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Original Article

Analyzing the role of Sentiment Analysis in Public Relations: Brand Monitoring and Crisis Management

Kareem Mohamed[1], Ümmü Altan Bayraktar[2]

[1]*Communication and Media Studies, Eastern Mediterranean University, Famagusta, North Cyprus Mersin 10 Turkey*
[2]*Faculty of Communication, Girne American University, Girne, North Cyprus Mersin 10 Turkey*

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Abstract *- AI is transforming how public relations professionals target demographics, measure effectiveness and insight into the media landscape and interact with influence groups to deliver their message more efficiently. Artificial intelligence has permeated nearly every industry worldwide. These new practices increase productivity by simplifying and automating time-consuming and repetitive tasks while offering more accurate insights into the digital universe of about 44 zettabytes of data. Sentiment analysis refers to the application in source materials of natural language processing, computational linguistics, and text analytics to identify and classify subjective opinions. Two comparative analyses have been done between the Arabic and Turkish situations through Covid-19 for crisis management. Moreover, for brand monitoring between Telsim and Turkcell companies using Brand24 as the sentiment analysis tool. A content analysis of two case studies illustrates how agencies and companies use AI-powered tools like sentiment analysis for public relations. The analysis does not intend to offer an exhaustive explanation of how AI algorithmic models work but rather illustrates a general picture of how this technology is being deployed to advance public relations efforts.*

Keywords *- Artificial Intelligence, Sentiment analysis, Brand monitoring, Crisis management, Public relations.*

1. Introduction

AI is the embedding of technologies that enable machines to perform tasks such as moving data, analyzing data, and processing data, while being better than humans. Rather than creating jobs, AI and machine learning can help skilled workers do better, complementing rather than competing with PR professionals. Social media platforms like Twitter, Facebook, Instagram, and LinkedIn are transforming the public relations industry, and that is good news for the industry. AI allows PR professionals to accurately quantify people's feelings and opinions about a brand and compare those feelings with real-time data from social media platforms.

This new relationship between humans and intelligent machines in public relations has enabled PR professionals to create data-driven campaigns, automate repetitions, analyze online conversations, predict crises, and even produce personalized content. By using artificial intelligence (AI) to analyze data from IoT devices, governments can do their job by identifying and fixing problems before they occur. (Blogs, September 13, 2018),(Relations, October 29, 2020), (Feedough, December 13, 2020).

(Marx, 2017) Some PR agencies have started using AI for jobs and tasks such as social media monitoring analytics and media developments. Practitioners also use broadly available AI tools for social media analysis, while others are developing their own AI instruments and tools. AI supports the development of new products and services, such as campaigns on social media. Public relations professionals may use chatbots for brands to interact with consumers. In its approach to marketing communications, the PR industry has been transforming.

AI and machine learning are used to power a variety of analytical and creative tools that can be used to improve an agency's offerings and marketing efforts. Artificial intelligence allows many traditional PR and marketing agencies to take a more proactive approach to their work. One area where AI is being used is to refine PR and marketing efforts by predicting future news events. AI can identify and predict what is happening in the media environment, analyze social media trends, and decide which events are most likely to be covered. It can even be used to identify press agents who are effective at tracking the news and recommending that companies or organizations seek coverage that's likely in their best interest. PR professionals can now create data-driven campaigns, automate repetitions, analyze online conversations, and predict crises from the new relationship between humans and those new intelligent machines. (Kietzmann, 2018). These social platforms are used by users to collect data on every topic and to influence each other's views. Social media is one of the most common ways of accessing information and data worldwide.

(Scribd, 2019) stated that the potential of AI for public relations can be demonstrated in many ways, such as through presentations and lectures at conferences and events and on social media. Use AI to provide quality, improved information and data on AirPR, Hootsuite, and Trendkite. A lot of data and training are needed to provide artificial intelligence for a very skilled and advanced PR specialist. PR professionals can use the information obtained by AI tools to adapt their approach and improve their success rate. To achieve their goals more quickly, using artificial intelligence in publishing will lead to faster and better results.

AI has also enabled PR and marketing agencies to take a more proactive approach to their work. In addition to product testing and customer satisfaction surveys, they can now predict the results of future news events, shift public opinion, or analyze customer activity on social media. In many ways, AI is just getting started, and it will have a huge impact on the PR industry in the coming years. Recent Developments Some of how AI is being used in PR are obvious, like social media monitoring and sentiment analysis. Both tools are good at identifying and uncovering negative or positive sentiments on social media networks. They can easily identify social media trends (which companies or individuals are the most vocal, how fans react to a product or service, etc.). However, many of the more innovative uses of artificial intelligence are in creative strategy, content creation, and target audience development.

(Ardila, 2020) The British Red Cross is a voluntary platform for conflict, emergency response, and natural disaster reactions. One of its primary goals was to analyze social data to obtain and recognize the appeal issues relevant to the organization's public. The Red Cross's digital team used Brand Watch's insights to evaluate the conditions they now must be using to reach people. (Ardila, 2020) Many of these tools now have AI algorithms that extract qualitative and quantitative data from an individual’s behavior, feelings, and opinions. The sentiments are analyzed to determine if any writing is positive, negative, or neutral. The analysis will make it easier for professionals to use measurements of public opinion, market research, brand reputation surveillance, or much knowledge about the customer experience.

(Rogers, 2019) stated that the massive amount of information in real-time provides practitioners with the information they need to supply. The associated press uses Facebook to filter ads and chatbots for full earnings reports. Corporations should not concern themselves with massive information and Artificial intelligence tools but instead embrace the trend and developments with new stories that match massive data between applications. Advances in AI can affect public relations, and smart PR professionals can see that massive information and AI give their audiences outstanding, detailed analysis in many cases.

