

Social Network Analysis #ChatGPT on Social Media

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ABSTRACT: The increasingly rapid development of technology causes changes in media usage patterns. Media convergence is something that is inevitable, speed and content differentiation are one of the reasons for media convergence. The emergence of ChatGPT provides its own assessment for social media users. The discussion about Chat GPT is one of the themes discussed on social media, namely Twitter. The aim of this research is to assess the social media content of Twitter #ChatGPT covered by the news. This research uses the concept of User Generated Content (UGC), as part of media convergence theory. The UGC concept is seen in the form of content created by ChatGPT users about various information, in text form. This research uses a qualitative type with the Social Network Analysis (SNA) method as a useful tool for mapping the impact of information received by the public as ChatGPT users in Indonesia. The research results show that through the SNA method, descriptions of the relationship structure developed by Twitter users in Indonesia regarding CHatGPT can be seen. Users started discussing the emergence of ChatGPT as a result of feedback. The fame of the players involved is largely shaped by these dialogues in the form of text that ChatGPT users exchange.

KEYWORDS: ChatGPT, Social Media, Social Network Analysis, User Generated Content (UGC)

INTRODUCTION

Media and internet technology are currently developing rapidly. The number of people using the Internet continues to increase. Another aspect that supports technological progress is through cell phones. Social media has 4.62 billion users worldwide, compared to 8.2 billion mobile device users in 2022 (*We Are Social*, n.d.). Today's social media can be used for various purposes, from sharing content such as Facebook, Twitter, and Snapchat to two-way conversations such as Line, WhatsApp, Messenger, and WeChat, or even for commercial purposes such as LinkedIn and Google Plus. We will not be cut off from social media, which can connect people from various countries, wherever we are or at whatever time. Technology 4.0 influences the development of the robotics industry, which will ultimately produce Artificial Intelligence (AI) or artificial intelligence in all areas of human activity, including employment, education, and commerce. As society develops, the function of AI also changes. The use of AI is very dynamic, used for various needs such as script writing, program design, drawing conclusions, and even various other needs that require an answer to a problem that the user wants. Based on the research results of Pakpahan (2021), the sophistication of AI is a new breakthrough for humans in various jobs carried out not only from the industrial aspect, in the educational, work aspects and includes other fields. AI is an effort made to help and provide solutions and improve the abilities of someone who uses it (Pabubung, 2023). It is hoped that it can create a harmonious life for humans and machines in the future (Liu, et.all, 2018). In this way, AI will provide benefits and support to human life.

Chat GPT, as one of the Open AI products launched at the end of 2022, has been widely used to solve various user needs. A variety of information can be found using Chat GPT. Even Chat GPT can be used in automating various customer services, content creation, chatbots, sentiment analysis and data collection. (Deng & Lin, 2022); (Biswas, 2023). It cannot be denied that the presence of Chat GPT has changed human life in interaction and communication. It can even provide suggestions and recommendations to users according to user preferences. However, on the other hand, caution is needed in using GPT Chat, because it allows disinformation to occur. Specific matters must be investigated again and even re-confirmation of the correctness of the information obtained via GPT Chat is required.

Advances in technology and communication have an impact on creating a faster flow of information, which in this case has an impact on society as a topic of development of the times (Faidlatul Habibah & Irwansyah, 2021). All societies, including Indonesia, are now increasingly active in utilizing advances in communication and information technology, thus ushering in the era of the information society. The public must understand existing advances and immediately test them, especially in this day and age, in order to stay up to date with the latest technology. Based on the Katadata survey results, it shows that internet user penetration is 79.5%. This is one of the drivers of AI development in Indonesia. Apart from that, 24.6% of companies in Indonesia also use AI. However, on the other hand, the level of readiness of Indonesian society in utilizing AI is still low. According to the 2019

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Government AI Readiness Index research from Oxford Insights and the International Development Research Center, Indonesia ranks sixth in ASEAN for the use of AI in government. In 2024 Indonesia will be ranked 57th overall out of 194 countries, with a score of 5,420 (Katadata, n.d.). Meanwhile, ChatGPT users in Indonesia are 52%, almost half of whom use the platform. (Annur, 2023). This shows that the GPT Chat platform is most interesting to use as a search engine for various information. GPT Chat is able to provide answers to various questions submitted by users. The more often users enter information, the smarter the platform becomes.

