Information Dissemination and Perception by Social Media Users: Urban Planning Conflicts

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Abstract: This paper presents an analysis of Information dissemination and perception by social media users in urban planning conflicts. The study involved a cross-disciplinary approach. The neural network technology TextAnalyst 2.3 was used as a tools. The material for the study was data from social networks, microblogs, blogs, forums, video resources concerning reviews of the South-East Chord construction in Moscow. Analysis of Information dissemination and perception by social media users showed that the growth of negative perception is more actively formed and disseminated through personal accounts, thus enabling involvement of a large audience and achieving a higher degree of involvement. Meanwhile, there is a more effective spread of a certain type of perception in communities.

1 INTRODUCTION

The digital space has become the central communication sphere; therefore, the study of the characteristics of the information dissemination and perception, as well as its impact in the network environment, is an important and urgent scientific task. The specificity of the information dissemination in social networks has already received a multi-dimensional coverage in scientific research (Wang et al., 2016; Yang et al., 2019; Ranganathan et al., 2023).

Methods of analyzing communication activity on the Internet open up new opportunities for identifying and researching various social conflicts. This is especially true for large cities and megacities, since the urban environment has an increased potential for conflict (Debord, 2020). A large crowd of people in a small area, the difference in interests of different groups generate hundreds of conflicts that are difficult to track and regulate.

One of the frequent causes of urban conflicts are projects for the development or reconstruction of urban infrastructure facilities. Large construction projects disrupt the habitual way of life of citizens and create temporary inconveniences. In addition, the interests of city authorities, big business and city residents often clash here. A major highway, which is necessary for a city, can at the same time create significant inconveniences for residents of the areas through which it passes (Raskhodchikov, 2017).

One of the important tasks of the city authorities is the settlement of emerging disagreements, the correction of situations that threaten public peace. "To govern is to correct," Confucius said. Since most conflicts are easier to resolve at the very beginning, without waiting for escalation, management bodies should be able to identify them in a timely manner and correctly assess the threat of an undesirable development of the situation (Raskhodchikov, Kharlamov, Pilgun, 2020). The method of analysis presented in the article on the example of a conflict situation around the construction of a major highway

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(South-eastern chord) in Moscow demonstrates the ability to predict the risks of urban conflicts.

The objective of this study are analysis of the characteristics of the information dissemination and perception by social media users to resolve of urban planning conflicts.

The study involved a cross-disciplinary approach using neural network technologies. The neural network technology TextAnalyst 2.3 was used as a tools (developed by A. Kharlamov) (Kharlamov & Pilgun, 2020; Kharlamov et al., 2021).

The material for the study was data from social networks, microblogs, blogs, forums, video resources concerning reviews of the South-East Chord (SEC) construction in Moscow.

Table 1: Data characteristic.

N	Data	Audience
1st stage	April 1, 2019 00:00 - June 30, 2019 23:59	352 267
2nd stage	July 1, 2019 00:00 –September 30, 2019 23:59	17 583 997
3rd stage	October 1, 2019 00:00 - December 31, 2019 23:59	65 588 26
4th stage	January 1, 2020 00:00 - February 29, 2020 23:59	99 096 49
5th stage	March 1, 2020 00:00 – March 31, 2020 23:59	130 180 782

2 RESULTS AND DISCUSSION

2.1 Digital Platforms Analysis

The user content related to the SEC construction is characterized by a change in the ratio of its representation in the Internet space, depending on the time stages, as well as the actors' preferences.

At the first stage, the content was posted mainly on social networks (97%), a small part of it appeared on blogs (2.7%) and less than 1% on microblogs. The percentage was calculated by stages from the total volume of the user content presented in the Internet space of the studied period.

At the second stage, most of the content remains on social networks (71.5%), but information activity in microblogs (16%) and videos (12%) increases; blogs account for 0.5%.

At the 3rd stage, there is an increase in the volume of content presented in videos (13.8%), the activity on social networks (75.6%) increases; and in microblogs (10%), there is a decrease in interest compared to the 2nd stage; blogs account for 0.6%.

At the 4th stage, an increase in information activity in microblogs (19.4%) is revealed, the representation of content in social networks (70%) remains the most popular in terms of information posting, but it decreases in comparison with all previous and subsequent stages; the representation of content in videos (8%) also decreased, but the placement of information on blogs increases to a maximum rate (2.6%).

At the 5th stage, the content representation in social networks (79.2%) increases again, while microblogs (12.9%) and videos (7.5%) retain their quantitative ratio in the context of the general data set of this stage; there is a decrease in users' activity on blogs (1%).