Sentiment Analysis has therefore become a popular topic for academic researchers and companies. The source materials identify data and information using NLP (Natural Language Processing). Analyzing the sentiment aims, on the one hand, to determine a speaker's attitude as the intended emotional communication and, on the other hand, to judge and assess the author's emotional state when writing. (Noordhuis, 2010) mentioned that there are new ways of understanding, grasping, and understanding the needs and feelings of the user in certain areas based upon the data collected in the senses and the emotional state of textual data.

2. Methodology

This section shows how sentiment analysis is an alternative technique capable of triangulating qualitative and quantitative methods through automated real-time data collection and analysis that can be carried out using several existing tools.

The mixed method is used to research in two ways: qualitative and quantitative, as described in Fig. 1 in the research study. It considers qualitative and quantitative methods and tools used in our understanding world. A shared commitment to creating information, transmitting information, and an astringent research approach integrates both tools. However, in some research areas, manipulation cannot be feasible given the high analysis value of the collection of multiple knowledge and, therefore, the delays in the collection and analysis of data. Automated data collection with tools avoids this disadvantage.

Brand monitoring and crisis management are two important applications of sentiment analysis in public relations. In Brand monitoring, the mentions of a given brand are monitored through various channels. Usually, online platforms such as Facebook and Twitter usually find and assess what is said about it. In crisis management, sentiment analysis helps detect public emotions in crisis to provide valuable information for the authorities to strategize their actions with due consideration to public sentiments. From the above definitions, manually doing brand monitoring or crisis management is tedious.

The focus of our research study includes but is not limited to just showing the existing sentiment analysis capabilities. How is the impact of sentiment analysis in public relations changing over time? What is expected from existing tools in the future? How many existing online platforms will change in the future? These are important questions to be answered in this paper.

The following sections describe in detail how the research study was conducted. Both brand monitoring and crisis management are concerned with what individuals think and feel or, in general, what they assume and how they say and feel. So, the input data involves feelings and impressions instead of numbers. This kind of data and information is subjective and requires both qualitative and quantitative analysis. The relationship between quantitative and qualitative analysis is complex. Quantitative analysis is statistical-based, focuses on measuring an objective fact and reality, and depends on massive samples to form generalized statements. On the other hand, Qualitative analysis uses subjective judgment to analyze given non-quantifiable information. The two techniques, however, are often used to analyze social media data, as shown in Fig. 1.

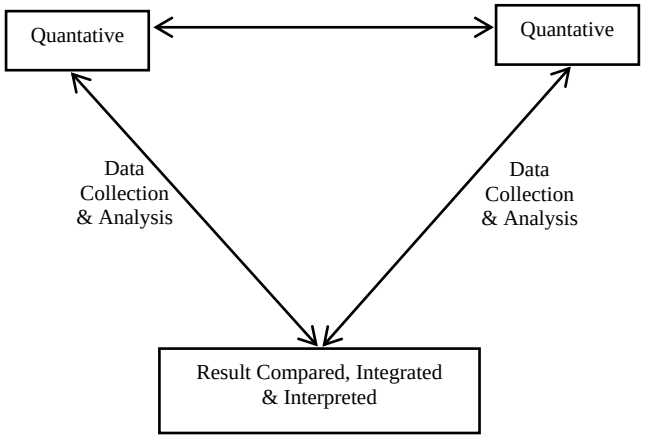


Fig. 1 Mixed Method

2.1. Research design

Using a sentiment analysis tool, a qualitative content analysis (QCA), possibly the most common and straightforward type of Qualitative Data Analysis (QDA), can be done quickly, easily, and with acceptable accuracy. In sentiment analysis, QCA is used to evaluate patterns within the content (usually a collection of mentions on online platforms). The research design is not threats-free; however, that slightly affects the internal and external validity of the study because sentiment is an opinion that expresses the feeling. In general, sentiment is a controversial conclusion that may differ from one person to another. It is not necessarily a fact or belief (Babčanová, Šujanová, Cagáňová, Horňáková, & Chovanová, 2019).

2.2. Sampling method

This section describes the population from which the samples were selected. It describes the participants involved in the study.

For the case study of brand monitoring, the sample was as follows:

- Mentions were collected from Videos, Blogs, the Web, Twitter, News, Podcasts, and forums.
- Mentions were collected from 22nd November 2020 to 22nd December 2020.
- The number of mentions collected and analyzed for Turk Cell is 1938 mentions. While for Telsim, 211 Mentions and both were in the Turkish language. While for the samples for the case study of crisis management were collected as follows: -
- The Turkish situation is 1086 mentions in the Turkish language.
- While the Arabic situation is 673 mentions in the Arabic language.

2.3. Data collection procedures

As shown in Fig. 2, data collection is the first step in the graphical description of the processes involved in sentiment analysis.

Sentiment analysis benefits from the huge web content generated by the user. The data and information sources address and refer to user discussions on public forums such as blogs, chat boards, product review boards, and personal logs on social network websites such as Twitter and Facebook. Usually, the data log on multiple portals is large, unorganized, and broken. Opinions and feelings are expressed in many ways, including the amount of details given, the type of language used, the written context, the slang, and the linguistic variations. This is tedious and almost not possible to analyze manually.