Finding feedback in a conversation is also possible with the GPT Chat platform. Not only in the field of customer service, ChatGPT can also be used on Twitter social media. Various conversations in text form on Twitter can show the direction of using positive or negative language. The research results of Akbar & Sugiharto (2023) show that the response of Twitter users in Indonesia shows positive feedback on Chat GPT.

SOCIAL MEDIA

Social networks are very important in today's culture. Hundreds of millions of people use social media, and the number continues to grow. Social media has developed into a valuable and beneficial tool for people from all walks of life, including education, politics, and business. Social networks encourage people to get to know and communicate with each other, as well as share and connect with people from other regions and countries. The power of social networks is associated with User Generated Content (UGC), which is content shared on social networks that is created by users. This is very different from the mainstream media which is controlled by an editor. Therefore, social media can be considered as online (supporting) media that strengthens relationships between users as well as social relationships. Social Media is internet-based media, where users can easily participate, share and create messages or content in the visual world (Sari & Basit, 2020). Another view says that social media is online media that helps people interact with each other and uses web-based technology that turns messages into interactive discussions (Rafiq, 2020).

Basically, with social media, various two-way activities can be carried out in various forms of exchange, cooperation and mutual understanding in the form of text, images and audio visuals. Sharing, collaborating and connecting are three things that lead to social media (Noor, 2011). Most social media sites belong to the mass entertainment industry indirectly because the source of their information is obtained from news and other features (Sampurno et al., 2020). Social media acts as an information medium that can reach the widest public and is easy and practical to use (Rizki, 2019).

SOCIAL NETWORK ANALYSIS (SNA)

The development of social networking is currently increasingly rapid. In a social networking community, the community functions as a convenient place for group members to exchange information. As a result, whether information is conveyed explicitly or tacitly, groups on social networks are information minefields. Mapping and quantifying interaction flows is complemented by social network analysis, which is defined as examining interaction patterns (Hadiana & Witanti, 2017).

In network theory, social relationships are represented by nodes and ties (also known as edges, links, or connections). Individual actors in a network are represented by nodes, while relationships between actors are represented by links. The resulting graph-based structures are often very complex. There are many types of node associations. Social networks operate at multiple levels, from the family level to the state level, according to research in several academic sectors, and play a critical role in determining how problems are solved, organizations are run, and how effective individuals are in their efforts to achieve your goals.

SNA provides a statistical technique for examining relational data that focuses not only on the characteristic qualities of individual agents, but also on the interpretation of agents' relationship patterns and the structural analysis of these models. Because graphs are the most basic representation of social networks, they are depicted graphically (Nooy, 2018).

According to Social Network Analysis (SNA), node relationships are very important. The goal of SNA is to discover how agents/nodes are connected together and how these connections are formed. Who is the agent connected to, how strong is the connection, how is the connection, is it one-way or two-way, how is the connection activated, does the connection occur to other applications via what methods, such as who has access to most links, who has access to some the size of the links, who has access to most of the links, who has access to most of the links, who is isolated in the network, what is the distance and reach (length) between each node, where are the bottlenecks, who are the key participants, and so on .

Individual foci can be classified into three types: (1) Degree centrality: the number of connections a node has. (2) Closeness centrality: the average distance between a node and other network nodes. This metric shows how close a node is to other nodes. The closer a person is to another person, the greater the connection. (3) Betweenness centrality: This metric identifies the role of nodes as barriers. The wider the intersection, the more roads must pass through it (i.e. no other roads).

