baym, N. K., & Burgess, J. (2020). *Twitter: A Biography.* NYU Press.
- Berger, P. L., & Luckmann, T. (1967). *The social construction of reality : a treatise in the sociology of knowledge.* Allen Lane.
- Bratton, B. H. (2016). *The Stack: On Software and Sovereignty.* MIT Press.
- Burrell, J., & Fourcade, M. (2021). The Society of Algorithms. 214-238.
- Cruikshank, J. (2021, October 28). 'It means everything': Duke professor receives \$1 million dollar artificial intelligence award. *Duke Chronicle.*
- <https://www.dukechronicle.com/article/2021/10/cynthia-rudin-duke-university-ai-award-artificial-intelligence>
- Gillespie, T. (2008). *Politics of Platforms.* Massachusetts Institute of Technology. Retrieved June 22, 2022, from <http://web.mit.edu/comm-forum/legacy/mit6/papers/Gillespie.pdf>
- Heller, A. (1984). *Everyday Life.* Routledge. 9781317403333
- Ilet, P. (2022, June 1st). *This is STILL on the @BBCNews website despite a 2nd round of major edits following complaints.* Twitter. Retrieved June 1, 2022, from https://twitter.com/Paul_Ilett/status/1531895595782311937
- Jin, D. Y. (2015). *Digital Platforms, Imperialism and Political Culture.* Taylor & Francis Group.
- Kenton, J. M., & Blummer, B. (2014). *Improving Student Information Search: A Metacognitive Approach.* Elsevier Science.

- Kundera, M. (1991). *Immortality*. Faber.
- Lovink, G. (2019). *Sad by Design: On Platform Nihilism*. Pluto Press.
- Lovink, G. (2020). Principles of Stacktivism. *TripleC*, 18(2).
<https://doi.org/10.31269/triplec.v18i2.1231>
- McLuhan, M. (1964). *Understanding Media: The Extensions of Man*.
- Nieborg, D. B., & Poell, T. (2018). The platformization of cultural production: Theorizing the contingent cultural commodity. *SAGE*, Vol. 20(11) 4275–4292.
- O'Reilly, T. (n.d.). *What Is Web 2.0*. O'Reilly Media. Retrieved March 10, 2022, from <https://www.oreilly.com/pub/a/web2/archive/what-is-web-20.html?page=4>
- Pariser, E. (2012). *The Filter Bubble: What The Internet Is Hiding From You*. Penguin Books Limited.
- Plantin, J.-C., Lagoze, C., Edwards, P., & et. al. (n.d.). Infrastructure studies meet platform studies in the age of Google and Facebook. *New Media & Society*, 20(1), 293–310.
- TikTok statistics & Facts*. (2022, May). Statista. Retrieved June 28, 2022, from <https://www-statista-com.are.uab.cat/statistics/910633/china-monthly-active-users-across-leading-short-video-apps/>
- Twitter. (n.d.). *About your Home timeline on Twitter*. Twitter Help Center. Retrieved June 21, 2022, from <https://help.twitter.com/en/using-twitter/twitter-timeline>
- Twitter. (2022). *Understanding when content is withheld based on country*. Twitter Help Center. Retrieved April 21, 2022, from <https://help.twitter.com/en/rules-and-policies/tweet-withheld-by-country>
- Van Dijck, J. (2013). *The Culture of Connectivity. A Critical History of Social Media*. Oxford University Press.
- Van Dijck, J., Poell, T., & De waal, M. (2018). *The Platform Society*. Oxford University Press.
- Warner, M. (2012). *Público, públicos, contrapúblicos* (V. Schussheim, Trans.). Fondo De Cultura Económica.
- Zhang, N. (2019). *Tik Tok's beauty and value*. Retrieved april 7, 2022, from <https://mp.weixin.qq.com/s/t0B08Fu2cGygEh9Hn8SwXg>

Zhang, Z. (2020, July 21). Infrastructuralization of Tik Tok: transformation, power relationships, and platformization of video entertainment in China. *SAGEPUB*, 4-18.