RUDN Journal of Studies in Literature and Journalism
Вестник РУДН. Серия: Литературоведение. Журналистика
ISSN 2312-9220 (Print); ISSN 2312-9247 (Online)
2023 Vol. 28 No. 4 749–756
http://journals.rudn.ru/literary-criticism

DOI: 10.22363/2312-9220-2023-28-4-749-756
EDN: KRFKZD
UDC 0.70

Research article / Научная статья

Models and methods of controlled transgression of media in crisis conditions

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Abstract. The creation and transgression of mediaobjects is a complicated process that involves making difficult decisions. Under such conditions, the risk of media crises inevitably increases, for example, inadequate perception by the reader of information released by the media, etc. To avoid such crises, it is necessary to take into account all possible factors, both quantitative and qualitative, characterizing mediaobjects and media in general, as well as precise evaluation methods. The focus of the study is on developing a new approach to decision-making that will aid in the controlled transgression of mediaobjects during crisis situations. The method for making decisions based on a hierarchy of cross-disciplinary criteria that takes into account the concept of crisisology is proposed. Additionally, the authors suggest the use of a decision support software service that utilizes an ontology-based mechanism to adopt the user interface dynamically. The proposed method is universal and can be applied to assess different types of medical objects, reducing the likelihood of crisis situations (caused, among other things, by incorrect assessment of the reliability of information).

Keywords: decision support, multi-criteria choice, crisisology, mediaobject

Acknowledgements and Funding. The research is supported by grant of the Russian Science Foundation (project no. 23-21-00112).

Conflicts of interest. The authors declare that there is no conflict of interest.

Article history: submitted July 2, 2023; revised August 15, 2023; accepted August 28, 2023.

For citation: Zykov, S.V., Babkin, E.A., & Ulitin, B.I. (2023). Models and methods of controlled transgression of media in crisis conditions. *RUDN Journal of Studies in Literature and Journalism*, *28*(4), 749–756. http://doi.org/10.22363/2312-9220-2023-28-4-749-756

Модели и методы управляемой трансгрессии медиа в условиях кризиса

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Аннотация. Создание медиаобъектов – сложный процесс, предполагающий принятие непростых решений. В таких условиях неизбежно возрастает риск медийных кризисов, например неадекватного восприятия читателем информации, выпускаемой различными

медиа. Во избежание таких кризисов необходимо учитывать все возможные факторы, как количественные, так и качественные, характеризующие медиаобъекты и медиа в целом, а также точные методы оценки. В исследовании рассмотрен новый подход к принятию решений на основе иерархии междисциплинарных критериев, учитывающий концепцию кризисологии, который поможет в контролируемой трансгрессии медиаобъектов в кризисных ситуациях. Представлен программный прототип поддержки принятия решений, основанный на механизмах онтологий с возможностями динамической адаптации пользовательских интерфейсов. Установлено, что предлагаемый метод является универсальным и может применяться для оценки различных видов медиаобъектов, снижая вероятность возникновения кризисных ситуаций (в тои числе вызванных некорректной оценкой достоверности информации).

Ключевые слова: поддержка принятия решений, многокритериальный выбор, кризисология, медиаобъект

Благодарности и финансирование. Исследование поддержано грантом Российского научного фонда (проект № 23-21-00112).

Заявление о конфликте интересов. Авторы заявляют об отсутствии конфликта интересов.

История статьи: поступила в редакцию 12 июля 2023 г.; отрецензирована 15 августа 2023 г.; принята к публикации 28 августа 2023 г.

Для цитирования: *Zykov S.V., Babkin E.A., Ulitin B.I.* Models and methods of controlled transgression of media in crisis conditions // Вестник Российского университета дружбы народов. Серия: Литературоведение. Журналистика. 2023. Т. 28. № 4. С. 749–756. http://doi.org/10.22363/2312-9220-2023-28-4-749-756

Introduction

The problem of the crisis in the media is multifaceted. Examples of a media crisis are: inadequate perception by the reader of information released by the media; inadequate perception by a large media organization of information created by a correspondent author, etc. In this case, it is quite possible to use the classical model of information exchange, for example, based on the information theory of K. Shannon (Zykov, 2021, p. 16), which allows correcting individual errors in infocommunication due to redundancy of the mediaobjects representation. In the context of this study, the mediaobject is understood as professional media of any format and content (Belousova, 2018, p. 20). The basis of this model is the following objects: receiver, transmitter and communication channel. In our more complex case, the receiver and transmitter themselves are complex systems with many communication channels, as well as ‘internal’ receivers and transmitters.

