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Efficiency assessment of IRT-T research reactor cooling system by machine learning methods

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Tomsk Polytechnic University, Tomsk, Russian Federation.

Machine learning is one of the components of artificial intelligence, the purpose of which is to build analytical models by learning from historical data [1]. The concept of artificial intelligence and machine learning can be traced back to the mid-20th century, when the inventor Alan Turing proposed creating a "machine that can learn from experience". After decades of gradual development and technological innovation, machine learning has become a powerful format for a wide range of scientific research and industrial applications, with the special power to find patterns in complex large-dimensional data and study non-dimensional relationships [2].

In modern industrial practice machine learning methods are already used to simplify and optimize the processes on site. However, nuclear power plants and research reactors do not use data analysis for evaluation of technological or neutron-physical characteristics.

In this research, it is proposed to develop the software for evaluation of heat exchanger fouling. That allows to predict the service time so the personnel will not face any maintenance difficulties, and heat transfer efficiency could be in high value throughout the operational time.

Experimental data from IRT-T Research Reactor SCADA System Database was taken and introduced into the workspace through the transforming software that was already developed. Using supervised learning with regression the most important parameters for changing of heat transfer were obtained and the heat exchange deviations throughout the year were predicted and performed.

References
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Primary author: KUBLINSKIY, Maxim (Tomsk Polytechnic University)

Co-authors: Mr SMOLNKIOV, Nikita (Tomsk Polytechinc University); Mr NAYMUSHIN, Artem (Tomsk Polytechnic University)

Presenter: KUBLINSKIY, Maxim (Tomsk Polytechnic University)

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