Designing An Intellectual System Of Forming Scientific Indicator Ratings In Higher Education

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Abstract: The rapid development of information technology and the ever-increasing flow of information, require process control without taking into account the human factor. At the same time, the organization of the management of processes without the human factor in the studying process serves to improve the quality of education. Therefore, it is important to determine the rating of professors and teachers in higher education institutions and to develop an automated system for evaluating the rating of these institutions based on the rating. In this work, the functions, models, and database structure of the system for the formation of rankings based on the scientific activity of professors and teachers and the determination of potential changes based on prediction data are developed.

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Introduction

Today, because of a large number of data streams, the cost of processing them in a short time also increases. Managing processes without the human factor will necessarily lead to the formation of transparency and a healthy competitive environment. Currently, all industries are unimaginable without information technology. Whereas information technologies are rapidly penetrating all spheres of society, the role of information technologies in the education system is also dramatically increasing. Such circumstances as the rapid development of information technologies and the increase in information flow, the changing information abruptly, encourage humanity to search for measures for the timely processing of this information. The creation of a reliable database for data processing, transmission, and storage with its subsequent widespread use based on simpler mechanisms is becoming relevant today. The main aim of creating automated systems is to quickly manage processes without the human factor and to develop an integrated information system that can automate information processes. Today, data processing devices that

simplify the interaction of humanity with technics, in particular, diverse devices at the stage of storing and showing information, can accelerate the introduction of a control automation system into the national economy. When automating management processes, it is possible to use methods for constructing modules based on the most advanced mathematical models, as well as solving problems of optimal planning, design, and management. Currently, it is important to form a rating system for the scientific activities of professors and teachers based on automation. This system allows professors and teachers to form a rating based on their scientific activities and this basis determines the possible change in the prognostic data. The development of a national rating system based on digital technologies and determining the potential of professors and teachers based on this system was considered one of the main urgent tasks of today. When automating management processes, it is possible to use methods for constructing modules based on the most advanced mathematical models, as well as solving problems of optimal planning, design, and management. Currently, it is important to form a rating system for the scientific activities of professors and teachers based on automation. This system allows professors and teachers to form a rating based on their scientific activities and this basis determines the possible change in the forecast data. The development of a national rating system based on digital technologies and the determination of the potential of professors and teachers based on this system was considered one of the main urgent tasks of today.

II. Database design and system structure

The system of rating formation based on the scientific activity of professors and teachers and determining potential changes based on forecast data performs the following tasks:

a) Acceptance of information about the introduction (article, dissertation, monograph, patent, certificate);
b) Define criteria for evaluating data;
c) Formation of a rating based on evaluation criteria;
d) Formation of forecast data based on rating data.

The structure of the software for forming a rating based on the scientific activity of the teaching staff and determining potential changes based on forecast data is formed in the form of the following picture 1.
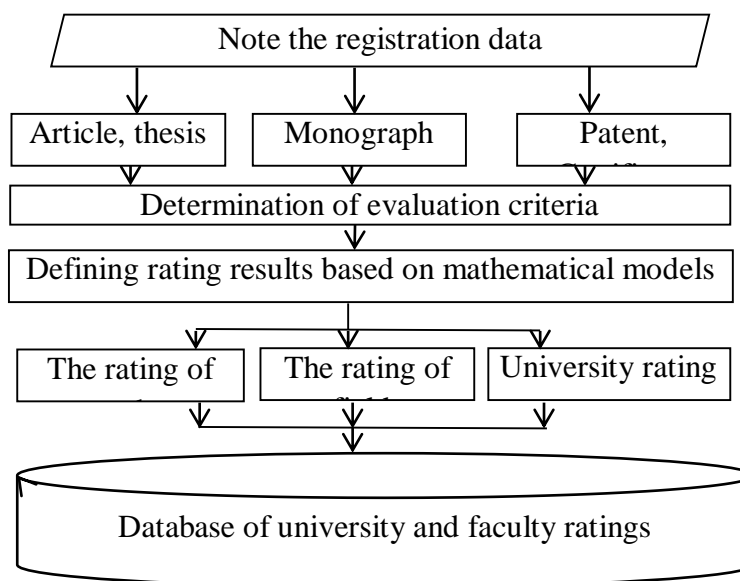
1-picture. Logic scheme of the rating automation system

For the database of the system of forming the rating of the teaching staff based on its scientific activity, it is necessary to consider the following relationships.

