***An approach to identifying social protest potential based on a city-to-city similarity metric***

***Introduction.*** Nowadays, the evaluation of city-to-city similarity is a relevant approach that can be applied to various tasks, including infrastructural, architectural, and other areas [1, 2, 3, 4]. Interest in this research direction is mainly driven by the possibility of using similarity assessment to address urban planning problems [4]. At the same time, social conflicts that arise during the implementation of construction projects are of great importance in the field of urban planning [5, 6]. Therefore, forecasting social risks (such as protests and conflicts) is a relevant task for urban planning. Undoubtedly, this problem is even more relevant for socio-economic policymaking [7–11].

Motives and factors of modern social protests are under careful investigation due to their significant impact on the socio-political situation, which, in turn, is closely connected with socio-economic processes [7–11]. The relevance of this research area is beyond doubt, since certain mechanisms of protests remain debatable or even unknown [7, 8]. The growing number of recent studies on this topic also serves as evidence of strong interest.

The main goal of this research is to develop a method for assessing the potential for social conflict in a given municipality (city, town, or village). The core of the approach is estimating the similarity not only of the socio-economic environment, but also the demographic structure (human capital) to characteristics that could show the predisposition to certain types of social conflict. In other words, similarity between two municipalities, where one of which has experienced a particular social conflict, can serve as an indicator of a likely comparable social response to the same type of stimulus.

***Related works.*** There are various approaches to investigating social conflicts. So far, the most common approach has been to examine the problem within the context of sociological and psychological research [7, 8]. However, it should be noted that forecasts based only on sociological data do not demonstrate high accuracy [7].

Also one of the common approaches is based on mathematical modeling of collective behavior [8]. It mainly involves the development of various agent-based systems that allow the analysis of protest dynamics through imitation processes. For example, an epidemiological model is often used as a representation of protest movements [8].

In recent years, machine learning approaches have also gained popularity in this field of research [9, 10, 11]. These studies are generally based on analyzing public sentiment through the monitoring of social networks and mass media [9, 10, 11].

In study [9], protests are investigated through the analysis of the stylistic features of mass media articles covering labor protests that took place in Romania (2018–2025). Within the context of the present research, particular interest lies in the evidence supporting the spatio-temporal hypothesis of protest diffusion, meaning that a protest in one location increases the occurrences of protests in neighboring areas [9]. This conclusion resonates with the effectiveness of the epidemiological approach to analyzing protest dynamics. However, the present research proposes a method that considers at least the “spatial” component in terms of the socio-economic and demographic space, which is often influenced by geographical closeness but is not determined by location alone.

The study [10] used social network data to forecast civil unrest events. A modified neural network was proposed, trained on Twitter data (now X.com) using the example of the 2019 protests in Hong Kong. The effectiveness of this approach was demonstrated by comparing it with various other machine learning algorithms [10].

In [11], protests in Latin America (2012–2014) were examined using a logistic regression model that was trained on data not only from the social network Twitter (now X.com), but also from other sources, including news feeds, political event databases, the TOR network, and economic indicators. It is important to note that only currency exchange rates were used as the economic indicator [11]. While this is a valuable factor, it is not sufficient to capture the full socio-economic condition of a territory within a country.

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