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The machine-learning algorithm for the condition-based-maintenance of the energy system in a near-zero-energy building**Igor Trotskii, Jukka Pulkkinen and Vesa Salminen**
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The aim is to apply machine-learning model to a Condition-Based Maintenance (CBM). The objective is to forecast energy consumption for air conditioning, ceiling radiant and floor heating continuously for the next 24 hours and if any changes to predicted energy consumption, outside of usual error range, occur, it indicates that some equipment in energy system does not work properly and there is a need for a maintenance task. CBM has been an interesting topic since long time. Nevertheless, today maintenance is done mainly based on traditional scheduled maintenance. The main limitation of CBM is a high initial cost for modern equipment, which has an embedded self-diagnostic and therefore could be used for CBM. On the other side, internet of things has been developing rapidly, meaning easy connectivity of data to the internet without any big investment costs. This makes it possible to utilize measured data in conjunction with machine learning to build inexpensive CBM systems, avoiding costly investments in new equipment by moving part of the expenses on the software. The research question is defined as what type of the machine-learning algorithm can be used to forecast the energy consumption in building. The new building for a sheet metal research was built in 2015. The building is near-zero-energy building including different technology like compact envelope, energy saving windows, effective heat recovery in air handling units, building automation and renewable energy sources. The renewable energy consists of the solar and geothermal energy units. The geothermal energy sources are the main heat supplier and it includes the energy piles and heat wells. The solar energy unit is used in the thermal storage for the piles.

Biography

Igor Trotskii serves as a Project Engineer at Häme University of Applied Sciences, Finland. His fields of interest are data analytics and machine learning.

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