The results of the analysis of Internet sites revealed some features of the network users' involvement in the SEC construction and the possibility of maintaining their interest in the project, depending on the time period for the development of Internet activity, on the type of information source, and means of attracting the actors' attention.

The main attention of the Internet audience during the information activity of the studied time period was focused on the content of social networks on the SEC construction. It was the content of social networks that generated and supported the network users' interest in the construction implementation.

The means by which audience involvement was achieved changed during the development of the information wave. At the beginning of the conflict (stage 1), it was possible to maintain the actors' involvement mainly within communications in social networks and in news messages; then in the second half of the year (stage 2), communications in social networks and official messages were complemented with communications in microblogs and on video resources, which retain its relevance at the next stages as well. At stage 3, video resources are ahead of microblogs in terms of audience maximization and actors' involvement. Stage 4 and 5 are characterized by the fact that communications in social networks and microblogs again become the main means of attracting the Internet audience, and video resources move to 3rd place (Fig. 1-5).
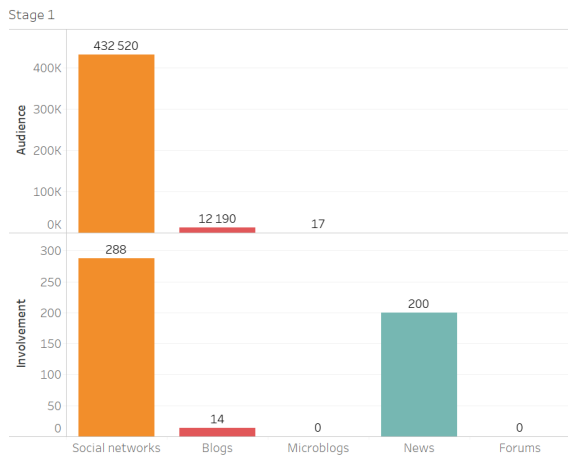
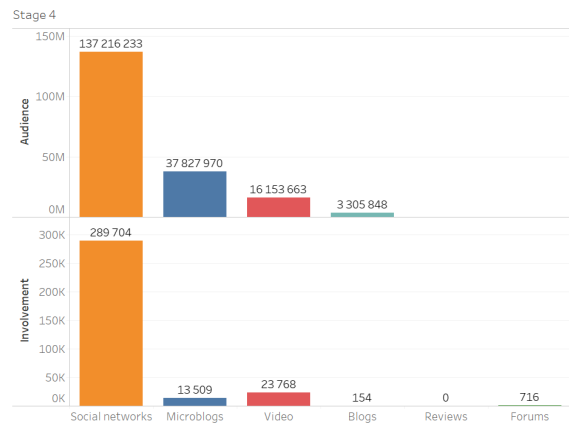Figure 1: This caption has one line so it is centered.
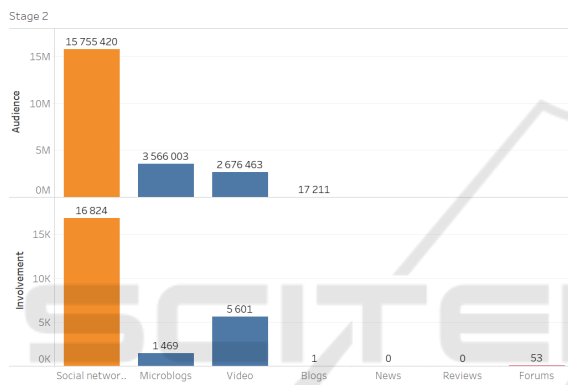

Figure 2: Audience and involvement (stage 2).
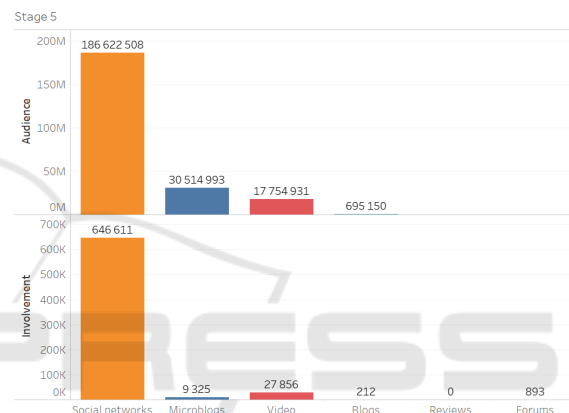

Figure 3: Audience and involvement (stage 3).

