

# A NEURAL NETWORK MODEL OF THE LEARNING PROCESS TO SIMULATE THE PROFESSIONAL COMPETENCE OF STUDENTS

Djanxodjaev Nursultan  
Karakalpak State University

## ABSTRACT

The results of the pedagogical experiment on the use of neural networks in neuropedagogy are described. The widespread use of neural networks in all aspects of the educational process, the expediency of their use in teaching has shown that neural networks can become a means of correcting knowledge in the subjects taught.

**Keywords:** Professional competence, neuron, modeling, intellectual, professionalism, model, methodology, educational standards, artificial agents.

## INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

According to M.A. Innazarov, professional competence is a sum of knowledge, skills and abilities, experience, personal qualities, which are based on existing knowledge and experience in the process of education and socialization aimed at ensuring the independent and successful participation of a person in activities [1].

Professional competence is the acquisition of knowledge, skills and abilities necessary for professional activity by a specialist and their practical application at a high level. Professional competence does not mean the acquisition of separate knowledge and skills by a specialist, but the mastering of integrative knowledge and actions in each independent direction. Also, competence requires constant enrichment of professional knowledge, learning new information, understanding important social requirements, finding new information, processing it and being able to use it in one's work. [2].

An important task of higher education, where neural networks can be used, is to determine the level of professional skills of students at the end of training courses.

One of the options to solve this problem was to develop a neural network model of students' learning process for an agent-based system for modeling students' professional competence. This model, in our opinion, allows to simulate the process of transfer of professional skills and knowledge in individual subjects, depending on the personal characteristics of students.

The learning process itself as an object of research is dynamic and characterized by great inertia. The consequences of changing one of the factors can only be known after the students have graduated. Therefore, it is economically and socially relevant to develop models that allow for the optimization of educational costs and the prediction of the results of innovative changes in personnel training [3],[4].

However, a formal (mathematical) description of the learning process is not possible. In this case, it is desirable to develop simulation models based on neural networks that provide the necessary research on this problem [5],[6].

The following tasks were defined in the development of a neural network model capable of functionally describing the dependence of the professional knowledge and skills acquired by the student on the factors affecting the completeness of this knowledge:

- ◆ consider the process of teaching university students as a system with distributed intelligence;
- ◆ identify external and internal factors affecting the quality of knowledge and skills acquisition;
- ◆ development of a methodology for determining the intellectual and psychophysiological characteristics of teachers and students;
- ◆ development of the structure of the neural network model and its learning algorithm;
- ◆ to study the complexity of setting up the model and the adequacy of its learning process.

From the point of view of the structure of neural networks, a higher education institution is a distributed system as a center for training qualified specialists, whose subjects are teachers and students who interact in the educational environment provided by the university. [7].

In this case, the quality of teaching students mainly depends on the following factors:

- ◆ professionalism of teachers;
- ◆ preparation of applicants and their selection system;
- ◆ educational environment (material and technical base of the university);
- ◆ educational standards (curricula, etc.);
- ◆ teacher training systems;
- ◆ organizational structure of education and employment management.

The object-oriented analysis of the process of training young professionals showed that its subjects are interrelated and form a distributed, diverse and intellectual system. Therefore, the development of a simulation model of such a system used for the analysis and prediction of educational processes can be successfully implemented based on agent-based modeling methods.

The main task of the educational process of students as a system is to transfer professional knowledge and develop skills to solve certain production tasks to future professionals. This function is performed by certain educational processes: lectures and practical training, production practice.

From the point of view of systematic analysis, the process of professional training of specialists is carried out by a complex distributed system consisting of autonomous, interconnected, purposefully functioning elements and interacting with the external environment. System analysis involves looking at the operation of the system in time and space to determine the main characteristics and parameters of the system itself and the processes that make it up.