Network analysis studies outline actor-based linkage mapping using sociograms, allowing us to observe and understand the structure of complex social networks. It is hoped that this research will reveal how effective the use of AI is in the information society. Individuals, groups and organizations are connected in communication networks through social activities such as responding to an issue, sharing knowledge and forming alliances (Luthfie, 2018).

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The communication network will create a map showing the location of each actor connected to social media. The opinion leader position is very important in a system's communication network. Determine the main actors and the importance of each actor in influencing public opinion. Opinion leaders are actors who play a major role in forming and developing communication network groups. Opinion leaders have an important role in designing and managing sources of information and innovation both internally and externally (Gunawan et al., 2022). Networks are something that we can find in every aspect of life, from physical networks such as transportation to non-physical networks such as social networks. The study of networks is a study that focuses on graph theory which explains how a network can be formed by explaining its components (Saputra et al., 2023). The network that this research wants to look at is the public conversation network related to #ChatGPT on Twitter.

METHOD RESEARCH

This research uses a network analysis method with a qualitative approach to the research location of Indonesia. Data collection was carried out by collecting tweets (big data) with the hashtag #ChatGPT to provide as clear a description or picture as possible to the audience of the object under study regarding the problem. Descriptive analysis in network analysis is carried out to see and understand the structure of complex social relationships. (Neuman, 2014). So it can explain the mapping of relationships created by actors using social graphs. This research is expected to reveal the use of AI ChatGPT on the Twitter social network in the information era. The data analysis technique used consists of three interrelated sub-processes: data reduction, presentation, and drawing conclusions/verification, as stated by Miles & Huberman in (Denzin, NK & Liincoln, 2009).

According to Denzin, NK & Liincoln (2009), the first stage is data reduction which refers to the process of filtering, simplifying, abstracting and transforming raw data obtained from written notes in the field. This process takes place continuously throughout the research. In fact, it starts from the beginning of the research, determining the conceptual framework, formulating the problem and collecting the data that will be used. When data is collected, data reduction occurs in the phases of summarizing, coding, exploring themes, grouping, dividing and recording. This data reduction process continues until the final reporting stage of the research. So, data reduction is a part of analysis that functions to explain, group, direct, eliminate data that is not or less relevant and coordinate data in such a way that final conclusions can be drawn and verified.

The second stage is data presentation. Data presentation is a process of collecting information that is structured in such a way as to enable conclusions to be drawn and action taken. They argue that good presentation is a key component in valid qualitative analysis. These presentations can take the form of various types of matrices, graphs, networks, and charts, all of which are designed to combine information in a cohesive, easy-to-understand format. Thus, an analyst can understand what is happening and decide whether the correct conclusions can be drawn or whether further analysis is needed, as suggested by the presentation.

The final stage is drawing conclusions, which is part of the entire analysis process. These conclusions were also verified during the research. Verification can take the form of brief reflection by the researcher while writing, review of field notes, or in-depth discussion with colleagues to reach mutual agreement. Verification can also involve major efforts to validate findings with other data. In short, the meanings that emerge from data must be tested for their truth, consistency, and suitability in order to be valid. Final conclusions do not only occur during data collection, but need to be verified to ensure accuracy and reliability. The data analysis process can be seen schematically in Miles and Huberman's interactive data analysis model below:

