

Assessment of implementation of neural networks in on-board dynamic payload weighing systems

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Abstract: While loading loose materials onto dump trucks, freight wagons or any other vehicles, a crucial issue is not to exceed their maximum permissible load capacity. Very efficient tools for monitoring weight of the loaded material are the on-board payload weighing systems which are usually installed on earthmoving machinery such as single bucket excavators and loaders. Operation of conventional systems of this type is typically based on computational models deriving from equations of dynamic equilibrium of machine and its manipulator. However, identification of parameters of these models might bring certain difficulties. The following paper presents a discussion on substitution of the conventional models implemented in payload weighing systems with the ones based on neural networks. A number of payload weighing systems involving neural networks varying in terms of inputs, structure and neuron types were designed by the author and implemented in an exemplary machine. Performance of these systems will be compared in the article. The influence of size of training dataset on the accuracy of the weighing system will be also discussed.

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