

Social Computing of the Social Well-being of Refugees and Internally Displaced Persons in Ukraine Using Data Mining Methods

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Abstract

The article is devoted to the study of the possibility of using intelligent computer systems using the analysis of knowledge bases on large arrays of sociological information. The state of social well-being of refugees and forcibly displaced persons during the military aggression against Ukraine in 2022 (N 1170) was studied using factor analysis, the method of classifications, methods of multidimensional scaling and two-dimensional distribution of data. The possibilities of computer processing of sociological information have been determined, which contributes to the emergence of approaches to obtaining new scientific knowledge, among which intelligent data analysis (IAD), based on the use of computer analysis methods and artificial intelligence in the search for latent knowledge hidden in arrays of source information.

Keywords

Social computing, social well-being, array of sociological information, factor analysis, refugees and forcibly displaced persons, data mining

1. Introduction

The rapid development of information technologies and, as a result, the expansion of the possibilities of computer information processing contributes to the emergence of approaches to obtaining new scientific knowledge, among which intelligent data analysis (IAD), based on the use of computer analysis methods and artificial intelligence in search for latent knowledge hidden in arrays of source information, plays an important part. Today, intelligent data analysis is gradually becoming an integral part of many technologies, penetrating more and more fields of scientific and practical activity.

Sociology also turned out to be involved in the process of applying various computer technologies for working with data. In particular, the possibilities and potential ways of developing computer sociology (computational sociology) [1] are being discussed today. Computational sociology is understood as a field of scientific knowledge that supposes the application of computational methods and various computer systems with the use of knowledge bases.

Today it is already possible to observe some consequences of the expansion of computer technologies in sociology:

- dissemination of online sociological studies;
- expansion of the arsenal of methods used to analyze sociological data owing to intelligent technologies for processing arrays of empirical information (both primary and secondary);
- formation of new branches of sociology, the development of which would be impossible without the development of computer technologies (Internet sociology is the most striking example);

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- the emergence of the concept of a social computing, which is understood as a new type of knowledge production, based on the ideas of the collective mind, "wisdom of the crowd" and smartmob.

The most natural and obvious field for the application of intelligent computer systems with the using of knowledge base analysis in sociological research is the expansion of processing and analysis of the results of mass surveys using quantitative and qualitative methods for text processing.

The actualization of the use of intelligent data analysis methods (especially data mining) in secondary research is due to the need to identify deeply hidden trends, for which various "complex" data analysis methods are usually used.

The purpose of the article is to carry out social computing of the social well-being of refugees and internally displaced persons of Ukraine in the first six months of military aggression with the help of IAD using data mining methods.

2. Research problem statement

2.1. Review of existing literature

Gartner company experts identify 35 trends, among which 16 (47%) determine the focus of computing technologies on meeting social challenges. This indicates that the direction of computer engineering research approaches the resolution of social problems related to the management of states, social groups, and every person in order to eliminate social conflicts [2, 3]. There are numerous publications in the field of cyber-social computing. However, among them there are few works aimed at managing social processes [4–6].

Among Ukrainian sociologists, research into the digitization of sociological methods of analysis and the application of intelligent computer systems using a knowledge base for the analysis of sociological information is not widely presented. It is possible to single out only the systematic studies by O. Kislova and L. Sokuryanska [7, 8]. Ukrainian sociologist O. Kislova points out that the amount of information containing big data is increasing explosively due to the spread of digitization and datafication processes. Digitization and datafication are two interrelated parts of the same process – the transfer of the entire heritage of humanity into a machine-readable format, that is, into Big Data arrays. At the same time, the possibility of quantitative analysis is a necessary component of the obtained data array [7].

The phenomenon of social well-being and the methodology of its research are presented in the works of Keyes C.L.M., Ryff C.D., Helliwell J.F. and others [9–12]. Various methods of measuring different criteria of social well-being have been developed. In Ukrainian sociology, the most famous is the Integral Index of Social Feeling (IISF) created by E. I. Holovakha and N. V. Panina [13]. A sociological analysis of the social well-being of refugees and forcibly displaced persons in Ukraine is presented in the work of N. V. Kovalisco and S. M. Bubnyak [14].

