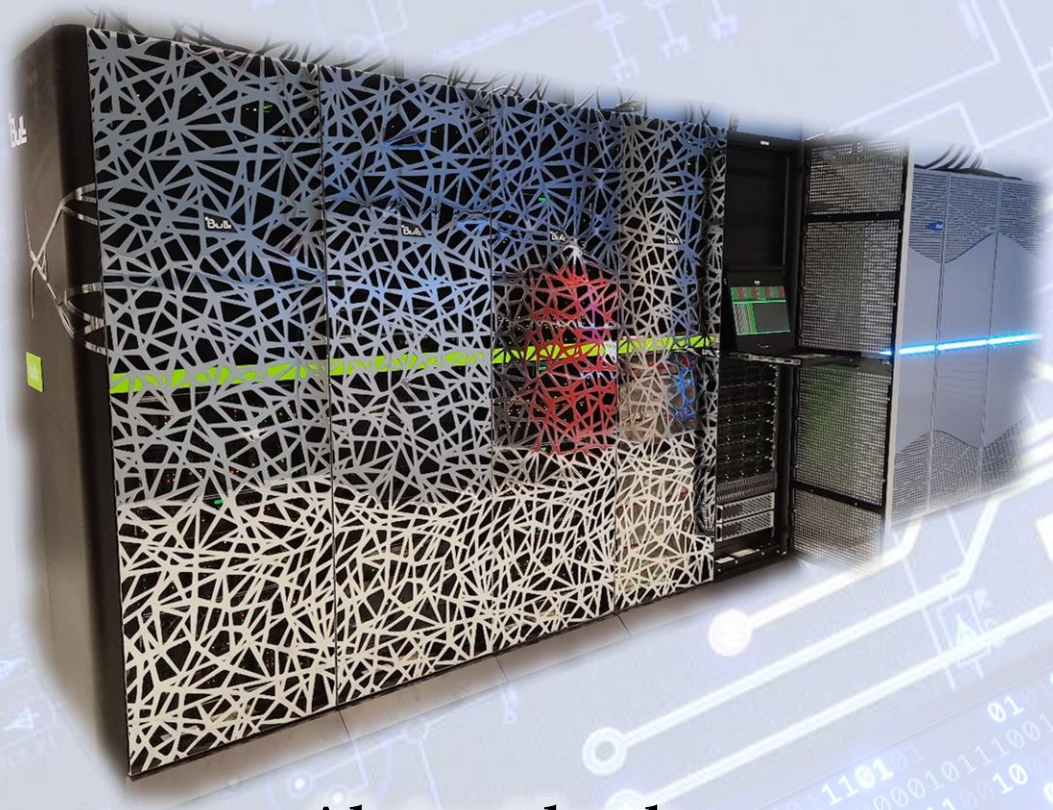
4TH EUROCC VILNIUS HACKATHON & WORKSHOP ON USING HPC



Abstract book

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VILNIUS TECH

Lietuvos hidrometeorologijos tarnyba

Feed-Forward Neural Network for Predicting Engine Combustion Parameters

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Predicting fuel combustion modes in engines is a very important area of urban planning. The correct choice of combustible mixtures allows solving many problems, such as more efficient transport operations, lower emissions, utilization of combustible waste oils, etc. Unfortunately, determining the correct fuel proportions requires a lot of experimentation and inefficient combustion in engines.

When solving the problem - how to select mixtures of appropriate proportions according to the desired energy or ecological parameters, only the use of Artificial Neural Networks (ANN) allows for an operational response in a wide dynamic range. Several realizations of ANN [1][2] were used for predictions of following parameters: CO, CO_2, O_2, HC, NO_x concentrations, smokiness, Brake specific fuel consumption (BSFC), Brake thermal efficiency (BTE). Experimental values of excess air ratio, Brake mean effective pressure (BMEP), EGR ratio, start of injection (SOI), cetane number, engine speed, volume fraction of HVO and D100, C/H, Lower heating value (LHV), density were used for input. Architecture of ANN was adjusted according to Ref. [3]. Several successful predictions were described in Refs. [4][5][6].

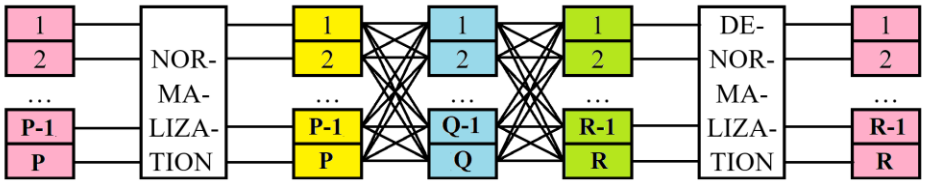

Fig. 1. *VALLUM01* [2] as realization of Feed-Forward Neural Network: input layer consists of P units, output layer consists of R units, single hidden layer consists of Q perceptrons.

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