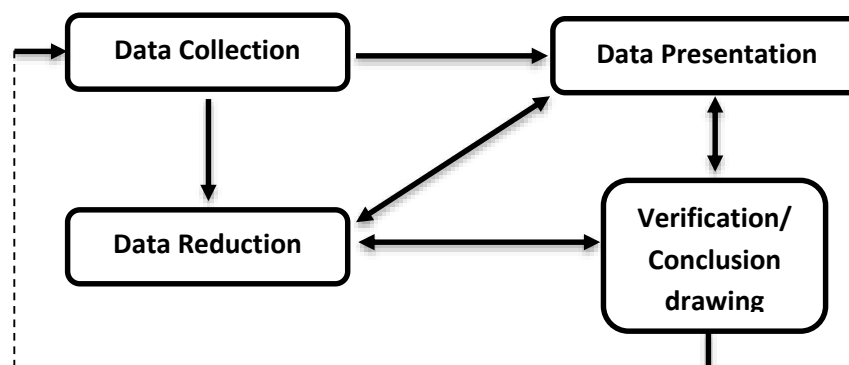


Figure 1. Miles and Huberman's interactive data analysis model

RESULT AND DISCUSSION OF THE RESEARCH

This research uses Twitter social network data as a dataset. Several accounts, tweets, retweets, mentions, replies, and dates were collected using the hashtag #ChatGPT. There are 6394 data points from news that mention the hashtag, and 532 data points from media that explicitly use the hashtag. Every account that updates its status with this hashtag becomes a node, and every tweet, retweet, mention, and reply becomes a relation node. This discussion forms a visual like Figure 1 which is focused in nature. This

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was formed because the focus of the conversation was on a certain theme, namely the benefits of ChatGPT as AI technology for users. Based on the results of data collection, it shows that ChatGPT has many benefits for users. Even though there are differences of opinion in the conversation, the benefits of ChatGPT have become one of the most widely discussed chats. Users assess that ChatGPT provides various opportunities to fulfill users' information needs. Even with its speed, it is able to provide solutions to problems asked via this chatbot. In the era of digital technology, speed has become the most important element in exchanging information. The use of AI as a tool is inevitable, people will look for AI that they think is most easily accessible and provides benefits in various activities that require speed.

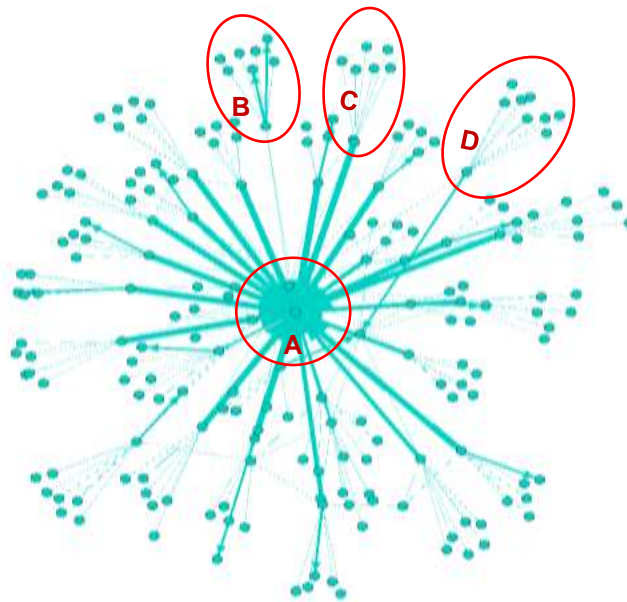


Figure 2. Visual Discussion #ChatGPT

Several discussion points visible in the image show conversations on Twitter by A (a financial influencer and motivator), expressing his opinion regarding the emergence of ChatGPT in human life. The presence of ChatGPT encourages creativity and can be used as a tool for brainstorming to support daily activities. The tweets that were made were able to penetrate the conversation by 312 tweets, while there were 23 retweets and 21 replies. On the other hand, B (an entertainment account that discusses women's images) stated that ChatGPT helps someone practice foreign languages. Various languages can be accessed via ChatGPT, although it does not yet reach all languages in the world. However, it meets the needs of most people who have difficulty understanding certain languages. Meanwhile D (Twitter user) stated that ChatGPT could be used to create interesting captions in content creation. This makes it easier for users who sometimes find it difficult to create eye-catching captions to attract the attention of readers and viewers. On the other hand, C (Twitter user) commented that not everyone is capable and skilled at using ChatGPT.