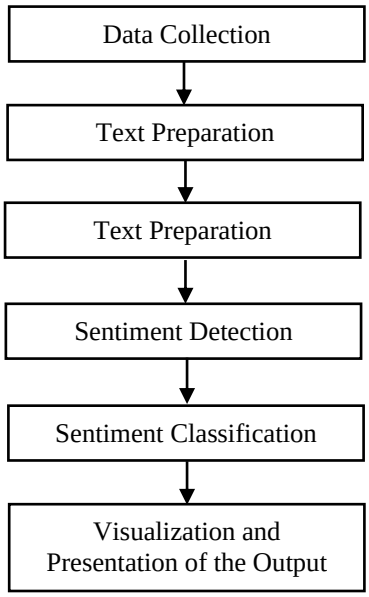


Fig. 2 Sentiment Analysis Process

2.4. Method of data analysis

Sentiment analysis is a great helpful tool to address the challenges of triangulation on the internet and the world. Incorporated into qualitative research, sentiment analysis is used as a tool for accuracy in a flexible and subjective process of collecting knowledge and analyzing data.

Integrated into quantitative research, sentiment analysis enables deep insights into views and emotions and helps us to understand any phenomenon more meaningfully. Through machine learning, feeling analysis provides a chance for a systematic approach to the concept of a mixed methodology.

Sentiment analysis provides a faster, simpler, less complicated, and cheaper alternative to traditional quality public relations and marketing techniques such as observations, interviews, and even anthropology and provides real-time data. It provides benefits in combination with measurability and objectivity for traditional quantitative strategies. Compared to the strategies employed in all qualitative and quantitative research, the data is collected ethically and responsibly. This methodology eliminates the problem of reacting to individuals without recognizing their answers.

2.5. Results and Discussion

Mentions Per Category for Telsim are shown in fig. 3. Also, the context of the discussion is shown in Fig. 4.

As shown below, Telsim Project will be analyzed and clustered according to the summary of mentions from Different sources like Twitter, blogs, websites, and forums, as shown in Fig. 3.

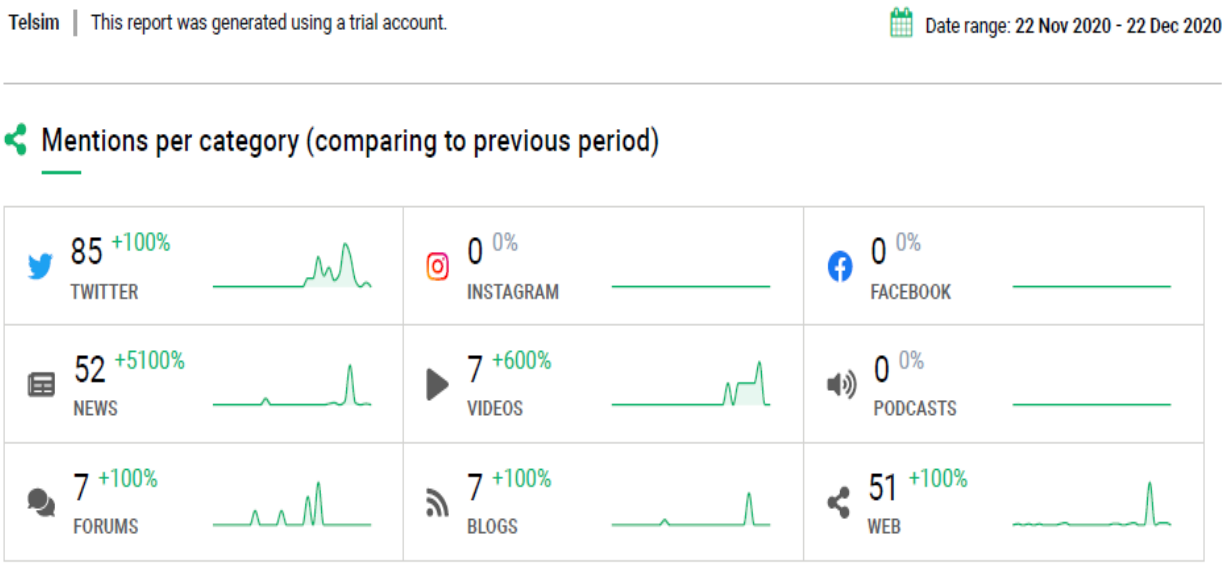


Fig. 3 Mentions Per Category for Telsim

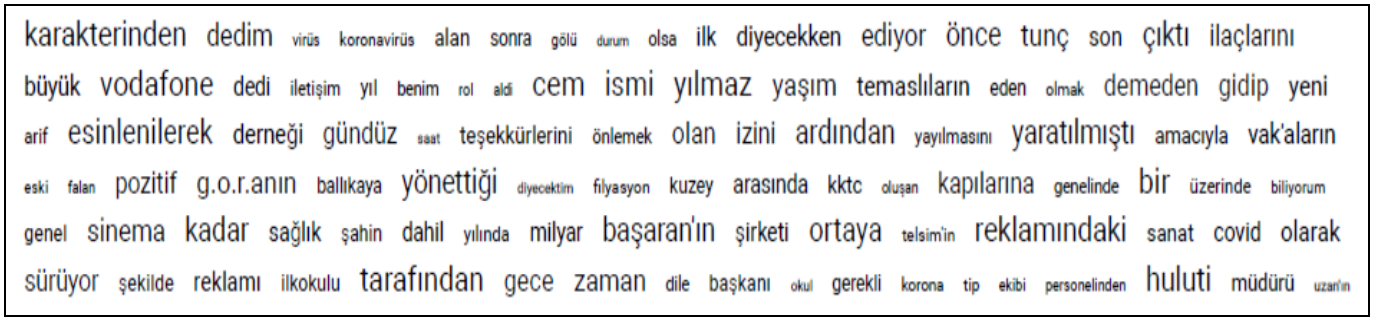


Fig. 4 Context of Discussion

On the other hand, a summary of mentions for the Turk cell Project is shown in Fig. 5,