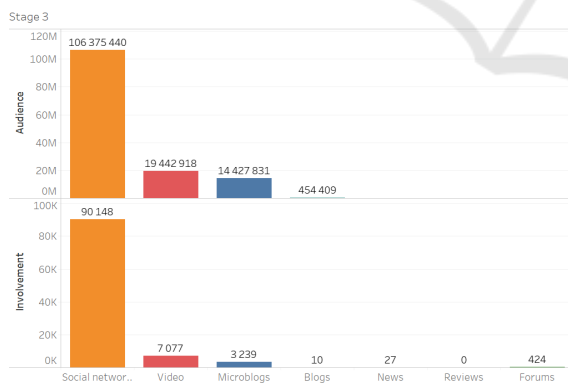Figure 4: Audience and involvement (stage 4).

Figure 5: Audience and involvement (stage 5).

2.2 Sentiment Analysis of the User-Generated Content

The emotional and semantic characteristics of the content are also not homogeneous and change at various stages of the conflict escalation regarding the SEC construction.

1st stage
The stage is distinguished by the absence of aggression and neutral sentiment of the content, which consists mainly of official messages covering the project planning and implementation (Fig. 6, 7).

2nd stage
This stage is characterized by growing of the users' interest in the problem. The content is mainly represented by comments on social networks and posts.

The overwhelming number of comments suggests a fairly high level of interest of Moscow residents in the project. The conclusion is confirmed by the research data that Internet audiences actively generate
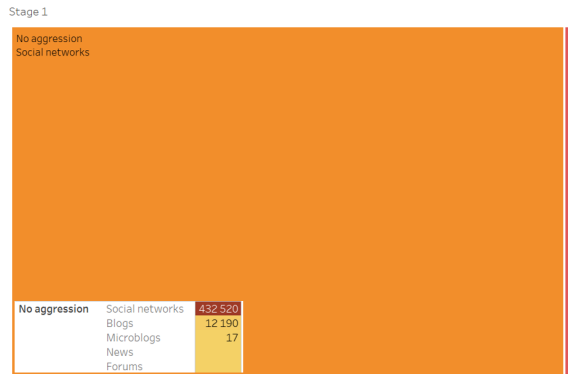
Figure 6: Aggression (aggression is present, strong aggression, no aggression) in various types of sources (stage 1)
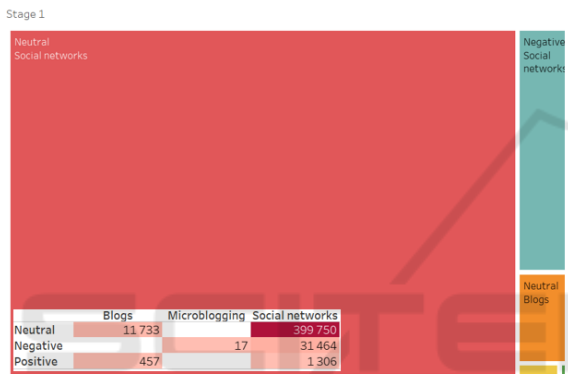

Figure 8: Aggression (aggression is present, strong aggression, no aggression) in various types of sources (stage 2).

Figure 7: Content sentiment in various types of sources (stage 1).

Figure 9: Content sentiment in various types of sources (stage 2).

comments and reposts; this parameter is an indicator of active manifestation of reaction, and the parameter of actors' involvement demonstrates the concentration of network users on posts that reveal various aspects of construction.

At this stage, a negative sentiment appears, and most importantly, the presence of aggression and strong aggression in social networks and microblogs is observed, which will continue to grow demonstrating the growth of protest moods and the residents' sharply negative attitude to the project (Fig. 8, 9).

3rd stage

This stage is characterized by a sharp increase in the users' negative reactions, a further increase in the negative perception of the SEC construction. The negative attitude towards the project is manifested in strong aggression on social networks, on video resources and microblogs. An important indicator is the fact that strong aggression significantly exceeds the indicators of the aggression presence. The user involvement reflecting the direct reaction of actors,

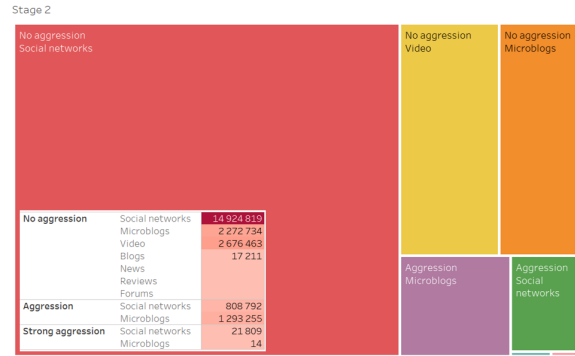shows high values in social networks in the negative cluster, significantly ahead of the neutral and positive ones (Fig. 10, 11).