Various comments occurred in discussions about ChatGPT, this shows that Twitter users are also enthusiastic about discussing the presence of ChatGPT as a general conversation. Even though there are differences of opinion, overall ChatGPT plays a role in human life because it makes it easier for people to carry out activities related to daily life, even for certain people it has a positive impact on the work or profession they are involved in. Using ChatGPT allows for live interaction between users, thereby providing a new experience for users. Communication that occurs via ChatGPT is like when someone asks questions and answers in the real world. Answers are obtained immediately without requiring a long time. Although there are still problems because not everyone is able to adapt to the platform. Therefore, digital literacy is needed, especially regarding the use of ChatGPT for new users, so that they are familiar with the platform and can use it properly and correctly according to their needs. Apart from the formation of visual conversations, conversations on #ChatGPT continue to increase. There are differences of opinion regarding the pros and cons regarding this AI technology. For those who are pro, GPT chat is considered to provide a solution in terms of creativity, while for those who are against, they think that GPT Chat is vulnerable to misuse, and can sometimes even cause disinformation. Therefore, it would be better for users to check again with data and facts.

The discussion around ChatGPT on Twitter has increased sharply, and has even become the main topic of discussion, as can be seen in Figure 3 below:

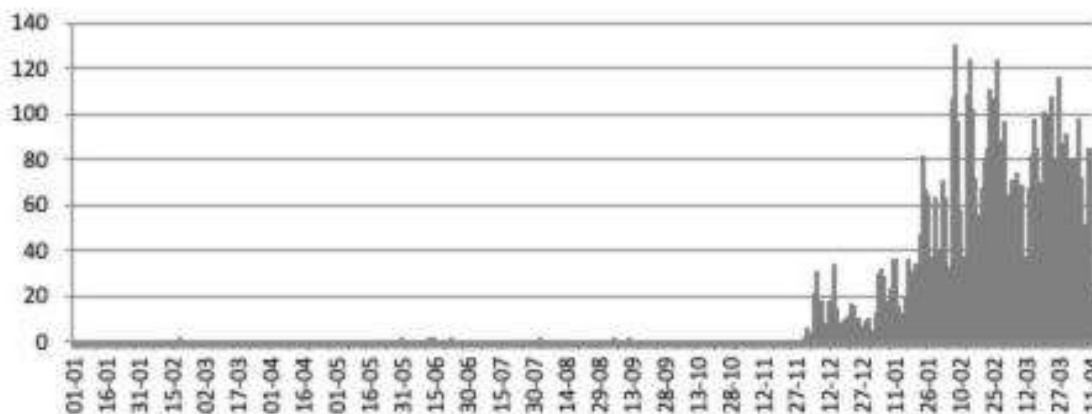


Figure 3. ChatGPT discussion graph on Twitter Media

Even though the graph shows the dynamics of ChatGPT conversations, the number of tweets experienced the highest increase at almost 140 conversations. It is understandable that the emergence of ChatGPT as a new AI platform is the hope of many people in the future. Some think that this chatbot is really needed in handling work that requires quick completion. Although some suggest checking the correctness of the answers given via ChapGPT. Even though the decline is not too sharp, this is possible if there are national issues that raise pros and cons. Some people even think that the presence of ChatGPT will replace human functions, in addition to other concerns that ChatGPT will actually present new problems. The discussion is becoming increasingly lively regarding the emergence of this chatbot. As one of the advantages of this chatbot, it provides natural answers like humans, so that users feel like they are not interacting with a machine.

If you look deeper, there are ten top media in Indonesia that discuss ChatGPT the most at the moment. As seen in Figure 4, it shows that the top 5 (five) positions from these media are Financial Assets with 432 tweets, Infokomputer.Com with 230 tweets, Iglonew.Com with 177 tweets and Kompas and Voi with 174 tweets. This shows that the media is also highlighting the use of AI among the public by spreading news and information related to the hashtag, via retweets, mentions and replies.