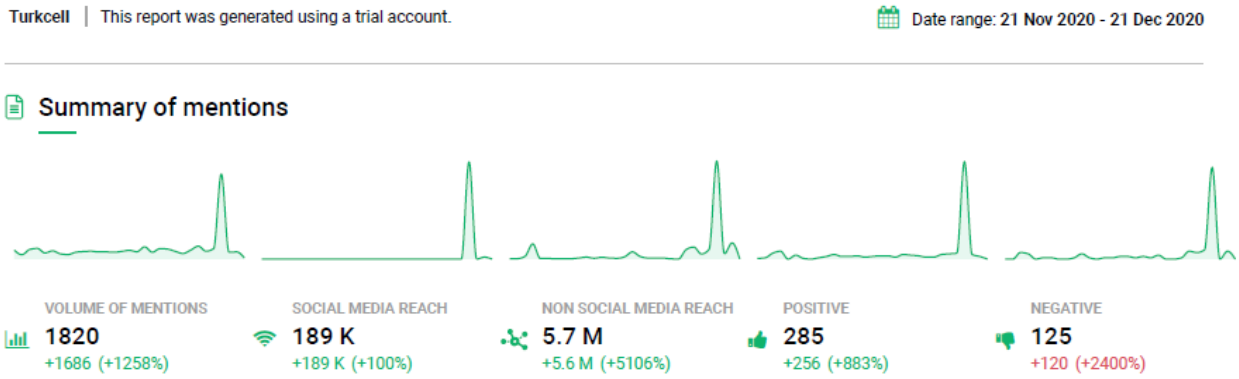


Fig. 5 Summary of mentions for Turk cell Project

Also, Mentions per category for Turk cells are shown in Fig. 6,

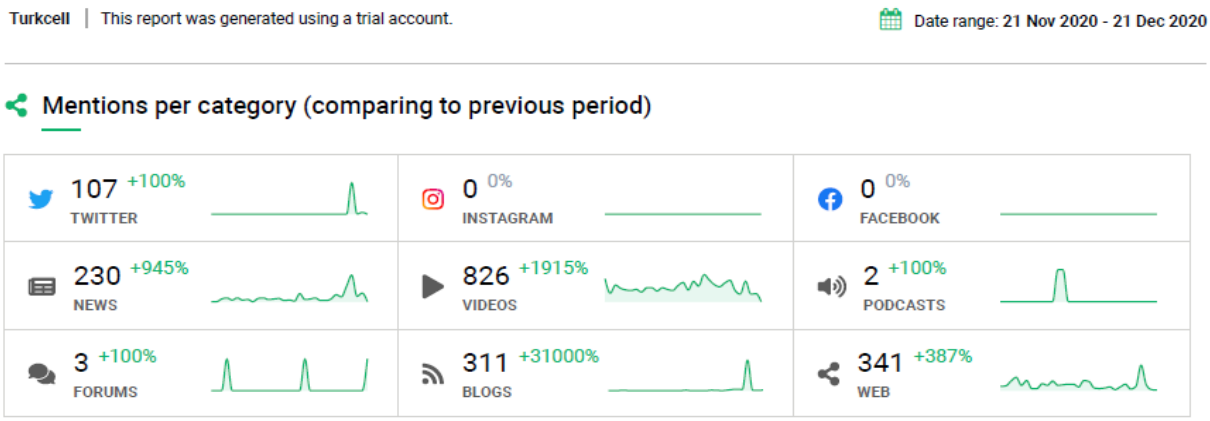


Fig. 6 Mentions Per Category for Turk cell

Sentiment analysis occurs at a sentence level; the platform identifies words or phrases inside a post that carries a tone or opinion. These phrases are sometimes written within the type of adjective-noun mixtures. Then, the algorithms provide each phrase with a sentiment weight supported by words they already understand. For example, the word (bad) or (zor) would generally be a sentiment score of 0.5 because it carries a negative connotation. In contrast, the word (good) or (guzel) would be a score of 0.5 due to its sometimes positive.