Figure 10: Aggression (aggression is present, strong aggression, no aggression) in various types of sources (stage 3).

	Blogs	Microblogging	Social networks	Videos
Negative	116 306	6 285 348	53 289 895	8 747 487
Neutral	288 831	7 177 454	49 027 587	2 812 041
Positive	49 272	965 029	4 057 958	7 883 390

Figure 11: Content sentiment in various types of sources (stage 3).

4th stage

The network content shows an increase in negative attitudes towards the project. The protest against the construction is manifested in aggression and strong aggression on social networks. An important indicator is the prevailing negative reaction of the audience. The number of negative posts and comments on social networks significantly exceeds the neutral sector. The user involvement reflecting the direct reaction of actors, also shows high values in social networks in the negative cluster (Fig. 12, 13).

No aggression	Social networks	128 026 313
	Microblogs	37 431 981
	Video	15 338 663
	Blogs	3 186 822
	Reviews	
	Forums	
Aggression	Social networks	7 133 836
	Microblogs	208 122
	Video	126 000
	Blogs	118 402
	Forums	
Strong aggression	Social networks	2 056 084
	Microblogs	187 867
	Video	689 000
	Blogs	624
	Forums	

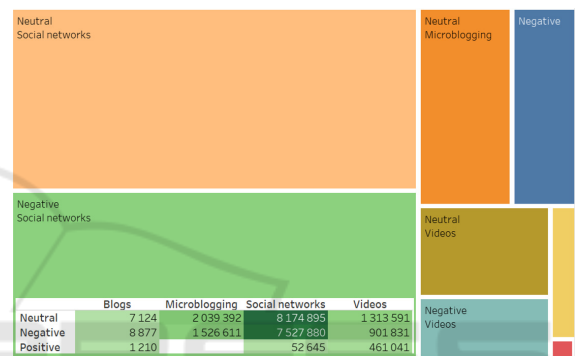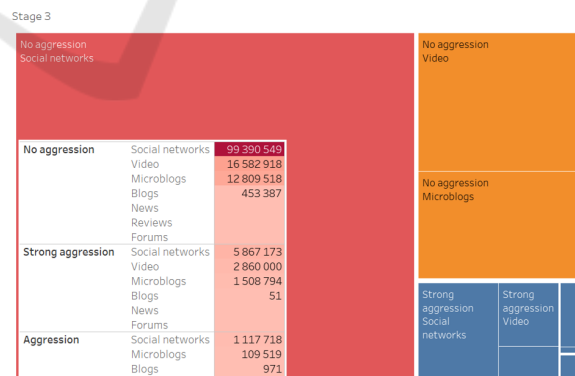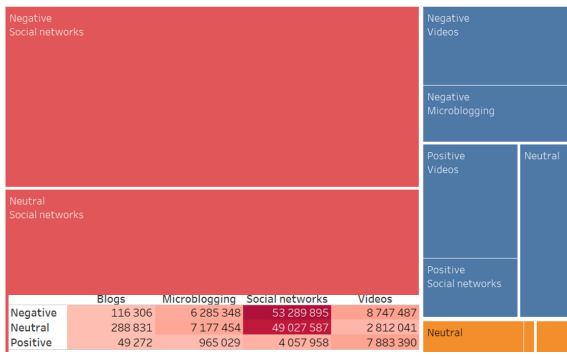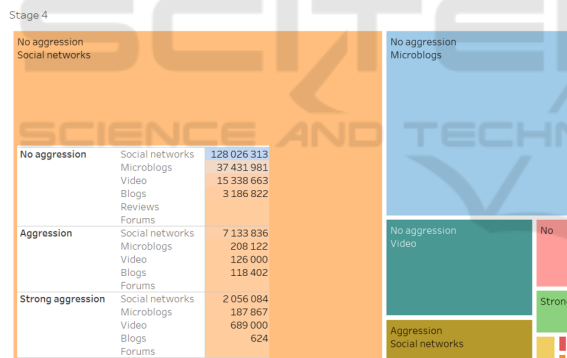Figure 12: Aggression (aggression is present, strong aggression, no aggression) in various types of sources (stage 4).