In addition, there is ‘information noise’ in the channel, the reasons for which may also be several. One of the specific reasons is the conscious (deliberate) distortion of information during transmission (“mediatransgression”). Other reasons may be technogenic or anthropogenic in nature (human factor), but in any case lead to a distorted perception of information or the loss of a significant part of it from the point of view of its original significance.

The crisis in this case is a significant difference between the original and received information. To solve the identified problem of a crisis nature, models, methods and tools of the discipline of IT crisisology can be used, which systematically investigates crises in the production and use of digital products. The developed models are aimed at minimizing the potentially negative consequences of the crisis and, also at improving the accuracy, reliability, and quality of transmitted information.

There is a big problem in determining the value and correctness of information in the modern media space. A large number of sources, discrepancies in interpretation (and in the very essence of mediaobjects) give rise to crisis situations when the media must make a decision both about the form and content (Zykov, 2021, p. 89). Given the large number of alternative mediaobjects, the most difficult is the stage of choosing the target content and its evaluation from the recipient's point of view.

Sometimes, the information provided about a mediaobject and reviews of it may not be sufficient to evaluate its usability for recipients (users). While technical assessments can be automated to some extent, considering user requirements is a complex process that requires human input. It involves understanding the needs, preferences, and limitations of the target audience to ensure that the mediaobject meets their expectations. This user-centered (reader-centric in media terms) approach is crucial for designing effective and user-friendly mediaobjects of all types (Crawley et al., 2016, p. 72).

To solve these problems, in what follows we offer a multi-criteria selection system based on dynamic interfaces, that allows for each user (or groups of users) to define their own system of evaluation criteria (in linguistic form) with their own gradation scales for these evaluations. This approach makes it possible to unify the procedure for making a decision on the choice of a mediaobjects, while not requiring the introduction of a unified system (and scale) of assessment.

Methods and materials

When it comes to user requirements, they are often expressed through language-based evaluations, having their own set of criteria for assessment. This can range from simple scales to more complex ones like plausible-reliable. This means that a one-size-fits-all approach to rating systems may not work for everyone. However, what's crucial to note is that user ratings are heavily influenced by their personal experience and knowledge. This means that before making a final decision on mediaobjects, it's important to formalize user knowledge and consider all the necessary evaluations, even if they are expressed in different ways. By doing so, we can ensure that the final decision is well-informed and takes into account the diverse perspectives of all users.

There are certain attempts to solve this problem in the practical environment. For example, (Martínez et al., 2015, p. 11) provides a generalized decision-making model based on linguistic information that considers the number of matching and non-matching expert assessments. However, this system involves preliminary work in the form of creating a single ‘terminological’ base for experts and ranking all assessments using unified principles.

There are numerous attempts to elaborate new decision-making approaches or adopt existing ones (like TOPSIS (Dehe et al., 2015, p. 6719), ELECTRE, VIKOR (Senthil et al., 2014, p. 52)) to real-life cases, like healthcare (Dehe et al., 2015, p. 6721), performance evaluation of partnerships (Senthil et al., 2014, p. 54), etc. The considerable drawback is that these methods rely mostly on quantitative evaluations (Cid-Lopez et al., 2017, p. 353). On the other hand, estimations that are given by experts during problem discussion can be both quantitative and qualitative. In comparison with quantitative evaluations, qualitative evalua-

tions become more and more preferable in complex situations because of their ability to express fuzzy information. However, according to our rigorous analysis of the field, there is an emerging trend of combining traditional decision-making approaches with methods of processing qualitative evaluations (for example, the combination of TOPSIS and 2-tuple model) (Xu, 2004, p. 21).

Reliable and flexible means for analysis of qualitative evaluations are provided within the scientific area of 'linguistic (multi-attribute) decision making'. These and other methods of processing qualitative evaluations now are generally called 'computing with words', among which the most popular are linguistic computational models (Xu, 2004, p. 22).

In many cases, information that comes from the experts is heterogeneous due to its multigranularity and there are approaches to work with such information: the fusion approach for managing multigranular linguistic information, the linguistic hierarchy approach and the method of extended linguistic hierarchies (Herrera et al., 2001, p. 229).

The current approaches to decision making mainly focus on analyzing either quantitative or qualitative assessments, but very few consider both types of estimations. Additionally, modern methodologies assume the availability of multiple experts without considering their specific areas of expertise, and fail to acknowledge that criteria can belong to different levels of abstraction. To incorporate all these gaps we offer a new approach – multilevel multi-attribute linguistic decision making (ML-MA-LDM). The proposed approach consists of several consecutive steps starting from defining the estimation rules and finishing with the communication stage. It is important to note that these steps can be found individually in various papers describing the decision-making process, for example in (Xu, 2004, p. 21), but never were fused in a consistent way.