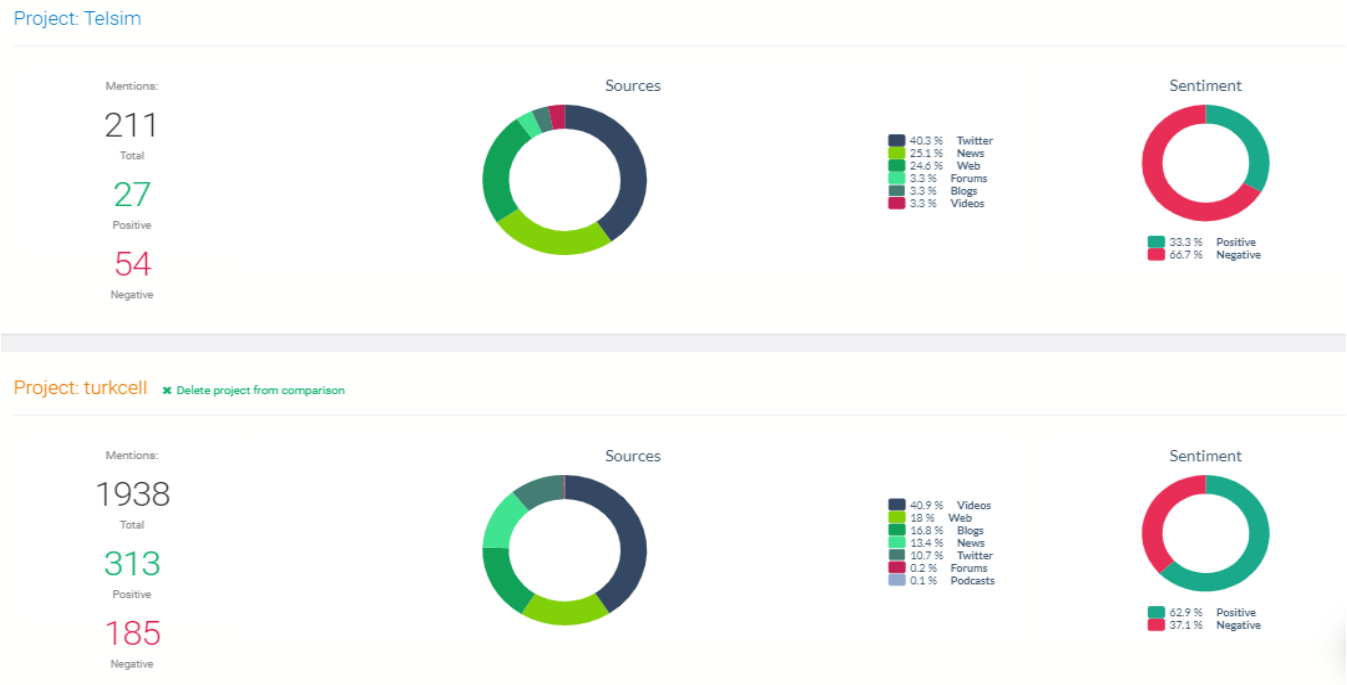


Fig. 7 Comparative Sentiment Analysis Between Turkcell and Telsim Using Brand24.

From the comparative analysis between Turk cell and Telsim shown in Fig. 7, the total mentions for Telsim were 211. 130 mentions were classified as neutral, while just 27 out of 81 mentions (33.3%) were positive, and 54 out of 81 mentions (66.7%) were negative. On the other hand, the total mentions for Turk cells were in 1938, with 1440 mentions classified as neutral, while 313 out of 498 were positive (62.9%), and 185 out of 498 were negative (37.1%).

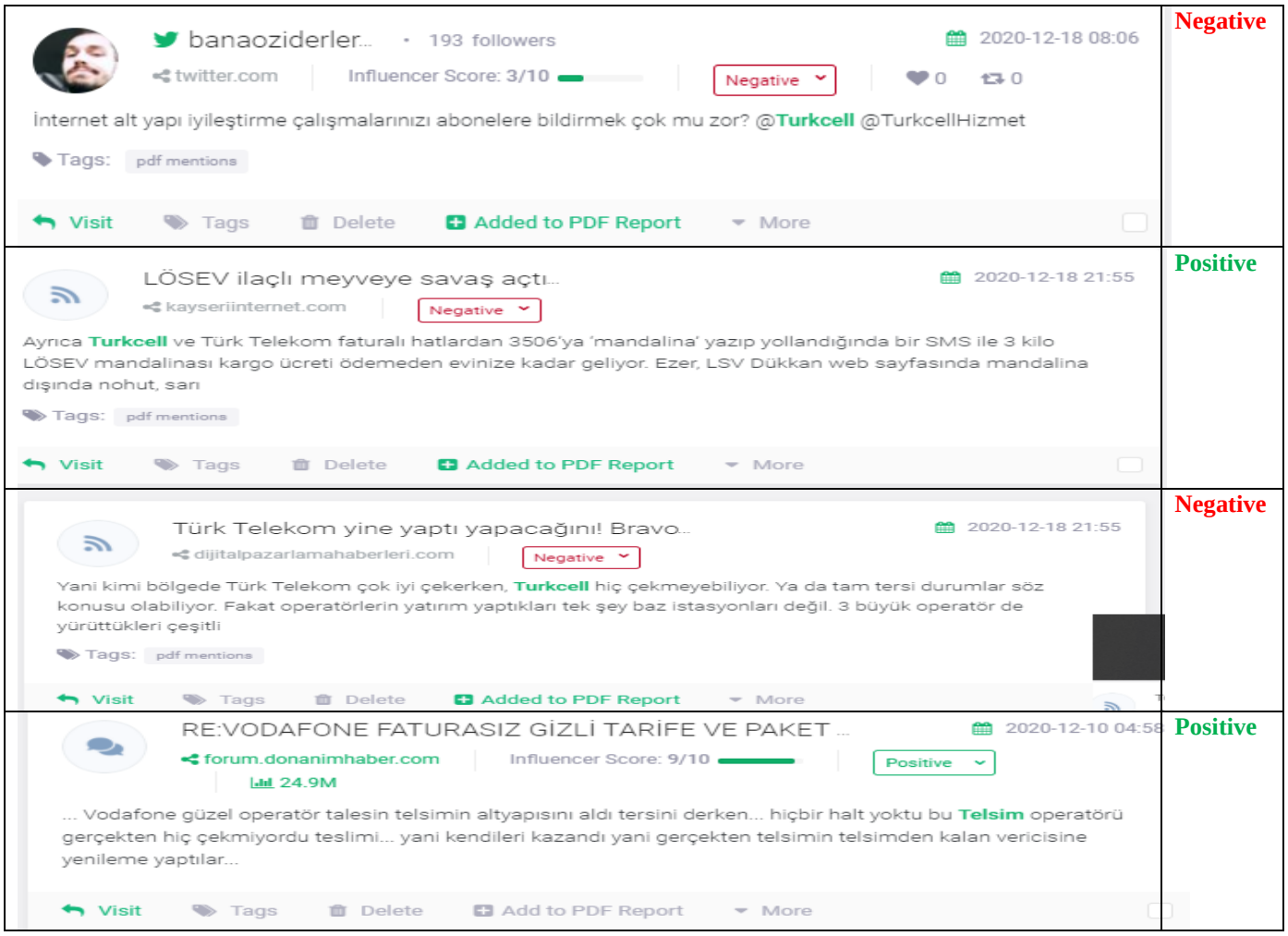
2.6. Manual Sentiment Classification

The manual sentiment classification shows that the program can classify the mention as negative according to the meaning of a single word instead of its meaning in the sentence. (Hastane) in Turkish means (hospital); Telsim company was making some good promotions and offered to help patients call a hospital. At the same time, the tool automatically classified Hastane for something that seemed to be negative. While also, the tool has been successful in classifying 4 out 5 manually random selections for mentions in the right way, like someone was making fun of Turkcell in how it is difficult for the company to inform subscribers about their internet infrastructure improvement works (Internet alt yapi iyilestirme calismalarinzi abonelere bildirmek cok mu zor @turkcell). (Vodafone guzel operator) This means that Vodafone (Telsim) is a beautiful operator.

