REDUCTION OF ROTATION SPEED OF ELECTRIC DRIVE ELECTRIC MOTORS

Abdusalyamova Tillokhon
Fergana Polytechnic Institute
"Electrical engineering, electrical mechanics and electrical technologies" assistant
E-mail: abdusalyamovatillokhan@gmail.com

ABSTRACT

The calibration parameters introduced in the MATLAB program above allowed us to determine the values of p, v, and w for the confidence gradient value. Taking into account the malfunctions of electric drives, the decrease in the rotation speed of electric motors, vibration and noise in the electric motor, the factors of short-term changes in their rotation speed, the tested motor is provided with a frequency converter in the fs=10-50 Hz range, under the control of us/fs=const works at open speed.

Keywords: weaving machine, neural network, electric motors, reliability, textile machine, methodology, differential and algebraic equations.

As a result of the organization of the experiment, the loading was carried out with the help of the device for determining the data on the speed of electrical conduction and the loading moment at the value of Mu = (0-1) MN (Fig. 1). The device includes 73211-type AD (Y/D 692/400 V, cosph=0.78, n=1350 rpm) and measuring devices. It is required to process the input signals measured in a diagnostic system using an artificial neural network in the process of identifying the signs of failure. The data was processed using a specially designed program (Fig. 2).

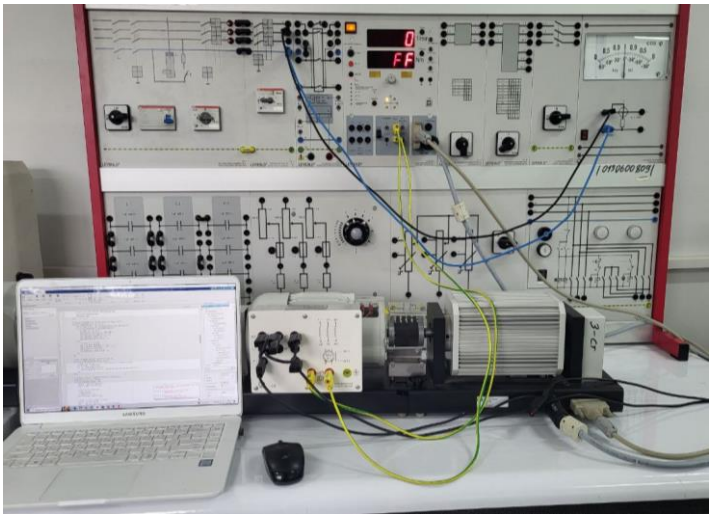

Figure 1. About electric current speed and load torque

data acquisition device

Based on the technological process of the weaving machine, as a result of changing the load, the convolutional layer set allowed to determine the level of reliability, which showed that the developed method has a higher accuracy compared to the step and fill method. At the same time, the convolutional neural network method made it possible to select three main factors that significantly affect the reliability of the electric drive of the weaving machine and the quality of the product:

-disruption of electrical circuits;

-reduction in speed of driving electric motors;

-significant change in load.

Such factors were determined by the convolutional neural network method using the Control System Designer package of the MATLAB program (Fig. 2).