Mathematical aspects and formalization of the approach are presented in detail in the work of A. Demidovskij and E. Babkin (Demidovskij, Babkin, 2022, p. 352). In this paper, we concentrate on the conceptual description of the approach, which includes:

1. Setting up rules for providing estimations and distribution of criteria weights assuming that the experts: a) give honest evaluations; b) believe each other; c) choose granularity of evaluations according to their experience and knowledge about a problem; d) have the same understanding of evaluations.

2. Defining available linguistic sets, a context-free grammar and transformation function.

3. Multi-level definition of the desired state, criteria and alternatives on each level of abstraction: a) analyzing the desired state; b) formulating criteria; c) formulating alternatives.

4. Giving multi-level and multi-criteria evaluations: a) aggregating information; b) searching for the best alternative; c) communicating the solution found.

Once experts have defined the criteria and alternatives, each expert provides one evaluation for each alternative, resulting in a matrix of evaluations. The best alternative can be determined by sorting these evaluations according to the rules of comparing hesitant 2-tuple fuzzy sets.

Through several aggregations of evaluations for each level of abstraction and transformations of these estimates, a total evaluation is obtained for each al-

ternative and level of abstraction. These assessments provide insights into how each alternative is measured on each level of abstraction and can be used by decision makers to better understand the scope of alternatives.

Results and discussion

In this case, we propose to evaluate the applicability of the proposed approach for solving the problem of choosing a mediaobject, taking into account the reliability of information (both at the level of the author and the media). The decision-making process involves both quantitative and qualitative factors:

– *cost:* this criterion is quantitative, the evaluation scale is inversely proportional to its values.

– *explicit characteristics of the media:* positioning in the media market, professional characteristics of the editorial staff, discourse around the activities of the publication.

– *latent characteristics of the media:* the value system of the mass media, manifested in the formation of the media agenda and the author's style of individual mediaobjects;

– *the ratio of the goals and interests of the media and the audience:* the type of mediaobject, its communicative goals, the absence of conflict between its elements, accuracy, completeness, sufficiency of information (i.e. adherence to logic when proposing hypotheses).

In addition to these characteristics, we can also consider *linguistic features of the mediaobject*: emotional connotation, complexity of perception, etc.

Instead of using a single scale, our adaptable approach suggests creating a customized scale for each expert involved in the assessment process, which allow for a more comprehensive evaluation based on multiple factors (fragment is represented in Table).

Mediaobject evaluation criteria evaluation scales

Criterion	Type	Scale (from least preferred to most preferred)
Cost	Quantitative	Any non-negative value
Positioning in the media market	Qualitative	Indefinite, personal, affiliated, official
Provider (media) reputation		Negative, indefinite, positive
Sufficiency of information		10 segments: from completely insufficient to perfectly sufficient
Quality		Worse/comparable//higher/is the standard

In the example shown below, we use these criteria to evaluate the mediaobjects of the RBC Internet portal, RIA Novosti, Mash and “Caution, News” telegram channels for assessing the reliability of information. For this purpose, we use a software prototype that includes a backend responsible for the ranking of alternatives and a frontend necessary for setting all the components required for evaluation.

The first step in deciding on the choice of a particular mediaobject is to determine the criteria for its selection. At the same time, it is important to remember that the criteria, by their nature, can be presented in various forms (numerical, textual (linguistic), etc.) and may differ in assessment scales in terms of quality (from

lower to higher and vice versa). Therefore, in the created service, the first stage is the creation of a system of criteria and the setting of scales for their evaluation.

Using the appropriate GUI (Figure 1), the user is able to first determine and save the names for the criteria system and each individual criterion, select the most appropriate data type to represent it. The supported data types are selected based on the nature of the possible criteria for selecting mediaobjects: *integer* (int) and *fractional* (float) *numbers* – to quantify mediaobjects (e.g. subscribers amount), *date* – in the case of distinguishing newer mediaobjects from older ones, *textual* (varchar) – for linguistic assessments. What is more important, we can use not only the data types, but full-fledged domains for each individual evaluation criterion, collecting them in the object-relation data-base (ORDB) structure. Once the criteria system and its evaluation scale are established, the system will switch to the mode of introducing alternatives by experts (Figure 2, *a*).