2.2. Methods/Methods and Materials

Knowledge Discovery and Data Mining (KDD) is designed to discover useful knowledge from data using special technologies, methodologies and methods, which include, in particular, automatic intelligent extraction of non-obvious knowledge from large volumes of information in a minimal amount of time. Computer Science, Systems Analysis, Artificial Intelligence, mathematics, cognitive psychology and other scientific disciplines related to the subject are considered in [15].

Under the influence of the growing number of social network applications, a new paradigm of computing has emerged – social computing, which is understood as "a new type of immaterial production (production of knowledge), which includes a new environment of production, a new subject of production and a new method of production of knowledge" [15]. Social computing involves the study of social behavior using modern computer systems. It integrates a variety of methods for learning the "wisdom of the crowd", combining the study of social networks with methods of predicting social behavior, cultural dynamics, etc.

Data mining is defined as the process of identifying in raw data previously unknown, important, practical and well-understood explanations of knowledge necessary for decision-making in various areas of human activity.

By using special software to find patterns in large batches of data, users can develop marketing strategies, manage credit risk, detect fraud, filter spam, and even detect user sentiment. The market of data analysis systems is growing. This is facilitated by the activities of large corporations: SAS, IBM, Microsoft, Oracle, etc.

Data mining relies on the efficient collection, storage and computer processing of data.

In IAD technology, there are usually four different types of knowledge that can be extracted from data: superficial, multidimensional, latent, and deep knowledge. In the context of the third group, attention is focused on obtaining a model for assessing the influence of various (both external and internal) factors on the analyzed social phenomenon or process. Currently, the demands of science and practice require the solution of other tasks, namely, the rapid analysis of large volumes of disparate information received in real-time mode (flow analysis of information), the ability to quickly make correct specific management decisions based on the results of sociological research is required from a substantive specialist, in particular, under conditions of uncertainty, shortage of hours, etc., to carry out accurate forecasting, etc.

As stated in [16], for the study of large databases, data mining has a dialogue with social scientific theories. It allows constructing a predictive model to forecast new "facts" and draw conclusions. Simple data collection is only the beginning of the entire cycle of research. Short-term practical predictions can be drawn from it, but this is not sufficient for theory development. However, one should be able to draw from a theoretical conclusion.

2.3. Experiment

The study has been conducted by scientists of the National Technical University "Kharkiv Polytechnic Institute" in June-July 2022 with the help of an Internet survey ($N=1170$ people) reflecting the peculiarities of the social well-being of Ukrainians during the first six months since the beginning of the full-scale invasion of the aggressor country and military operations against Ukraine [17]. Residents of Ukraine who lived in all regions of Ukraine before the start of military aggression on February 24, 2022, took part in the survey.

Attention is drawn to the definition of social well-being, which emphasizes that "it is a subjective assessment by people of the level of satisfaction of their own needs and interests by society or its individual institutions. Such self-esteem acts as a spiritual stimulus and the guiding force of social activity of individual individuals and social groups" [18]. Most researchers try to identify the components of social well-being based on human needs and the possibilities of their realization in society. Thus, eight components of social well-being are most often distinguished, they include: work, material situation, age, family, personal desires, social status, state, education.

In empirical studies of social well-being, various methodological approaches are used, which, in fact, determine the structure of questionnaire surveys. The most complete structure of the questionnaire includes questions characterizing social attitudes related to various types of personal well-being. The following types of personal well-being can be distinguished:

- social well-being, as the individual's satisfaction with his social status and life conditions, and even satisfaction with interpersonal relationships and status in the microsocial environment;
- material well-being, as satisfaction with the material side of one's existence, the completeness of one's security, the stability of material wealth;
- spiritual well-being, as a feeling of belonging to the spiritual culture of the society, awareness of the possibility of involvement in the riches of spiritual culture; awareness and experience of the meaning of one's life;
- psychological well-being, as a feeling of inner balance, integrity, satisfaction with one's creativity;
- physical well-being, that is, the joy of the need for health, good physical well-being, bodily comfort.

2.4. The results

The results of the study have shown that the majority of respondents assessed their own state at the beginning of the war as nervous, tense, 53% noted that they had a feeling of the unreality of what was happening.

We can state that women showed more composure and determination. For example, 29% of men and 17% of women stated that they were in a state of stupor; 39% of men and 14% of women felt fear and oppression; a state close to panic 19% of men and only 4% of women.