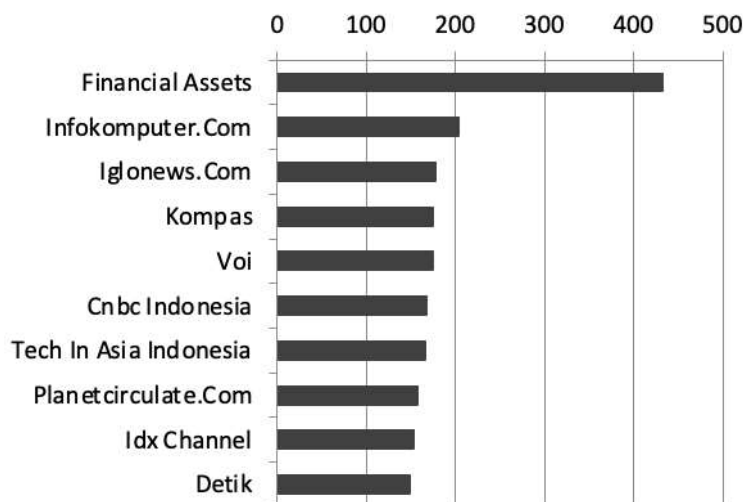


Figure 4. Chart of Top 10 ChatGPT Media Shares

Financial Assets occupies the top ranking in the use of ChatGPT, of course this cannot be separated from the policy of the media being used as financial media. Technological advances make it easier for ChatGPT users to manage financial assets, both personally and in corporate form. The presence of ChatGPT provides a new color in financial management, for example in the stock exchange or other matters related to financial matters. One of the attractions of ChatGPT is that it helps users solve financial problems. This advantage really helps people work quickly, so that the investment choices made can benefit users who want to invest in the future. The financial sector media discusses ChatGPT the most, because it encourages readers to learn about finance from ChatGPT. Through this chatbot, it can produce detailed financial reports and conclusions. This is very useful in making routine reports carried out by people in the financial sector. This report can be in the form of trends or observations that can be used as a basis for making financial policies. So that professionals in the financial sector will adapt more quickly to this AI-based technology.

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Meanwhile, Infokomputer.com is only in 2nd place in the ChatGPT discussion, this is understandable because people who have professions in the field of informatics usually discuss AI more directly, both in their respective work environments and in certain groups. Professionals in the informatics field will certainly get the first information on developments in AI-based technology, especially ChatGPT. Even students and observers in the field of informatics discuss ChatGPT in their circles, especially discussions between users. The benefits obtained will also be different from financial professions and other professions. Below Infokomputer.com media follows other media whose media policies are not much different from the media above. Meanwhile, the general media is represented by Kompas and Detik.

#CHATGPT SENTIMENT ANALYSIS

Apart from being a hot topic of discussion among the media, this discussion gave rise to various sentiments in society, such as those in Figure 5. The sentiments formed were positive sentiments of 30.1%, neutral sentiments of 37.9% and negative sentiments of 32.0%. This shows that the news was widely accepted by Indonesian society despite the pros and cons regarding this technology. Some people are of the view that advances in artificial intelligence (AI) make a positive contribution, namely helping to make work easier, both in brainstorming and helping to synthesize a theme from various articles. Some people view this as a big gap regarding the misuse of technology. Those who are against this technology think that AI will actually make users lulled and pampered. However, in general, the public agrees that advances in artificial intelligence provide benefits to their activities. Since the advent of AI, the entire world, including the media, has developed and used it to help them complete tasks.

The results of this sentiment also illustrate that a phenomenon will become a highlight if the news is related to the interests of society and becomes a hot topic of conversation in the media, especially on social media. This is in accordance with research results (Gunawan et al., 2022) which say that news about a phenomenon or problem conveyed via social media will get a quick response from the public, especially as the news is relevant to the interests of the community. User Generated Content (UGC) in the form of text shared via Twitter media gives users the flexibility to express different opinions. For example, a topic of conversation becomes popular as users talk about it. Based on these conversations, user sentiment on a topic can be known. In this study, conversations about ChatGPT are divided into 3 (three) sentiment categories, namely: neutral, negative, positive.

