The Peerian Journal
Open Access | Peer Reviewed
Volume 5, April, 2022.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

Improving labor relations based on intellectual modeling of employment in the labor market

Nurmamatov Mehriddin Qahramonovich
Samarkand State University, assistant

Annotation: This paper presents the results of the study of mathematical modeling methods to solve the problem of automated management of the labor market. The results of the study are summarized using brief conclusions. In the optimization of the labor market, a differential genetic algorithm was studied and an algorithm for determining the patterns that best represented the population target function was developed.

Keywords: Employment; evolutionary model; genetic algorithm; imitation modeling; labor exchange; mathematical model; specialist; population

Introduction

Today, with the development of the digital economy, one of the most important challenges is to ensure the permanent employment of the world's population. According to the International Labor Organization, 1.44 billion people in the world are currently without permanent employment. To address today's global unemployment, the International Labor Organization estimates that at least 475 million new jobs will need to be created in the next decade.

The main part

Issues of imitation modeling of the labor market. The choice of mathematical modeling methods to solve the problem of automated labor market management depends on many aspects. As a result of imitation of the labor market on the basis of mathematical models, it is possible to find optimal options for the structure of the labor exchange, which are difficult to solve in traditional methods, to create an object with predefined features, to automate labor market control [1].

The imitation model of the developed labor exchange allows:

- to reflect the process of events in the labor exchange on the basis of appropriate formalization of the behavior and interaction of its objects;
- identification and coordination of a wide range of generalized indicators of the modeled labor exchange process;
- forecasting the future behavior and interaction of labor exchange facilities.

In addition, the simulation modeling system will have the following features [5]:

• use of imitation programs in combination with special economic-mathematical models and methods based on the theory of management of economic processes;

• demonstration of the results of the analysis of complex economic processes in the labor market;

The Peerian Journal
Open Access | Peer Reviewed
Volume 5, April, 2022.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

• material supply within the framework of a single model of the labor market real-time modeling of actions, turnover, information exchange processes; [6].

Differential genetic algorithm in labor market optimization. The evolutionary synthetic model of the genetic algorithms studied has the following features:

- the existence of two mechanisms of interaction with the external environment and two subsystems that perform different functions of adaptation to it;
- if the solutions remain unchanged for a sufficient period of time in one of the subsystems, it is possible to exchange them between the systems, which in turn leads to finding a solution that meets all the criteria [2,3].

Due to the peculiarities of the differentiated GA, standard random number generators cannot be used because they have a normal distribution, i.e. they are more likely to select numbers from only a fraction of the range. Under the terms of the algorithm, the resulting values are required to be evenly distributed over the entire interval. To solve this problem, a BBS-generator is proposed [7]. The block diagram of the BBS-generator is shown in Figure 1.

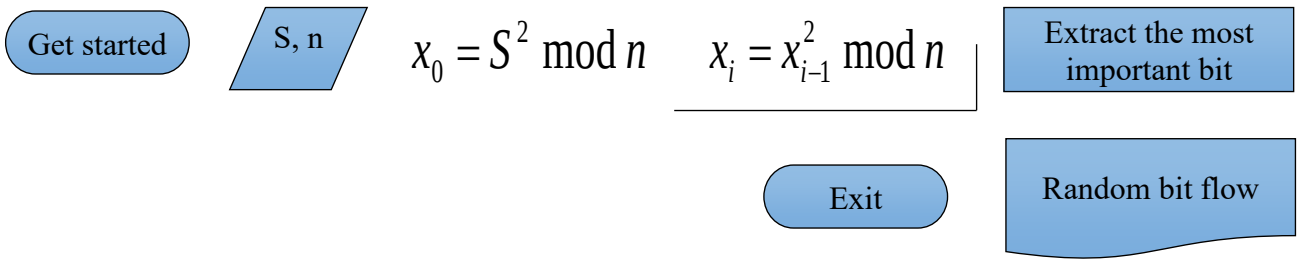

Figure 1. Block diagram of the BBS-generator.

For population formation, the values of the chromosomes in the population are initially filled with random numbers distributed over an equal probability that are converted to Gray code (a BBS generator is used). After that, the population is sorted by the value of the target function. Samples showing the best value of the objective function are required$s_k$the number is selected [4].

The proposed algorithm is executed in several rounds. A generational sample in each round$\overline{S_0}$times. The algorithm is as follows.