The theoretical basis of our research is gender studies, which have become very relevant recently in Ukrainian society and science. Gender roles are socio-cultural constructs that are determined by social expectations regarding behavior, actions, and characteristics associated with gender. Throughout most of history, gender roles have undergone changes and reincarnations, both in the narrow cultural field of a specific society and in a global world sense. The very concept of "gender" is relatively new, as it appeared only in the middle of the 20th century. Sociologists who studied society and, in particular, the problems of men and women, say that only one definition of "gender" does not suffice, so the American psychoanalysts have introduced the new term "gender", which denoted the "social gender of a person", the norms and rules for men and women were now considered from positions of social constructions, not traditionally biological ones. Over time, this approach grew not only into permanent "gender roles" determined biologically or culturally, but also into the individual's own self-identification. This has also led to the study of gender roles not only in today's issues, but also from a historical perspective, in order to find the reasons why they are changing in the first place.

Well-known social gender stereotypes of a "guardian" woman, i.e., one who guards the home fire and a man protector. These stereotypes arose historically, because traditionally a woman was first of all considered a housewife, she looked after the household, comfort, children while the man worked, providing for the family. Now, these social gender stereotypes are not only criticized by some scientists, but also transformed under the influence of today's realities.

The fact that women perceived the reality of war much more than men was indicative. And vice versa, many men were not concerned about the threat of hostilities. Data on the distribution of answers to this question (Did you personally expect or predict the start of hostilities on the part of Russia?) are provided in Table 1.

Table 1

Data on the expectation of war men/women (%)

	No, I did not think about it, and the possibility of war was not discussed in our circle	Heard certain conversations and media information, but did not attach importance to it	There was some concern, but she did not consider the war scenario to be real	Expectations of war were very realistic
All	9%	18%	54%	18%
Women	3%	11%	51%	35%
Men	10%	20%	55%	15%

This is also confirmed by concrete actions to prepare for war. 41% of women and 56% of men did not take any action, even if they had some concern about the possibility of military actions. The most popular actions on the eve of the war, demonstrating preparation, were: packed an "anxiety suitcase", compiled documents, etc. – 46% of women and 34% of men; made some supplies of water, food – 31% and 25%, respectively; prepared the car, stocked up on fuel – 24% and 11%; took care of the stock of medicines – 23% and 22%. Traditionally, women are more focused on maintaining family well-being, acting as the protectors of the family, taking care of the safety and future of the family. In addition, modern women in Ukraine are more pragmatic and try to take responsibility for themselves and their families, even in the matters that were previously considered purely man's ones – almost twice as many women prepared cars and stocked up on fuel than men.

At the time of the survey, June-July 2022, respondents rated their own psychological state, on a scale from "0" to "10", (where "0" means the maximum level of calmness, confidence that everything will be fine, and 10 – the maximum level panic, fear, uncertainty). During the survey, the following result was obtained: a total score of 5.95 (see Table 2). In other words, the feeling of anxiety and insecurity still prevailed.

Table 2

Assessment of the emotional state at the time of the survey on a scale from 0 to 10 (%)

1	2	3	4	5	6	7	8	9	10
2%	4%	9%	9%	20%	13%	20%	15%	6%	1%

The highest values are observed in the interval from 5 to 8, which indicates a rather anxious and tense state of the people we interviewed, especially since this question was answered by all respondents, both forced migrants and those who did not leave their homes despite the danger and even hostilities around populated areas.

Residents of the central regions of Ukraine in the summer of 2022 rate their own emotional state as calm, almost confident (rating – 3.12). Also, it should be noted that the respondents' assessment of their emotional state worsened at the time of the survey compared to the beginning of the war. In Table 3 a comparison of the average values of the mood assessment at the time of the start of the war and at the time of the survey is presented.

Table 3

Average values comparing respondents' mood at the beginning of the war and at the time of the survey

	Please rate your emotional state today
	Average
Normal, more or less normal psychophysiological state, calm	4,83
Collected, determined, ready for the necessary actions	4,35
Nervous, tense	5,02
A state of fear and depression	5,01
Stupor, lack of clear thinking	5,15
The condition is close to panic	5,36
My chronic diseases have worsened	5,59
Loss of sleep, appetite	4,83
A feeling of apathy	5,21
There was a feeling of unreality of what was happening	4,94
A state of irritability and aggressiveness	5,25
There was internal mobilization and the need to act	4,75
Received damage from an explosion or shelling (wound, contusion)	6,80

An important indicator of social well-being is the degree of a person's involvement in social processes, a subjective assessment of one's position in society, and its dynamics. In this case, it is not about formal social status, but rather about the perception of one's current position in society, which is not necessarily measured by some external indicators. It is not a matter of possessing some social resources, high material well-being, access to power or a prestigious social position. A more important category is involvement in social processes, the feeling of being a part of the community, as well as the extent to which this feeling shapes a person's social optimism or pessimism.