A manual revision for a sample of six mentions referring to the Turkcell and Telsim companies shows that even though some comments include words that people would generally consider negative, like (hastane) or (zor) while the overall meaning of the posts shows the opposite.

Table 1. Manual sentiment classification for brand monitoring

	**Positive**



3. Crisis management using Sentiment analysis

3.1. Background

Tools for social media monitoring use AI's capacity to process various social media posts in seconds. One of the deadliest and most destructive natural disasters in 2012 was in the Atlantic region (Hurricane Sandy). The challenge of listening to and communicating with different audiences simultaneously was for this non-profit organization. Amid a crisis, online monitoring allows PR professionals to identify people's feelings and understand how the people communicate and what messages echo and resonate with the audiences.

The British Red Cross is part of a network of volunteers who respond to conflicts, natural catastrophes, and personal emergencies. The challenge was to listen to and communicate with various audiences simultaneously. One of its main communication goals was to analyze social data and information collected to recognize appeal topics relevant to the organization's public.

The British Red Cross partnered with the Brand watch, an AI-powered intelligence platform that captured data from various social media sites in multiple languages and processed millions of posts through AI technologies like natural language processing, As shown in Fig. 8.

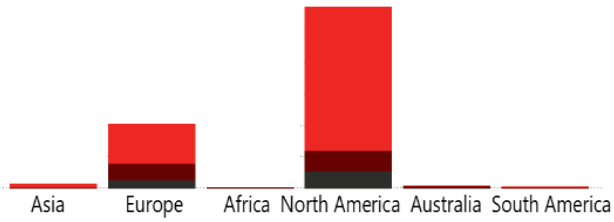


Fig. 8 British Red cross

Artificial intelligence-based systems can track sentiments, reactions, and results to detect and respond to crises. Brands and conversations can engage and monitor disgruntled stakeholders' ethical problems and inquiries and avoid possible negative reactions or buzz. Negative messages are spreading like wildfires and may lead to a complete crisis. Public relations professionals can get quick alerts about a dilemma or a problem with social listening AI-

powered machines. To control negative word of mouth, artificial intelligence can respond to a full-blown crisis even with appropriate messages.

3.2. Artificial intelligence reporting and measurement

PR customers and agencies can ensure highly precise and accurate coverage analysis with AI-assisted tools. Thanks to its ability to scan and analyze social posts and news articles, this technology has improved reporting with significant efficiency. Experts believe AI will be able to analyze better and communicate campaigns and assess the impact of any campaign. Thus, AI tools would be better for PR professionals. Reviews of some articles and expert interviews on the possible and current use of artificial intelligence in the public relations sector resulted in the automation of repetitive tasks, crisis communication management, and content creation.