When creating a database, two important conditions must be considered: Firstly, the type of data, their appearance should not depend on the programs that use them, it means when adding new data to the database or changing the data type, changing the programs should not be mandatory. Secondly, you do not need to create a program to extract or search for the necessary information from the database. Therefore, when creating a database, you must comply with certain laws and regulations. Different users have access to the information stored in the database by separating the programs that describe and store the database from the user's application programs. Communication between the system and user programs are carried out using special connecting additional software blocks that are part of the database management system. Add-ons provide the user with the ability to select among the many information available in the database that is necessary to solve his problem. There are different principles of network data production: "file-server" and "client-server." The "file-server" principle is based on the fact that the core of the network operating system and the computer on which the centrally stored files are located are reserved for the "file-server." While other computers host applications and a copy of the database processor. The requested data are transferred from the "file-server" to other computers, and they are processed by the database management system. The task of processing information on the principle of "client-server" is distributed between the client computer (program) and the server computer (program). The client requests data processing, and it is transmitted to the database server over the network. The main features of a database management system are the structure of procedures that are used not only for entering and storing data, but also describe their structure. The data management system has the following properties:

- the file package supports a logical convention;
- provide a data processing language;
- recover data after various stops;
- the database management system provides parallel operation of several users.

The database of the rating system of the teaching staff based on its scientific activities is carried out on the principle of "client-server."

III. The development of intellectual models for the formation of ratings

The use of individual models for the process of rating formation based on the scientific activities of professors and teachers and determining potential changes based on forecast data is highly effective. Currently, the neural model is the optimal model for predicting data. Neural networks are very new and bright futures for computer hardware, which can be used to study the dynamic issues related to various sectors of the economy, to make effective decisions. It is also widely used in fields such as economics, technical means management, process control, and so on. Currently, it is used to analyze the learning process of neural networks and solve methodological management issues.

Neural networks, first of all, opened their new productive opportunities in the field of image perception, after which they added tools that support the process of obtaining solutions based on statistics and artificial intelligence methods, as well as solving rating issues. To form a rating based on the scientific activities of professors and teachers, it is proposed to use a 2-layer architecture consisting of several neurons of the neural network, which is shown below.
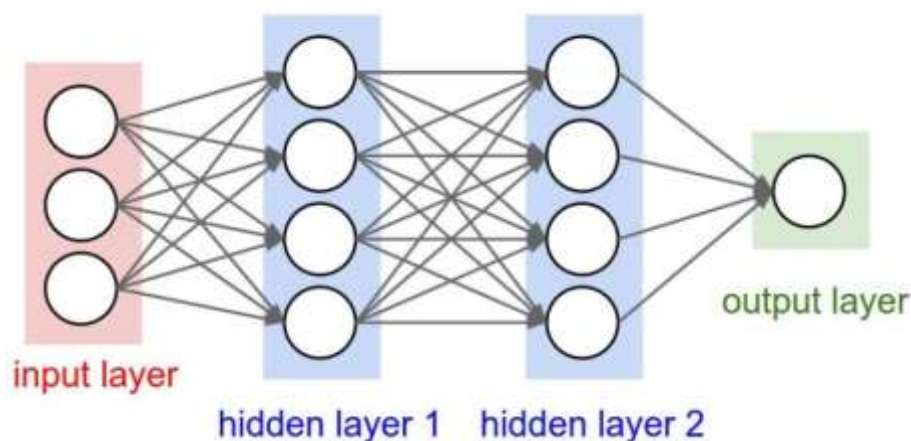
2-picture. Neural network model

Data approximation, which gives time series, can be carried out using multilayer, radially generalized regression, and other types of networks. The above input data are analyzed in 1-layer networks and transmitted in 2-layer networks. Based on the activation functions contained in the model, it is possible to formulate predictive rating data for several neurons.

IV. Conclusion

Based on the tasks of implementing models in socio-economic processes, meeting the needs for high-quality personnel, and optimizing rating relations, automation of rating relations of the teaching staff was developed. Functions of the general scheme and modules of the software package were created. It was proposed to use the neuron model in the implementation of the functions of the software package.

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