Social well-being, as it was mentioned earlier, is determined by many factors, not the least of which is the feeling of family, Motherland, hometown, where there is a home, that is, the location where a person feels at home. That is why measurements of social well-being were carried out through a person's

decision to evacuate. It is clear that each case is unique, and behind each of them we can see the pain of making a difficult decision and a heavy burden of responsibility. After all, fear, uncertainty about the future, anxiety for children and deceased family members, hostilities that can start anywhere at any moment, all this multiplied by collective panic caused people to want to leave a dangerous place (or even a safe one) as soon as possible at that time. It is clear that the most important reason was fear for the lives of children (grandchildren) or one's own life – 61% of forcibly displaced persons gave this answer. 52% left because of constant shelling of the settlement where they were located. Another 37% were afraid of the occupation of their settlement and did not want to live under occupation.

Today, we can observe a change in the distribution of certain social roles in public life. First of all, this applies to social roles related to the provision of vital human needs during wartime. Especially women with children and women who left with relatives, who need constant outside care and are not capable of self-care, or who themselves have disabilities or serious illnesses. Such women need to solve many problems outside their home, look for a source of income, and then combine work and care for dependents. Women need to simultaneously solve the housing problem, establish a household, find an educational institution for their children, start life anew and overcome personal inner experiences. In addition, during the war, the vulnerability of women and girls to gender-based violence increases tremendously, which also actualizes the issue of conducting a gender analysis of social practices of Ukrainians regarding the satisfaction of basic needs. It should be taken into account that Ukrainians have to integrate into a new social environment and search for social practices under the influence of stereotypes prevailing in society. However, deep-seated gender stereotypes, prevailing societal ideas about men and women, which people encounter most often in their personal, social, and professional lives, are very often on the way to social integration [19].

Unfortunately, in modern society, the problem of stereotyped, mostly negative, image of displaced persons and migrants is also widespread. Often, the displaced people themselves complain that they are always portrayed as beggars with an outstretched hand, who lack any motivation to improve their lives on their own, that they are always waiting for someone to do things for them and solve all their problems. As a result of prevailing stereotypes about immigrants in general, and stereotypes about women and men in the new social environment, they are exposed to a double influence – both as immigrants and as men or women.

Gender analysis, on the theoretical basis of which our research is based, recognizes that the social practices of meeting the basic needs of women or men can change in time and space, they can be affected by the processes of accelerated social changes, including armed conflicts and wars. Conflicts and displacement disrupt the normal lives of people of both sexes, causing trauma, loss, impoverishment and marginalization, but they also create conditions for self-initiative in choosing appropriate social practices or creating new ones, through the breakdown of social, economic and political structures. In order to study the social practices of individuals and groups, it is necessary to carry out a conditional distribution of social practices according to a defined criterion, that is, to carry out a classification. In our research, it is appropriate to choose criteria that indicate how each respondent is included at the moment and in this context in a new social environment in the conditions of war.

First. Ukrainians who have chosen the active nature of social practices participate in our research – all of them made a difficult decision to leave their own homes and were active in moving to a safer place due to the start of active hostilities.

Second. Every citizen has the need and right to a sufficient standard of living for himself and his family. In the situation in which the respondents of our study found themselves, they need to solve the issue of finding the income provided by the law as a source of livelihood. They can choose one of the possible ways of obtaining legal sources of livelihood: salary, profit from entrepreneurial activity or receive a pension, scholarship, alimony, other social benefits, rely on their own financial savings or financial assistance from family members. According to the selected criteria, the social practices of forced migrants can be divided into the following groups:

- "Group 1": innovative activity – social practices of forced migrants who left their place of permanent residence due to the start of active hostilities and chose a way to obtain legal sources of livelihood by opening their own business.
- "Group 2": non-productive activity – social practices of forced migrants who left their place of permanent residence due to the start of active hostilities and chose the method of obtaining legal sources of livelihood through employment under a labor contract (contract).