3.3. Results and Discussion

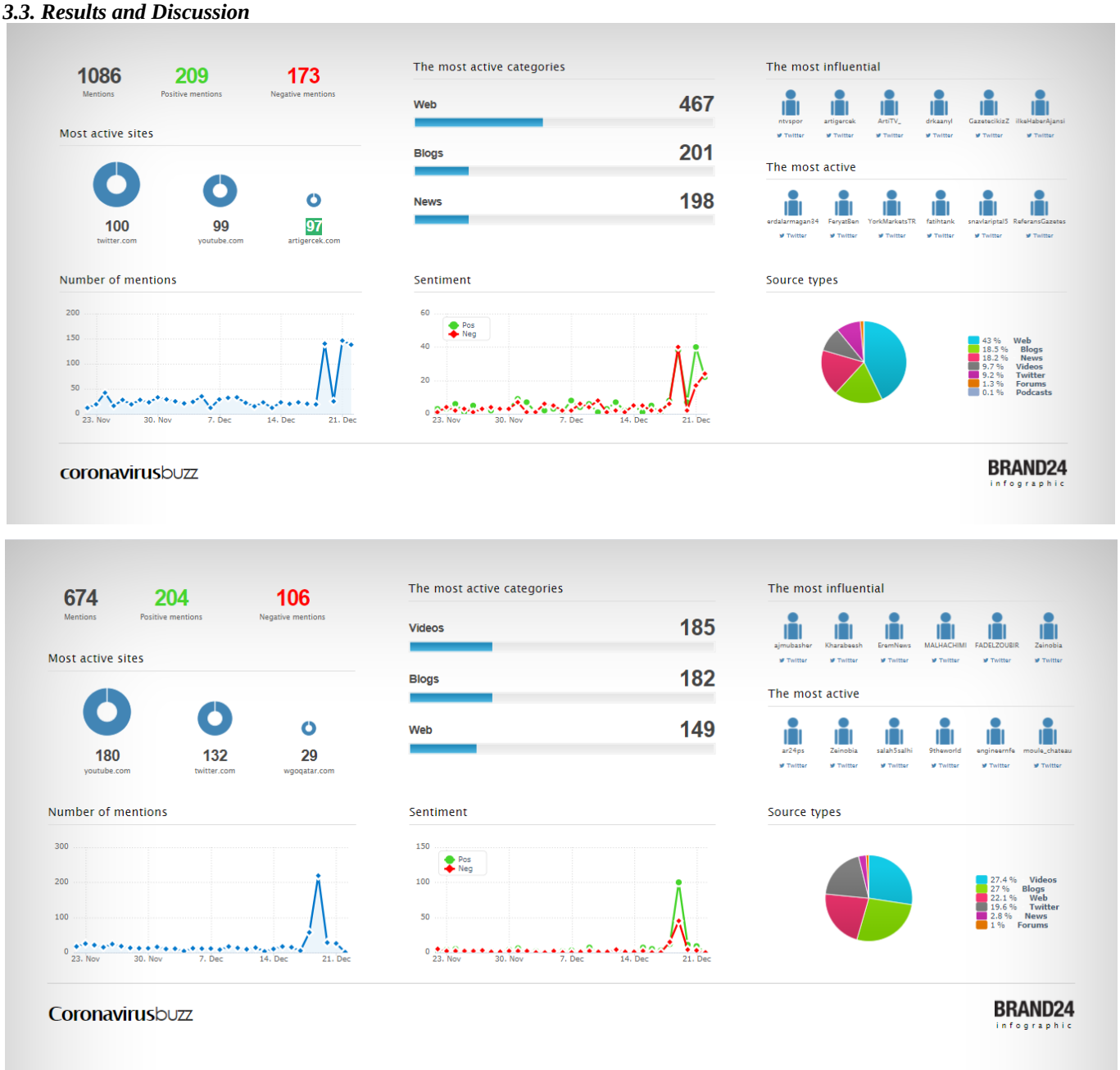


Fig. 9 Turkish Situation

On the Other hand, the Arabic situation, as shown in Fig. 10

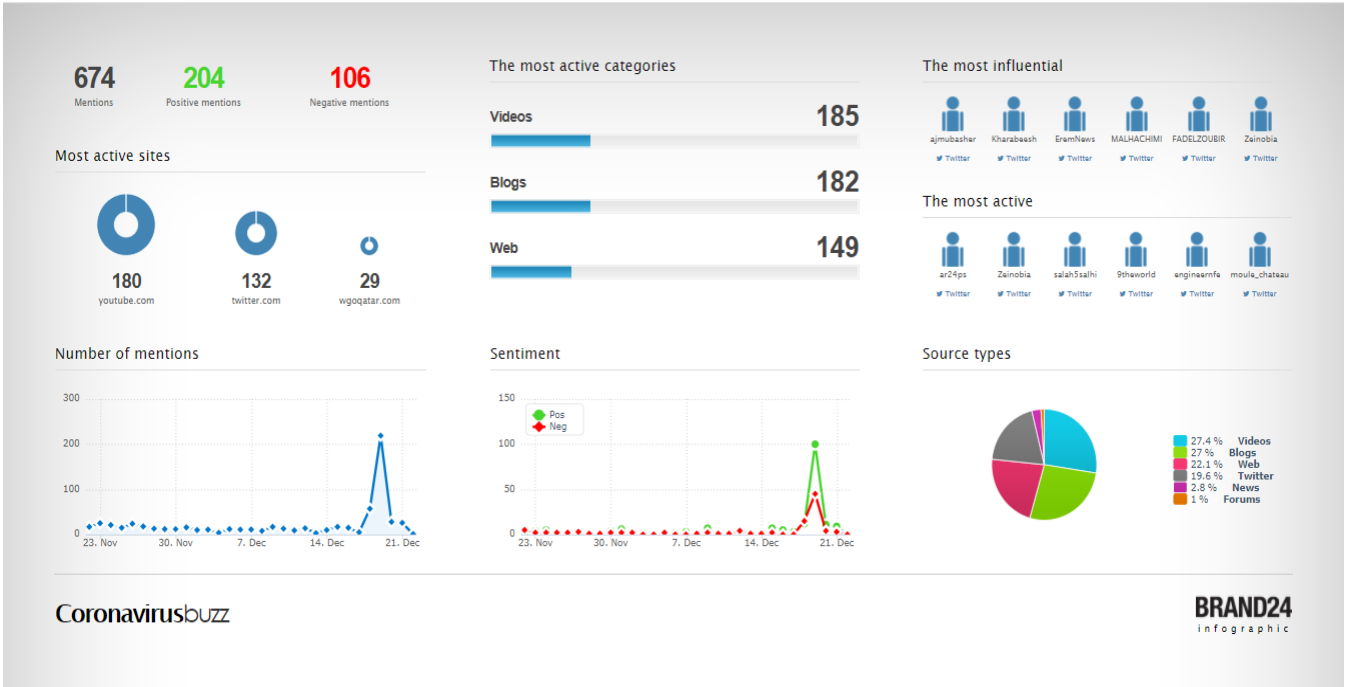


Fig. 10 Arabic Situation

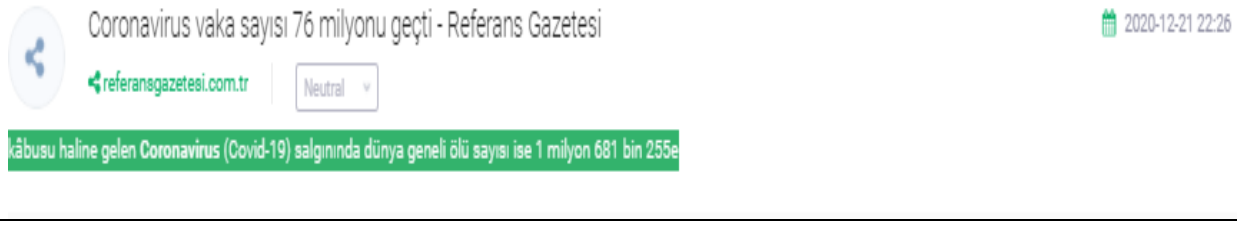
From the comparative analysis between the Turkish Situation in Fig. 9 and the Arabic situation in Fig. 10, the total mentions for the Turkish situation were 1086. There were 704 mentions classified as neutral, while just 209 out of 1086 mentions (19.244%) were positive, and 173 out of 1086 mentions (15.93%) were negative. On the other hand, the total mentions for the Arabic situation were 674; there were 364 mentions classified as neutral, while 204 out of 674 were positive (30.26 %) and 106 out of 674 were negative (15.72%).

