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MACHINE LEARNING-BASED DETERMINATION OF LIMIT SWITCH ADJUSTMENT REQUIREMENTS FOR PIPELINE VALVE ACTUATORS

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Within the Siberian Chemical Combine area, the enterprise of Rosatom Fuel Company TVEL, an innovative pilot-scale demonstration power complex with a unique reactor plant BREST-OD-300 is being constructed.

A relevant direction to improve the efficiency of the Maintenance and Repair function in power unit equipment is the implementation of machine learning (ML) algorithms, including deep neural networks. An electric valve actuator is a device designed to control pipeline valves using electrical energy. A pipeline valve electric actuator can not only control the shut-off component but also, when required, lock it in the specified position to ensure the required seal tightness. Limit switches deactivate the electric motor when the valve's moving part reaches its preset position, typically 'closed' or 'open'.

This research evaluates various ML methods and highlights the following promising algorithms for determining adjustment needs of limit switches in electric actuators of pipeline valves at the 'BREST-OD-300' reactor plant:

- Random forest
- LightGBM
- Recurrent Neural Net.

The application of ML will enable more precise determination and prediction of pipeline valve parameter changes, automate routine processes for assessing limit switch adjustment requirements, while simultaneously reducing process durations and enhancing both operational organization and power unit safety.

REFERENCES

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