- "Group 3": paternalistic activism – social practices of forced migrants who left their place of permanent residence due to the start of active hostilities and whose legal source of livelihood is state social assistance, their own savings or other financial support [19].

Analysis of the research results made it possible to determine the number of respondents in each group.

- "Group 1": innovative activity – 7%
- "Group 2": unproductive activity – 65%
- "Group 3": paternalistic asset – 28%

The results show that the absolute majority of women chose social practices of group 1 (innovative activity) and group 2 (unproductive activity) – 72%. They have a way of obtaining legal sources for the existence of opening their own business and employment under an employment contract (contract).

Social connections are known to bring many benefits to both social, psychological and physical health. Some foreign researchers even compare their positive effects to a healthy lifestyle and admit that their benefits exceed those of other known public health factors, such as physical exercise, avoiding obesity and quitting smoking. Conversely, negative social relations are not only a source of serious social problems, but also reflect on a person's social well-being. Thus, social relations act as a key factor of social well-being. "The secret to 'happiness' – such as it is – may lie in high-quality social relationships. Humans are fundamentally social animals, living together, having romantic relationships, family groups, neighborhoods and communities. Our relationships can be a source of support, a source of identity, and a source of fun, etc." [21].

Researchers Diener and Seligman [20] determined the qualities that distinguish the happiest and the least happy people. They found that these two groups differed not in gender or socioeconomic status, but in the presence of relatives and friends. Similarly, in a study of social support in Iran, Jordan, and the United States, Brennan and colleagues (2013) found that social support from friends and family members was associated with satisfaction and positive mood, and overall, there is ample evidence in the scientific community that that humans have an innate and deeply rooted need to form strong social bonds with others, and the lack of such bonds has detrimental consequences for health and well-being.

Disruption of social and family ties leads to deterioration of social well-being, especially if it is accompanied by a forced change of place of residence. In table 3 data on the general assessment of the emotional state of the respondents at the time of the survey are given. This emotional state was definitely formed under the influence of many factors, but it is an undeniable fact that the rupture of social and family ties has a predominant influence on its definition. In response to the question "Was your family separated during the evacuation?" the following results were obtained (see Table 4)

Table 4

Family separation (%)

No, my whole family left together	39%
Yes, unfortunately, the older family members stayed at home	16%
Yes, the men stayed, and the women and children left	9%
Yes, some family members left separately at different times and then joined together	12%
Yes, the family is separated and it is not known when we will be able to see each other	25%

The social well-being of refugees and forcibly displaced persons is determined by their emotional state, which is influenced by the presence of loved ones and family. The average value of the emotional state was determined by us in the form of a correlation with the above question by estimating the average value. Table 5 shows data on the assessment of the emotional state of forcibly displaced persons, which, in our opinion, was directly affected by the circumstances of evacuation and separation of families.

Table 5

The average value of the emotional state depending on the state of the family

Family	Please rate your emotional state today
	average
No, my whole family left together	4,64
Yes, unfortunately, the older family members stayed at home	3,73
Yes, the men stayed, and the women and children left	5,26
Yes, some family members left separately at different times and then joined together	5,66
Yes, the family is separated and it is not known when we will be able to see each other	4,13

Social well-being, as it was mentioned earlier, is determined by many factors, not the least of which is the feeling of family, Motherland, hometown, where there is a home, that is, the location where a person feels at home. That is why we measured social well-being through a person making a difficult decision to evacuate. It is clear that each case is unique, and behind each of them is the pain of making a difficult decision and a heavy burden of responsibility. After all, fear, uncertainty about the future, anxiety for children and deceased family members, hostilities that can start anywhere at any moment, all this multiplied by collective panic caused people to want to leave a dangerous place (or even a safe one) as soon as possible at that time). It is clear that the most important reason was fear for the lives of children (grandchildren) or one's own life – 61% of forcibly displaced persons gave this answer. 52% left because of constant shelling of the settlement where they were located. Another 37% were afraid of the occupation of their settlement and did not want to live under occupation. We see the distribution of answers to this question in Table 6.