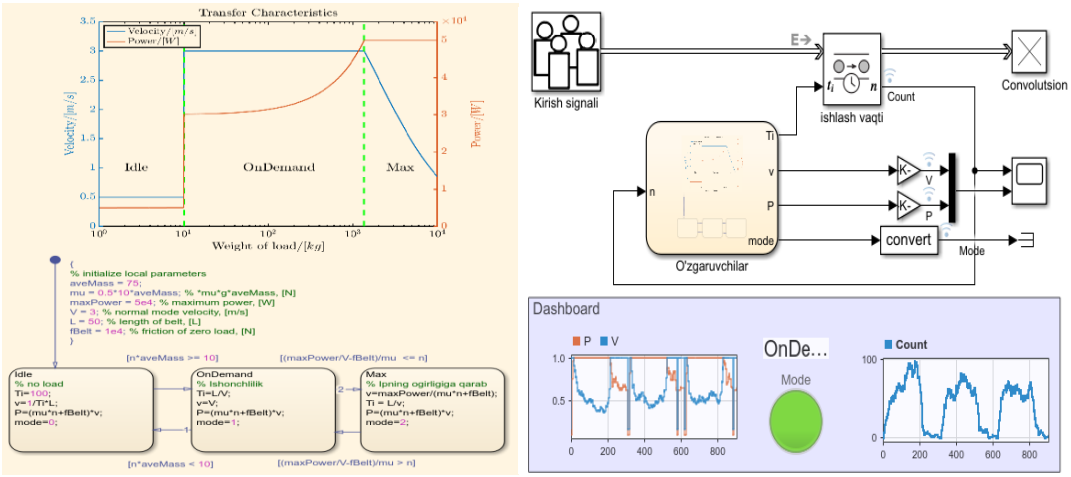

Figure 2. A model consisting of a set of convolutional layers

A model consisting of a set of convolutional layers (Figure 2) consists of one layer and was considered for the loading of the weaving process. It is proven that the obtained values increase the reliability by 7% compared to other methods as a result of this model (Fig. 3).

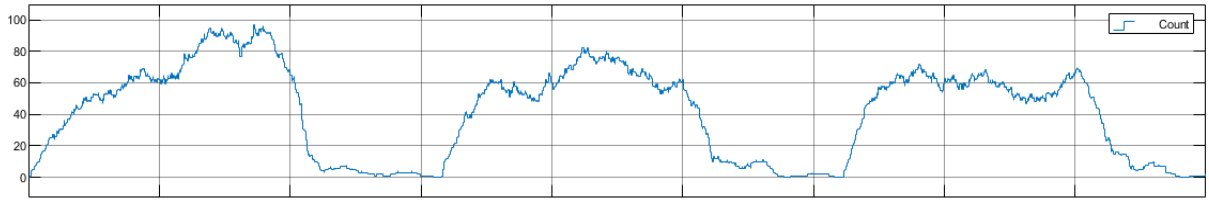

Figure 3. Reliability indicator obtained using the model

The development of classification of electrical and mechanical faults in the model forces the network input matrix to adapt accordingly. The developed set is formed by the difference between the size of the input matrix and the amount of data delivered to the network. If the size of the input matrix is large, it significantly increases the network

loading time, and if it is small, it cannot ensure the correct distribution of input data into classes.

The procedure was developed to combine mechanical and electrical faults of electrical circuits through 2 artificial neural networks. Experimental investigation of the developed artificial neural networks, short circuits of the stator windings based on 3200 vectors of asynchronous motors including 6 different failure categories of the stator windings were conducted in four stages in the experimental study.

The steps were implemented using the MATLAB environment based on the neural network process. The main quantities describing the developed structures and the parameters of the artificial neural network process are presented in.

In the study, based on the information about the induction motor, two structures of convolutional networks, artificial neural network 1 and artificial neural network 2, were used to classify the degree of damage of the stator winding of the induction motor. Differences in the structures of networks arise from the task assigned to them (estimation of the number of categories).

REFERENCES:

1. Jaloliddinova Nozima Doniyorjon Qizi, Sultonov Ro‘Zmatjon Anvarjon O‘G‘Li Renewable sources of energy: advantages and disadvantages // Достижения науки и образования. 2019. №8-3 (49). URL: https://cyberleninka.ru/article/n/renewable-sources-of-energy-advantages-and-disadvantages (дата обращения: 01.12.2023).

2. Султонов Рузиматжон Анваржон Угли, Кодиров Хусанхон Мунаввархон Угли, Мирзалиев Бобурбек Бахтиёрович Выбор механических двигателей электрического тока, используемых в системе электропривода // Проблемы Науки. 2019. №11-2 (144). URL: https://cyberleninka.ru/article/n/vybor-mehanicheskih-dvigateley-elektricheskogo-toka-ispolzuemyh-v-sisteme-elektroprivoda (дата обращения: 01.12.2023).

3. Султанов Рузимаджон Анваржон Угли Рекомендации по выработке электроэнергии и компенсации потерянной энергии с помощью системы охлаждения электродвигателей // Вестник науки и образования. 2019. №19-3 (73). URL: https://cyberleninka.ru/article/n/rekomendatsii-po-vyrabotke-elektroenergii-i-kompensatsii-poteryannoy-energii-s-pomoschyu-sistemy-ohlazhdeniya-elektrodvigateley (дата обращения: 01.12.2023).

4. Usmonov Shukurillo Yulbarsovich, Sultunov Ruzimatjohn Anvarjohn O‘G‘Li, Kuchkarova Dilnoza Toptievna Research potential of energy saving pump unit and hydraulic network // Проблемы Науки. 2019. №12-1 (145). URL: https://cyberleninka.ru/article/n/research-potential-of-energy-saving-pump-unit-and-hydraulic-network (дата обращения: 01.12.2023).