Based on the results of data analysis, it was found that there were various Top Issues regarding #ChatGPT reported by Indonesian media, including:

1. How to Use Paid GPT Chat, Login GPT Chat, and Get 4 Benefits.
2. Login to Chat GPT: How to Use Chat GPT or Chat GPT Openai in Indonesian.
3. Enter GPT Chat: Chat GPT Openai Bahasa Indonesia Online Free.

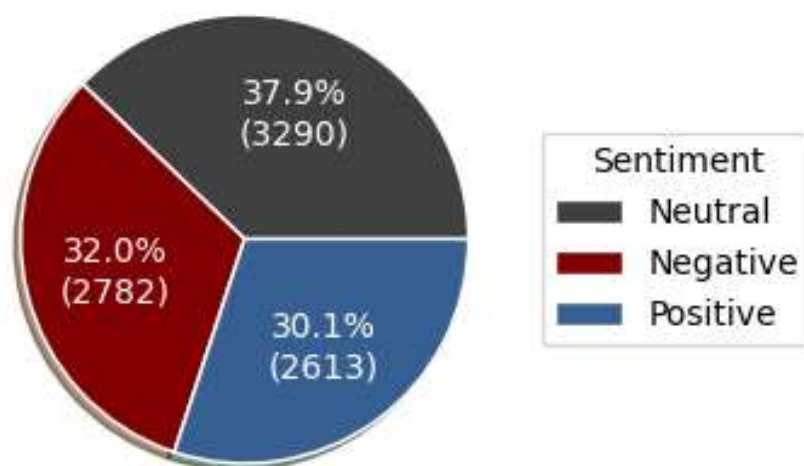


Figure 5. ChatGPT news sentiment

Furthermore, examples of Indonesian media news that have positive sentiment regarding #ChatGPT can be seen in Table 1. This table shows that the media reporting on AI developments is accepted in society, one of which is news from VOI, namely:

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Table 1. News that received a positive response

Title	OpenAI will provide rewards of up to IDR 298 million for anyone who finds vulnerabilities in ChatGPT	Author	
Media	Voi	Reporter	
Date	12-04-2023 12:43:45	Anything	Positive
Link	http://voi.id/teknologi/271927/openai-akan-beri-hadiah-hingga-rp298-jutaan-bagi-siapa-saja-yang-temukan-kerentanan-di-chatgpt		
Summary	OpenAI has just announced that it will pay security researchers up to 20,000 US dollars (Rp. 298 million) who can find vulnerabilities in its artificial intelligence (AI) systems. Through the OpenAI Bug Bounty Program, registered security researchers will be offered rewards based on the severity of the bugs they report. The prizes given start from 200 US dollars (Rp. 2.9 million) for the lowest level of severity and those who are extraordinary will get Rp. 298 million. According to the details, OpenAI invited researchers to review certain functionalities of ChatGPT and its framework for how enterprise systems communicate and share data with third-party applications.		

Apart from positive news, there is also negative news which can be seen in table 2, negative news which articulates that the information society rejects the development of AI because it can damage or harm many things including human resources (HR). This is understandable because some people are worried about AI-based technology, because they are worried that the information exchanged via ChatGPT may not necessarily be correct. However, it is hoped that the emergence of Open AI technology will have a better impact on society. All fields of work can make maximum use of various AI platforms so that it will make their work easier according to their respective fields.

Table 2 states that ChatGPT is the most popular chatbot, so because of its high popularity it can have an impact on the emergence of fake ChatGPT which encourages the rise of crime in the use of AI. So in this news the public is reminded to always be careful when using AI as a tool in human life. This attitude of caution must always be followed by not easily believing the answers given via ChatGPT. Users are advised to re-check the information obtained. As a human assistance machine, of course ChatGPT has to receive a lot of various data. Public unrest arises if the emergence of ChatGPT is followed by the emergence of crime, while people only know about using it but do not think about its negative impacts.