3.4. Manual Sentiment Classification

A sample of posts to be manually analyzed is shown in Table 1.

Table 2. Manual sentiment classification for crisis management

Türkiyede Koronavirus kaynaklı 190 ölüm ve 30 bin 110 yeni vaka tespit edildi 2020-12-22 06:13 anadoluhaber.blogspot.com Influencer Score: 2/10 Negative 10.8k Türkiyede Coronavirus salgını nedeniyle son 24 saatte 190 kişi hayatını kaybetti, 30 bin 110 yeni vaka tespit edildi [...] Sağlık Bakanlığı Türkiyenin günlük Coronavirus tablosunu açıkladı	**Negative**
Mısır'da Yalnızca COVID-19'lulara Özel Robot Geliştirildi 2020-12-22 06:13 bielci.com Positive İLGİLİ HABER Koronavirüs Salgınının Yarasalardan İnsanlara Geçtiğini Doğrulayan Keşif Kaynak : https://www.reuters.com/article/health-coronavirus-egypt-robot-idUSKBN2852F6 Kaynak Mısır'da Yalnızca COVID-19'lulara Özel Robot Geliştirildi yazısı ilk önce bi Elçi üzerinde ortaya çıktı	**Positive**

	**Negative**
	**Negative**
	**Neutral**

The manual sentiment classification shows that the tool can classify the mention of the Arabic language as positive cause the source was from a certified and credible page with an influencer score of 10\10, which leads to classifying it as neutral while its meaning was that Finland stopped all their flights to the UK for 2 weeks. KSA postponed any flights to its borders regarding the new breed of coronavirus, which is a negative thing. (kabusu haline gelen coronavirus salgninda dunya geneli oku sayisi ise 1 milyon 681 bin 255) This means the number of deaths worldwide from coronavirus has become a nightmare and risen to one million and 681 thousand, which should be classified as negative. Still, the tool automatically classified it as neutral. While on the other hand, (Misir'da yalnizca covid 19 lulara özel robot gelistirildi) means that (In Egypt, a special robot was developed for only covid 19s).

(Niburya, Jan 18, 2021) In Egypt, which is only one of the countries deeply affected by the covid coronavirus epidemic, an inventor has developed a robot that he believes will make health workers' jobs easier.

The robot's inventor says that it can test for COVID-19, measure the fever of patients, and even alert people who do not wear masks. The tool classified that mention as Positive, which was logically acceptable. The features of the robot are not finite with just these. Also, this robot can take blood analysis, echocardiograms, and x-rays, which offers a valuable advantage in terms of functionality and has been tried to be likened to people as much as possible in terms of appearance. While on the other hand, (turkiyede koronavirus salgini nedeniyle son 24 saat 190 kisi hayatini kaybetti, 30 bin 110 yeni vaka tespit edildi. Saglik bakanligi turkiyenin gunluk coronavirus tablosunu acikladi) which Because of coronavirus outbreak turkiyede last 24 hours 190 people had lost their life, 30 thousand 110 new cases were detected. The Health Ministry has stated the daily coronavirus report. That was classified as negative, which was typically acceptable. The fifth and last manually classified mention was (حكومه الصين تهدف الي تطعيم 50 مليون), which means that (China's government aims to vaccinate 50 million) which the tool classified it as neutral which was not positive as it is a small number for the population of China to be just vaccinated. The Chinese government's willingness to vaccinate was not a negative thing.

A manual revision for a sample of 5 mentions referring to the Arabic and Turkish situations shows that even though it shows that human intelligence is needed, the tool was able to correctly classify 3 mentions out of 5, as shown in Table 2. The combination of PR professional skills and Artificial intelligence tools will be great in the future. It will make many public relations tasks, especially the repetitive ones and the ones with large data set tasks, easier and with better results.

4. Conclusion

The rapid growth of the global internet and social networks enables users to play an active role in creating content. Using new marketing channels such as social

networks and e-commerce, users measure the reputation and quality of the brand. As a result, companies can identify and analyze these digital data and knowledge to enhance customer reputation.

The results demonstrate that the tool is valid in providing all small and medium-sized companies involved in e-commerce with strategic and innovative potential to meet customers' requirements.

Companies can increase their competitiveness by detecting the tweet sentiment and how it affects people, considering its popularity. The effectiveness of our sentiment analysis approach shows that branding strategies play an even more prominent role in online environments. We also believe that Twitter-based retweets are a good index for measuring the author's popularity and influence. Finally, through statistical analyses of the author's popularity, we have stressed the degree's value that modifies the tweet's real feeling towards the highest or lowest level of polarity.

The case studies show that machine learning and the development of algorithms for natural language processing to interpret unstructured knowledge and data such as social media is still at the earliest stage. It will be a while before feelings based on meaning, contexts, and intention can be accurately measured. This means that human intelligence is necessary, but this feature is not to be disregarded by PR professionals.

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