Table 6

Reasons for forced evacuation (%)

The fear of war and the desire to escape from this hell	33%
Fear of occupation and reluctance to live under occupation	37%
Approaching the war zone to my settlement	36%
Constant shelling of my settlement	52%
Anxiety for the lives of children, grandchildren, loved ones, one's own life	61%
Fear of problems/problems with necessary medicines/medical procedures for me/my family member	12%
He saw no point in staying in the city, because he had nothing to help	9%
Having/apprehending food/food problems for me and my family members	17%
Stories of those who have already evacuated, about their lives in safety	6%
Information about destruction and killings in occupied towns and villages	17%
Administration and military recommendations for immediate evacuation from my place of residence	4%
Information about the possibility of organized evacuation offered by volunteers	3%
My house has been ruined and I have been looking for a place to live.	4%
An offer of a safe place to live	26%
Requirements of the management of the organization where I / my relatives work	4%
Destroying houses near mine	21%

2.5. Discussion

The purpose of the next step in the analysis of the social feelings of refugees and IDPs of Ukraine after the first half of the war was to determine the degree of readiness of Ukrainians at the time of the war, not so much for the war itself, but for active social practices to protect themselves, their families, and the state as a whole. To do this, firstly, a reversed solution (Varimax rotation) was found with the help of factor analysis using the method of principal components regarding the classification of respondents according to their emotional state on the eve of the war (Table 3).

Table 7

Distribution of respondents (N=1170) into classes by emotional state using the inverse component method

Matrix of inverse components ^a			Component					
Group	Percentage of respondents		1	2	3	4	5	6
I Group	37%	Collected, determined, ready for the necessary actions	,921	,075	-,160	,109	-,078	,159
	25%	There was internal mobilization and the need to act	,942	,124	-,077	,164	-,028	-,114
II Group	78%	Normal, more or less normal psychophysiological state, calm	,220	,092	-,200	,837	-,231	-,075
	53%	There was a feeling of unreality of what was happening	,058	,072	,151	,891	,158	,172
III Group	55%	Nervous, tense	,362	,218	,500	-,020	,062	,485
	35%	A state of fear and depression	-,144	,149	,762	,120	-,070	-,098
	41%	Loss of sleep, appetite	-,104	-,116	,672	-,109	,105	-,028
IV Group	27%	Stupor, lack of clear thinking	-,166	,097	-,178	,050	,838	-,012
	16%	The state is close to panic	,090	-,051	,353	-,103	,690	-,078
	10%	My chronic diseases have worsened	,164	,835	,070	-,017	,029	,036
V Group	16%	Feeling of apathy	-,325	,653	-,292	,070	,259	-,035
	17%	A state of irritability and aggressiveness	,196	,811	,125	,158	-,107	-,063
VI Group	1%	Received damage from an explosion or shelling (wound, contusion)	-,027	-,087	-,143	,092	-,089	,906

Determination method: Analysis by the method of principal components.
Inversion method: Varimax with Kaiser normalization.

a. The inversion converged in 6 iterations

As we can see, the respondents were divided into five subgroups according to their own answers regarding the emotional state, which makes it possible to reduce the dimension of the characteristics, and on the other hand, to formulate new hypotheses (knowledge) regarding the units of analysis. So, the 1st group (collected, determined, ready for the necessary actions, internal mobilization and the need to act appeared) are the respondents who were ready to act, they were morally ready for an attack. It was these representatives of refugees and IDPs who were ready to leave, save their families, pets, they knew where to go, and upon arrival in a new community organized volunteer activities and actively began the process of adaptation to new conditions. Its number is approximately 15% of the total number of respondents. Group II (normal state, more or less normal psychophysiological state, calm, but there

was a feeling of unreality of what is happening) are respondents who endured the first days and weeks of the war. They were in no hurry to evacuate, but under the pressure of circumstances and with the development of events at the front, they made a balanced decision. Its number is 31%. Group III (nervous, tense state, state of fear and depression, loss of sleep, loss of appetite) – these are the respondents who received certain emotional injuries and needed help, time and effort to make decisions about their future life. Its number is 34%. Representatives of further groups IV (a state close to panic, stupor, lack of clear thinking) and V (a state of irritability and aggressiveness, I have an exacerbation of chronic diseases) are respondents who needed serious support and help; the process of their adaptation was difficult and lengthy. Their number is 11% and 8%, respectively. And the VI group of respondents, these are those who, in the first days and days of the war, were injured by an explosion or shelling (wound, contusion) – 1%. Thus, thanks to the factor analysis, we can see that in general, almost less than half of Ukrainians (representatives of the I and II groups) met the beginning of the war in an active position. And the second part were confused, among whom almost 20% needed outside help.