5th stage

The analysis of the content suggests the persistence of a sharply negative perception of users towards the SEC construction. The peak in the growth of actors' activity falls on March 18-25; the sharp increase in negative assessments was caused by the start of the construction works, the protest and the act of violence of the Moscow authorities against the activists on March 19. The negative attitude towards the project, the growing protest against the construction is manifested in the emergence of strong aggression in social networks. It is significant that strong aggression

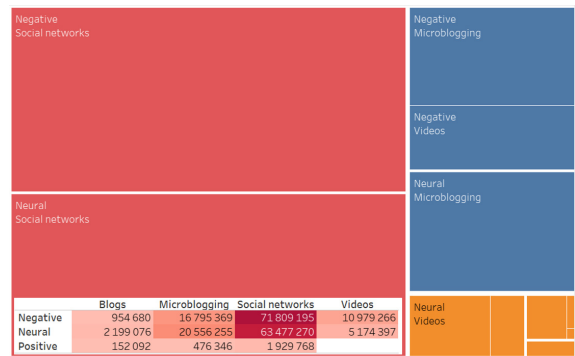|	Blogs	Microblogging	Social networks	Videos
Negative	954 680	16 795 369	71 809 195	10 979 266
Neural	2 199 076	20 556 255	63 477 270	5 174 397
Positive	152 092	476 346	1 929 768	

Figure 13: Content sentiment in various types of sources (stage 4).

significantly exceeds the indicators of the presence of aggression. The quantitative reduction in digital footprints should be associated with the onset of the Covid 19 pandemic in Moscow, which significantly distracted users from the construction problems (Fig. 14, 15).
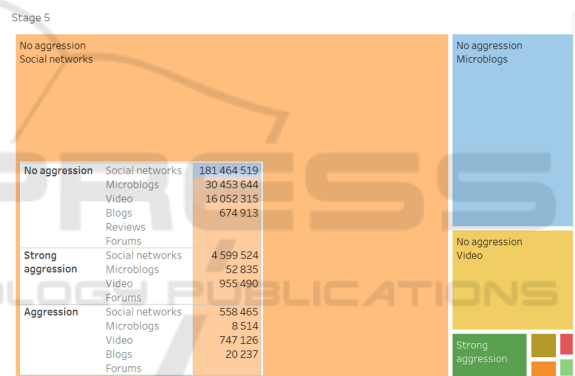

No aggression	Social networks	181 464 519
	Microblogs	30 453 644
	Video	16 052 315
	Blogs	674 913
	Reviews	
	Forums	
Strong aggression	Social networks	4 599 524
	Microblogs	52 835
	Video	955 490
	Forums	
Aggression	Social networks	558 465
	Microblogs	8 514
	Video	747 126
	Blogs	20 237
	Forums	

Figure 14: Aggression (aggression is present, strong aggression, no aggression) in various types of sources (stage 5).

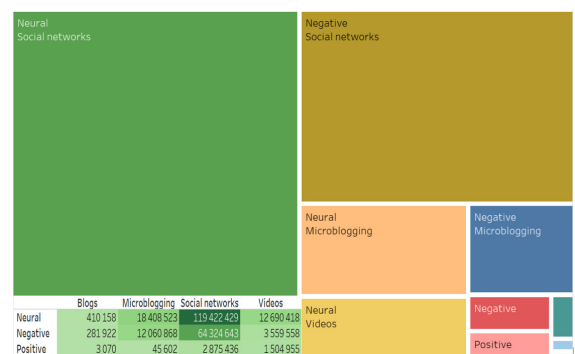|	Blogs	Microblogging	Social networks	Videos
Neural	410 158	18 408 523	119 422 429	12 690 418
Negative	281 922	12 060 868	64 324 643	3 559 558
Positive	3 070	45 602	2 875 436	1 504 955

Figure 15: Content sentiment in various types of sources (stage 5).

3 CONCLUSION

This paper presents an analysis of Information dissemination and perception by social media users in urban planning conflicts

Analysis of Information dissemination and perception by social media users in response to the SEC construction showed that the growth of negative perception (negative sentiment, aggression, strong aggression) is also more actively formed and disseminated through personal accounts, thus opponents of construction can enable involvement of a large audience and achieving a higher degree of involvement. Meanwhile, there is a more effective spread of a certain type of perception in communities.

The presented method demonstrated the possibility of assessing the risks of conflict escalation by tracking the growth of social stress in user texts. The use of neural networks allows you to quickly process a large number of messages, as well as investigate several conflict situations simultaneously. What makes it possible to use this technology in modern conditions, given the rapid growth in the number of communications on the Internet. The presented technology can be used as one of the methods of Predictive analytics in management decision support systems (DecisionSupportSystems - DSS).

At the same time, it is worth noting that the effectiveness of neural network technologies depends on the volume of similar tasks being solved. Therefore, all kinds of conflicts (Urban planning, political, social) require separate configuration and training of the neural network. The advantage of using neural networks is their learning ability, when the quality of analysis increases as such tasks are solved.

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