Table 2. News that received a negative response

Title	Be alert, there are lots of dangerous fake ChatGPTs starting	Author	Tina San
Media	Jawapos Gorontalo	Reporter	
Date	11-04-2023 22:10:23	Anything	Negative
Link	http://gorontalopost.jawapos.com/lifestyle-teknologi/11/04/2023/waspada-mulai-banyak-chatgpt-palsu-yang-berbahaya		
Summary	One of the most popular chatbots on the market today is ChatGPT, developed by OpenAI. However, its success has attracted malicious hackers who use ChatGPT banners to defraud unsuspecting internet users. In a recent incident, a malicious Chrome extension was discovered which was claimed to be the OpenAI chatbot extension ChatGPT. Overall, the incident involving fake ChatGPT extensions highlights a cybercriminal trend that will clearly continue to grow.		

Meanwhile, in the processed data, researchers also found sentiment with a neutral assessment, as seen in table 3, which means that ChatGPT news and discussions were only rated as equal. However, in this case there are concerns about misuse of data generated from this technology. Neutral assessment shows public acceptance of the emergence of ChatGPT because it will make people's work easier in jobs and professions. One of the technology companies, Alibaba, shows hope for a better future as a company that applies AI to support company goals. The company is an enabler not only for other companies but also for those who want to learn more about AI-based technology. This news tends to show competitors that with AI, Alibaba has become a leading company in the e-commerce sector which has synergy with AI.

Therefore, although on the one hand we are worried about the presence of future AI-based technology, the other hand shows acceptance of this technology. Technological progress is an inevitable condition in human life. As human needs increase, technology as a support becomes important. Thus, humans and technology must continue to coexist in realizing the prosperity of life. Technology must be used for the convenience and goodness of human life, not the other way around. Humans as creators of technology must realize that technology is a tool, so humans should not be influenced by the tools they create.

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Table 3 News that received a neutral response

Title	Jack Ma Back, Alibaba Shows off ChatGPT Competitor's AI that is Proficient in 2 Languages	Author	
Media	Detik.com	Reporter	
Date	11-04-2023 22:05:06	Anything	Neutral
Link	http://inet.detik.com/cyberlife/d-6667917/jack-ma-balik-alibaba-pamer-ai-pesaing-chatgpt-yang-jago-2-bahasa		
Summary	Alibaba continues to thrive after its founder Jack Ma returned to China. Chinese technology giant Alibaba is the first company to showcase an artificial intelligence (AI)-based chatbot. "We are at a moment of technological reckoning driven by generative AI and cloud computing, and businesses across the board are starting to implement intelligent transformation to stay ahead," said Alibaba CEO Daniel Zhang, as quoted by Cnet, Tuesday (11/4/ 2023). Tongyi Qianwen will initially be involved in DingTalk, Alibaba's office messaging application.(what does this mean)		

CONCLUSIONS

Based on the research results, it can be concluded that social network analysis via Twitter social media can see the response of the Indonesian people, especially news from media related to #ChatGP. Technological advances, especially artificial intelligence (AI), are currently a hot topic in Indonesian media. Degree Centrality (DC) or the centrality of the popularity of the actors involved can be calculated using Social Network Analysis (SNA). The use of SNA will help to see more deeply the involvement of various parties in accepting Open AI ChatGPT, both individuals and companies can be important actors in exchanging information. The interaction process that occurs on Twitter media provides freedom for users to exchange information. Twitter functions as a channel for sharing information and even as a source of information. Advances in AI-based technology, especially Chat GPT, have become a hot topic of conversation since it was released during Covid-19. As a form of assessment of people's attitudes towards technological developments, it can be seen based on #ChatGPT sentiment analysis regarding good, neutral or negative assessments.

Even though there are pros and cons in accepting the ChatGPT charbot, this new technology is considered to provide benefits to human life. However, when using it, you must always prioritize data and facts, so that it does not have a negative impact on users. Therefore, media literacy is required in the use of technology. Users must know the good and bad consequences of Open AI. User Generated Content (UGC) in the form of text discussed on social media Twitter provides an overview of audience acceptance of the emergence of Open AI, especially ChatGPT. UGC can be used as a campaign medium for various innovations.

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