Step 1. Getting Started. The first parent to create a generational pattern$s_k^i$is selected randomly from among the samples. The second parent is according to the tournament scheme$S_0$is selected from among the samples, i.e., an n-fold random representative is selected, and a sample with the value of the best objective function is selected from the formed set. If the values are equal,$T_{\text{life}}$the value of the parameter is selected to be large. In determining a random parent, it is necessary to use a random number generator with an equal probability distribution so that all members of the population have the same parental capacity.

Step 2. Once the parent pair is identified, a progeny is formed by crossbreeding (one-point, two-point, or equal probability) and a mutation operator is applied to it. In the formation of offsprings_k^idifferent combinations of chromosomes derived from the parent and those obtained

The Peerian Journal
Open Access | Peer Reviewed
Volume 5, April, 2022.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

during the mixing of the parent chromosomes are considered and the best of them is selected in terms of the value of the target function.

Step 3. Generation pattern by the value of the objective functionss_o^jcompared to the parent.

Step 3.1. If the value of the target function of the generation sample is better than that of the parent, then the generation sample is placed in place of the parent and the life span of the parent is zero.

Step 3.2. If the value of the parental target function is better than that of the generational sample, then the generational sample is canceled and the parental life cycle is increased by 1.

Step 4. After the formation of generations is over$s_k^i$and$s_o^j$the ratio of the number of samples to each other is changed. Deficiency$s_k$to them when detected in samplesS_0samples are added. In this case, the samples with the highest life cycle value are used.

Step 4.1. Agar$S_k$if the new dimension of is smaller than that of the previous iteration of the algorithm, thens_k^isurplus value$S_0$is converted to, the life cycle of the transferred samples is zero.

Step 5. Storing "genetic" data at the core of the solutions, i.e., samplesS_0andS_kA search is performed to transfer to.

Step 5.1. AllS_0The samples are examined and the life cycle$T_{\text{life}}$the samples with the largest value are selected.

Step 5.2. EveryoneS_0The value of the target function for the sample is the worst and life cycleT_{life}greater than or life cycle $2T_{\text{life}}$separate from the larger$s_k^i$are searched.

Step 6. Founds$s_k^i$the value of the objective function of the sampless_o^jcompared with the value of the objective function of the sample.

Step 6.1. A best valuess_o^jif at, hess_k^ireplaced by,s_k^ilife cycle is equal to 0.

Step 6.2. Allss_o^jafter inspection,s_k^iThe value of the life cycle of s is increased by 1.

Step 7. The best specimen in the population is found and memorized. If the best specimen in the population is relatively poor, the best specimen previously preserved is replaced by the best specimen previously preserved, its life cycle being equal to 0. That's it.

The Peerian Journal
Open Access | Peer Reviewed
Volume 5, April, 2022.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

The block diagram of the algorithm is shown in Figure 2.