Turning to the analysis of multidimensional distributions, namely to Prefscal multidimensional scaling methods, a visualization of the sample of respondents was carried out taking into account the degree of closeness according to the Minkovsky scale, according to indicators of gender, emotional state at the beginning of the war, and assessment of one's own state during the research (Fig. 1).

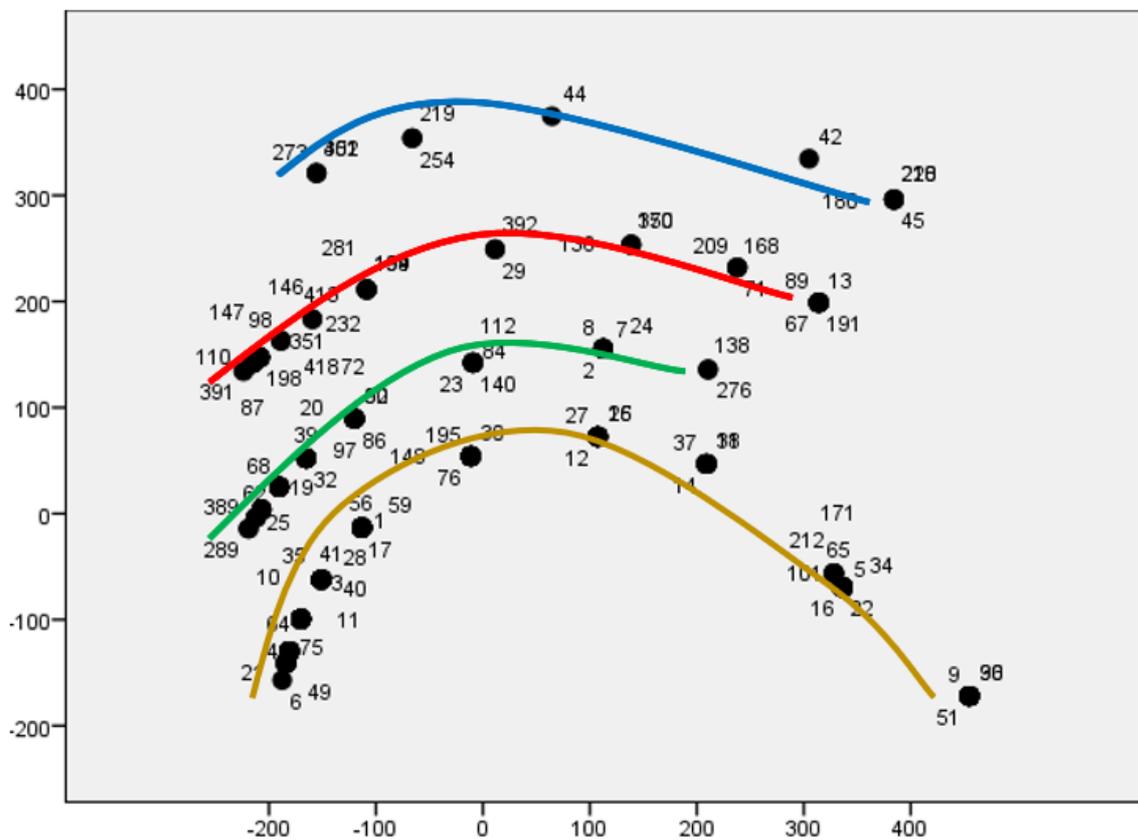


Figure 1: Visualization result of Prefscal multidimensional scaling of a sample of respondents by gender, emotional state at the beginning of the war, and assessment of their own state during the research

According to the obtained data, we can conclude that according to these indicators, Ukrainians can be divided into certain groups, where the axes correspond to the following characteristics: *OX* – readiness to adapt in difficult conditions, and *OV* – "migrated – did not migrate".

Thus, the sample of respondents can be classified into four groups. Group I (lilac color) – middle-aged Ukrainians who live and work in Ukraine, pay taxes to the state budget, help the Armed Forces, have a certain financial "safety cushion". This cohort also includes young people studying at Ukrainian higher education institutions, who associate their future with the reconstruction of their native state.