The following elements can be distinguished in the system of training and employment of young professionals: young professionals, educational institution, Ministry of Public Education and firms (enterprises). The listed elements of the system do not belong to one category in their structure, are geographically distributed and have complex functionality. Together, they form a distributed system within which the following tasks can be solved:

- ◆ organization of an effective educational process of personnel training in professions corresponding to educational programs (university);

- ◆ determination of quality standards and educational programs (Ministry of Science and Education, educational institution);
- ◆ selection of necessary employees to solve production tasks;
- ◆ job search by specialists in an organization that matches the acquired qualifications and meets the social needs of job seekers.

List problems are difficult to formalize and therefore cannot be solved by traditional mathematical methods [8].

In addition, the participants of the considered process are located geographically far from each other, do not belong to the same category in terms of structure, and their activity has an intellectual nature [9]. These characteristics make it appropriate to use the theory of intelligent agents in the development of imitation. At the macro level, there are artificial agents that model the functions of the Ministry of Education, educational institutions and enterprises within the framework of bounded rationality. At the micro level, it includes communities of agents that facilitate communication between students and employers and educational institutions.

## REFERENCES

1. М.А.Инназаров. Малака ошириш тизимида педагог кадрлар касбий компетентлигини таъхислаш технологияларини такомиллаштириш (Олий таълим муассасалари мисолида). Автореферат. пед.фан.фал.док. – Т. 2020. 11-б.
2. Муслимов Н.А., Усмонбоева М.Х., Сайфуров Д.М., Тўраев А.Б. Педагогик компетентлик ва креативлик асослари / Т.2015: «Sano-standart» 4-5-б. Ўқув-методик кўлланма
3. Тельнов Ю.Ф., Данилов А.В., Казаков В.А. Применение многоагентной технологии для решения образовательных задач в информационно-образовательном пространстве // Инжиниринг предприятий и управление знаниями: Сб. науч. тр. 18-й научно-практической конференции (ИПи УЗ-2015, 21-24 апреля 2015 г., Москва, МЭСИ). - М.: МЭСИ, 2015. - С. 451-457.
4. Федяев О.И. Многоагентная модель процесса обучения студентов на кафедральном уровне // Наукоєі прац Донецького національного техшчного ушверситету. Серія "Проблеми моделювання та автоматизацп проектування динамічних систем". Вип. 5 (116). - Донецьк: ДонНТУ, 2006. - С. 105-116.
5. Трёмбач В.М. Интеллектуальная обучающая система с адаптацией индивидуальной траектории обучения // Труды 15-й Национальной конференции по искусственному интеллекту с международным участием (КИИ-2016) (3-9 октября 2016 г., Смоленск, Россия): Труды конференции. Т. 3. - Смоленск: Изд-во Универсум, 2016. - С. 203-211.
6. Федяев О.И., Лукина Ю.Ю., Стропалов А.С. Анализ и прогнозирование процесса трудоустройства молодых специалистов с помощью мультиагентной имитационной модели // Труды конференции ИАИ-2013, КПИ. - Киев, 2013. - С. 47-53.
7. Zhabska Tetiana, Fedyaev Oleg. The development of agent-based intellectual e-learning environment // Proceedings of the IADIS International conference Intelligent systems and agents 2011 Rome, Italy July 24-26, 2011. - P. 143-147.
8. Янковская А.Е., Шурыгин Ю.А., Ямшанов А.В., Кривдюк Н.М. Определение уровня усвоенных знаний по обучающему курсу, представленному семантической сетью // Труды 5-й конференции "Открытые семантические

- технологии проектирования интеллектуальных систем" (OSTIS-2015) (19-21 февраля 2015, Минск). - Минск.: БГУИР, 2015. - С. 331-338.
9. Власов А.А., Нехаев И.Н. Интеллектуальная система адаптивного тестирования уровня усвоения знаний // Двенадцатая национальная конференция по искусственному интеллекту с международным участием «КИИ-2010» (20-24 сентября 2010 г., г. Тверь, Россия): Труды конференции. Т. 3. - М.: Физматлит, 2010. - С. 257-263.