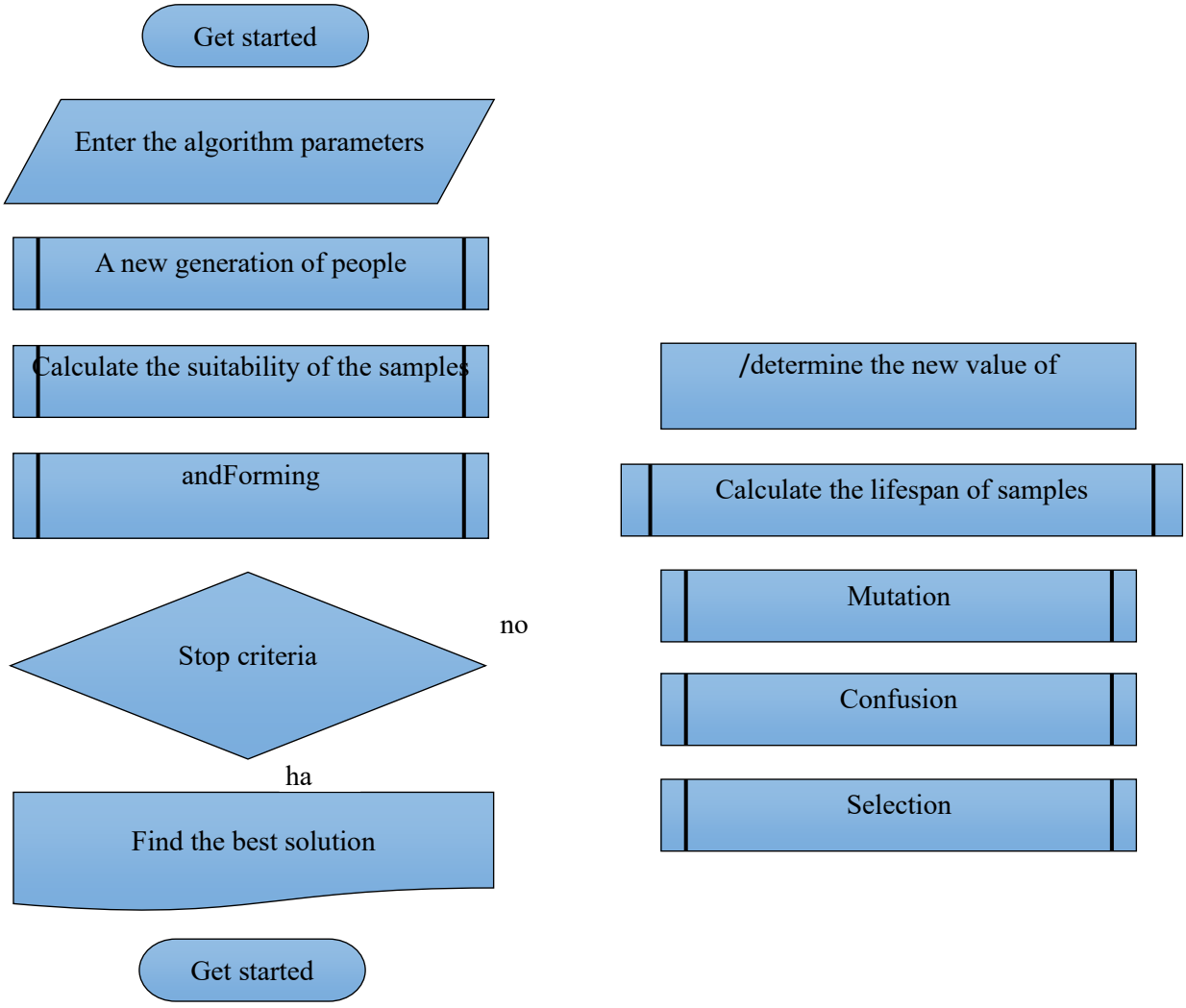

Figure-2. Differential genetic algorithm block diagram

Conclusion. In the course of the research, mathematical models of employment status were studied. The practical application of the studied models is given. A differential genetic algorithm has been proposed to optimize the labor market, and the features of implementing an evolutionary model of a differential genetic algorithm are presented.

The Peerian Journal
Open Access | Peer Reviewed
Volume 5, April, 2022.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

Books

1. Akhatov AR, Mardonov DR, Nazarov FM "Improvement of mathematical models of the rating point system of employment" Samdu scientific bulletin. Samarkand. 2021y, 1-con (125) [100-108] p.
2. Cohoon, JP, Martin WN, Richards DS A Multi-Population Genetic Algorithm for Solving the K-Partition Problem on Hyper-Cubes // Yed. by RK Belew, LBBooker. - San Mateo CA: Morgan Kaufmann, 1991. -P. 244 - 248.
3. Edoardo Acabbi, Cristina Barcelo, Andreas Gulyas, Stefano Lombardi, Raffaele Saggio. The Unequal Cost of Job Loss across Countries. // Working Paper. –P 55. December 2021
4. Eremeev, AV Optimal recombination in genetic algorithms / AV Eremeev, JV Kovalenko // Accepted for Yugoslav Journal of Operations Research. 2013. - 39 p.
5. Maximey I.V. Imitatsionnoe modelirovanie on EVM. // - M .: Radio i svyaz, -c 323. 1988.
6. Nurmamatov MQ, Axatov AR Nazarov FM Mathematical Models of Coordination of Population Employment in the Labor Market. // RA JOURNAL OF APPLIED RESEARCH ISSN: 2394-6709 Volume: 08 ISSUE. -pp 111-119. 2022.
7. Knut, D.E. Iskusstvo programmirovaniya, Tom 4, Vypusk 3: generatsiya vsex sochetaniy i razbieniy (razdel 7.2.1.3): Per. s angl. / D.E. Knut. - M .: OOO "I.D. Williams", 2007. - 208 p.