Representatives of this group, both women and men, have a certain social capital that helped them adapt to difficult conditions and provide for their own lives and the lives of their families. The structure of social capital includes the presence of a special secondary or higher education, knowledge of foreign languages, skilled work, the presence of one's own undamaged real estate and a car. Most of them did not migrate, and if they moved from their place of living, then it happens within the country.

Group II (green color) – Ukrainians with passive expectation. This group includes both refugees and IDPs who are waiting to return home. This group consists mainly of women with children, whose husbands remained in Ukraine, and who have no or almost no experience of staying abroad and do not speak foreign languages. People with this type of behavior seek to return to Ukraine under any circumstances and preferably as soon as possible, but their relatives in Ukraine insist that they remain abroad for the time being. Their whole lives (friends, work, housing, hobbies) are in Ukraine and they have no motivation to integrate into foreign society. Some of them admit that they will have to work and express their willingness to perform skilled work close to their profession or work that do not require special qualifications.

The third group (red color) is Ukrainians who were forced to leave their hometown, but due to a number of circumstances could not leave abroad. As a rule, these are entire families in which men are of military age, older family members have elderly parents to support them, and the family includes sons over 18 years old. All family members received IDP status and financial support from the state, and regularly receive humanitarian aid. They live in the Western and partly in the Central regions with relatives or friends, rent social housing free of charge or pay utilities. They also believe in the soon victory of Ukraine and hope to return to their homes. They are looking for new jobs occasionally, because they either have remote employment or have a pension state security.

Group IV (blue color) – are Ukrainians who associate their immediate future with living in Ukraine. At the beginning of the war, they could temporarily leave their places of permanent residence, but by the winter of 2022 they had already returned home, or did not leave their native homes at all. Such Ukrainians believe in the imminent victory of Ukraine and are ready to wait for it regardless of power outages, periodic bombings and threats to their own security. This cohort includes citizens who confidently and unequivocally identify themselves as Ukrainians, who systematically speak Ukrainian after the start of military aggression. But they consider themselves poor enough to carry out active social practices that are not traditional for them. If they do not believe in the return of pre-war life, then they try to do everything to preserve as much of that life as possible. Territorially, this type includes residents of the Western and Central regions and some of the Northern and Southern regions. By age, they are middle-aged and older people, by gender, men and women.

2.6. Conclusions

Social computing is a link in the evolution of methods for analyzing the results of quantitative sociological research. It opens up new horizons for the detection of latent patterns hidden in arrays of sociological information.

Currently, the following methods are actively used in social sciences for social computing:

- Big Data;
- intellectual data analysis Data Mining;
- digital humanities Digital Humanity;
- data science Data Science.

The actualization of the use of intelligent data analysis methods (especially data mining) in secondary research is due to the need to identify deeply hidden trends, for which various "complex" data analysis methods are usually used.

Intellectual analysis usually refers to the field of artificial intelligence and involves several features of the use of this technology by sociologists:

1. the sociologist is not aimed at defining the typology of respondents, but at fixing patterns in a large mass of data that describe previously unknown structures of connections, etc.;
2. when identifying regularities in large volumes of data, sociologists process, combine and transform them in such a way as to test hypotheses of interest to the researcher about connections and regularities;

3. data mining has a wide set of big data visualization tools, which allows sociologists to work with them without additional mathematical training.

Thus, the analysis of the social practices of Ukrainian immigrants in 2022 (gender aspect), regarding the satisfaction of basic needs, showed the destruction of the usual ideas about the possible options for implementing the strategy of the behavior of immigrants during the war. Ukrainian women forced to relocate choose active social practices of an innovative nature, they take responsibility for their fate and the fate of their children and act as active subjects of social life in new conditions.

The methods of factor analysis were used to classify the sample of respondents according to their emotional state at the beginning of the war and to determine that less than half of Ukrainians emotionally "endured" and were ready for active social practices. On the other hand, using the methods of multivariate analysis, using the Minkowski metric regarding the closeness of the respondents in the group. The sample of respondents was characterized not only by the criterion of having migrated – not migrated (refugees, IDPs and those who did not leave), but also by the criterion of social well-being and readiness for active social practices.

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