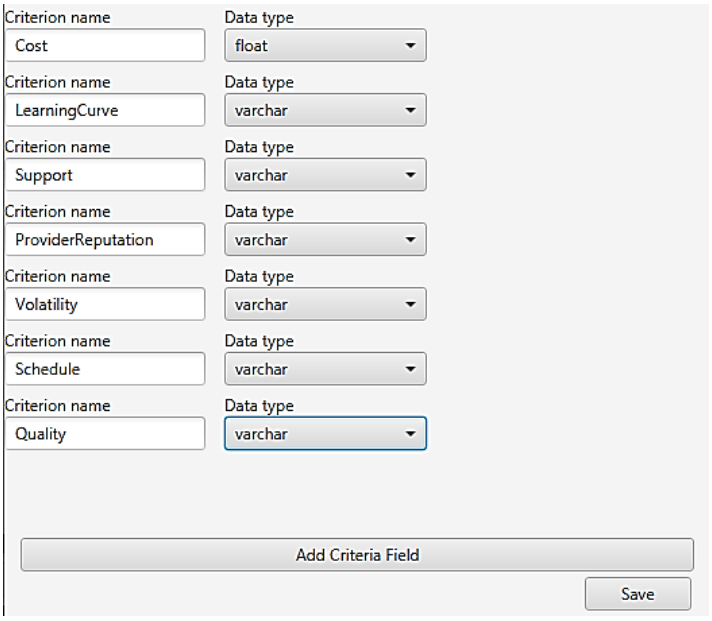
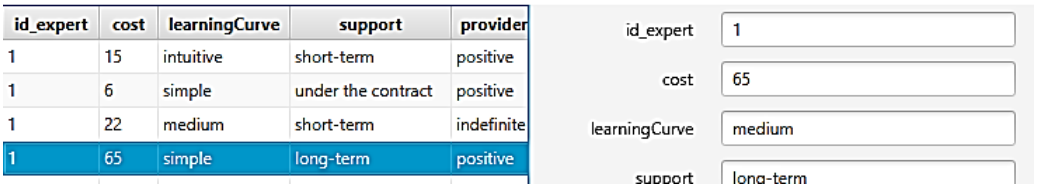


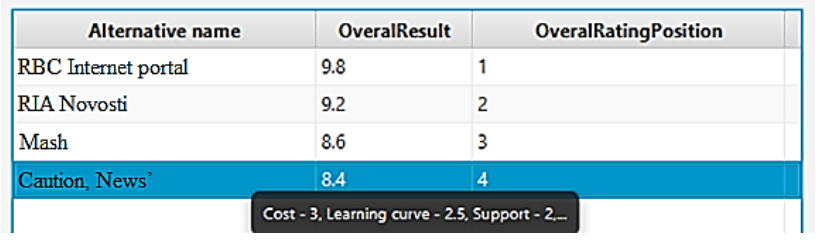
Figure 1. GUI for creating a criteria system

a



id_expert	cost	learningCurve	support	provider
1	15	intuitive	short-term	positive
1	6	simple	under the contract	positive
1	22	medium	short-term	indefinite
1	65	simple	long-term	positive

b



Alternative name	OverallResult	OverallRatingPosition
RBC Internet portal	9.8	1
RIA Novosti	9.2	2
Mash	8.6	3
Caution, News'	8.4	4

Figure 2. GUI for entering (*a*) and displaying ranked (*b*) alternatives

The most significant advantage of the implemented GUI is its adaptability. If the system of criteria is modified, GUI will be updated completely automatically to allow the expert to make assessments in accordance with the updated criteria system.

After all experts have entered their own ratings of alternatives, the entered ratings as a JSON package are transferred to the service for comparing and ranking alternatives, and the processing result is displayed (Figure 2, *b*).

Conclusion

This article presents a new approach and tools for evaluating different alternatives based on linguistic data during the overcoming the media crisis. Unlike existing approaches (like Crawley et al., 2016, p. 73 or Martínez et al., 2015, p. 11) that require extensive preparation (like to unify the used scales), the approach proposed involves setting individual rating scales for each criterion and does not require a transition from qualitative to quantitative criteria. Our approach is universal and can be applied to various domains, helping decision-makers to make informed decisions by considering multiple criteria and linguistic data. In this case, we give an example of working with mediaobjects in crisis situations, when a large number of data sources and their heterogeneity can cause content to be unreliable.

What is the most important, any changes made to the evaluation criteria and expert assessments are done through a GUI that adapts and adjusts automatically to the initial system of criteria set for evaluating alternatives (without need to recreate it or re-enter expert assessments).

In the future, we plan to introduce into the prototype support for more complex rules for accounting for linguistic assessments, the ability to vary scales based on the mechanisms of category theory, to analyze a wider class of qualitative assessments, which are the most difficult to formalize and heterogeneous in a media crisis.

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