5. Usmonov S. Y. Analysis of Working Modes of Well Pumping Equipment Eectr //Central Asian Journal of Theoretical and Applied Science. – 2022. – Т. 3. – №. 11. – С. 119-125.
6. Yulbarsovich U. S., Nurillaevich M. N. FREQUENCY CONTROL OF POWER EQUIPMENT DURING SECONDARY STEAM GENERATION IN THE PRODUCTION UNIT //PRINCIPAL ISSUES OF SCIENTIFIC RESEARCH AND MODERN EDUCATION. – 2022. – Т. 1. – №. 6.
7. Yulbarsovich U. S. et al. MEASUREMENT AND CONTROL OF THE LOAD OF ENERGY DEVICES //Galaxy International Interdisciplinary Research Journal. – 2023. – Т. 11. – №. 4. – С. 663-666.
8. Yu U. S., Sultonov R. A. NONLINEAR FEEDBACK CONTROL IN INTELLIGENT AC MOTOR CONTROL //Advancing in research, practice and education. – 2022. – Т. 9. – С. 188.
9. Усмонов Ш. Ю., Султонов Р. А. У., Кучкарова Д. Т. СИНТЕЗ АЛГОРИТМОВ ИНТЕЛЛЕКТУАЛЬНОЙ СИСТЕМЫ УПРАВЛЕНИЯ МНОГОСВЯЗНЫМИ ЭЛЕКТРОПРИВОДАМИ //Universum: технические науки. – 2022. – №. 1-3 (94). – С. 50-53.
10. Усмонов Ш. Ю., Кучкарова Д. Т., Султонов Р. А. Автоматические системы управления машин и агрегатов шелкомотания на основе энергосберегающего электропривода //Universum: технические науки. – 2021. – №. 12-6 (93). – С. 37-41.
11. Sultonov R. A., Shermatov B. A. IMPROVING PRODUCT QUALITY BY REDUCING THE ENERGY CONSUMPTION OF ELECTRIC DRIVES IN THE SILK INDUSTRY //Экономика и социум. – 2021. – №. 11-1 (90). – С. 538-544.
12. Mukaramovich A. N., Yulbarsovich U. S. CALCULATION OF THE SPEED CONTROL RANGE OF AN INTELLIGENT ASYNCHRONOUS ELECTRIC DRIVE DURING REWINDING RAW SILK //ЭЛЕКТРИКА. – 2011. – №. 4. – С. 26-28.
13. Арипов Н. М., Усмонов Ш. Ю. Разработка энергосберегающего частотно-регулируемого асинхронного электропривода с вентиляторной нагрузкой //Электрика. – 2011. – №. 4. – С. 26-28.
14. Усмонов Ш. Ю. Частотно-регулируемый асинхронный электропривод с экстремальным управлением для вентиляторной нагрузки //Advances in Science and Technology Сборник статей X международной научнопрактической конференции, Москва:«Научно-издательский центр «Актуальность. РФ. – 2017. – С. 36-38.
15. Арипов Н. М. и др. Основные технические требования по диапазону и точности регулирования скорости перемотки шелка-сырца //Вестник Казанского

государственного энергетического университета. – 2021. – Т. 13. – №. 1 (49). – С. 218-231.

16. McCray T. R., Gritzner C. F. Uzbekistan. – Infobase Publishing, 2009.

17. Арипов Н. М., Усмонов Ш. Ю., Кучкарова Д. Т. Влияние изменения скоростных режимов переработки полуфабриката на энергоемкость шелкомотания //Текстильный журнал Узбекистана. – 2021. – №. 2.

18. Usmonov S. Optimization of the Launching Process in the Electric Drive with the Help of Genetic Algorithm //Machine Learning Research. – 2017. – Т. 2. – №. 2. – С. 61-65.

19. Usmonov S. Y. et al. Research potential of energy saving pump unit and hydraulic network //Проблемы современной науки и образования. – 2019. – №. 12. – С. 38-40.

20. Усмонов Ш. Ю., Муминов З. М., Сайфидинов Р. КОНЦЕПТУАЛЬНЫЕ ВОПРОСЫ ПОВЫШЕНИЯ ЭНЕРГОЭФФЕКТИВНОСТИ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ //PRINCIPAL ISSUES OF SCIENTIFIC RESEARCH AND MODERN EDUCATION. – 2022. – Т. 1. – №. 6.