The automatic parsimonious neural networks factory

NeurEco introduces a new generation of neural networks, based on parsimony. Through NeurEco's parsimonious approach, the resources required for implementing artificial intelligence are reduced by several order of magnitude. This includes reduction in: learning data, computing resources, development time, and energy consumption.

NeurEco 2.0 is an ANN (artificial neural network) factory. It generates parsimonious ANN models automatically while using only the learning data.

NeurEco 2.0 generates feedforward neural networks. However, it can be used in a recurrent context for dynamic modelling. The parsimony plays a major role in this context.

NeurEco 2.0 can process a large number of parameters and is already suitable for small and medium sized image processing tasks (e.g. classification)

In the third quarter 2020, two add-ons of NeurEco will be released:

- A compression/decompression add-on for unsupervised learning
- A convolutional add-on

These add-ons will be provided, without additional cost, to the NeurEco users.
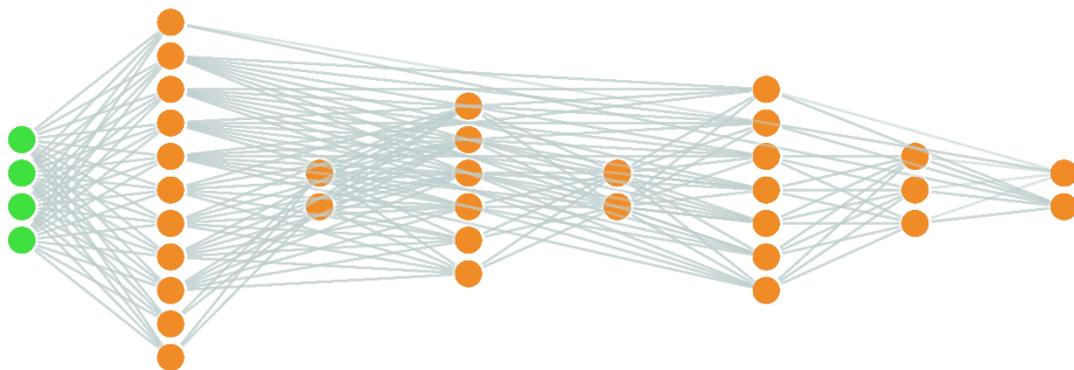
The NeurEco 2.0 technology

To run NeurEco 2.0, the user needs only provide data. The network hyperparameters are deduced automatically and a tailor made deep neural network is created by optimizing the network structure using two concurrent approaches:

- The additive or incremental approach (n-D printing of the model), using the topological gradient theory,
- Subtractive approach (machining).

The first approach ensures that the ANN is able to learn the provided data, and the second one guarantees the model's ability to generalize on unseen data. However, in practice the subtractive approach is rarely used by NeurEco, due to the effectiveness of the incremental approach.

Unlike the classical layered neural network structure, the neurons in networks created using the topological gradient theory can be connected to any subsequent neuron in the network, regardless of layer. Curious users can observe the subsequent developments of the neural network structure via the graphical interface. The images below illustrate an example of a few intermediate steps during creation of a network.

Furthermore, NeurEco provides, alongside the generated model, an estimated generalization error that predicts the performance of the neural network on unseen data.

This entire process is deterministic so the created ANNs are reproducible.

NeurEco 2.0 versions and features

- ## NeurEco Essential

This version comes with two interfaces:
- Command line executable
- GUI (Graphical User Interface)

Operating it does not require any prior experience in AI. The GUI is user friendly; users only need to provide their data in any commonly used format (csv, npy and MATLAB mat files) and NeurEco will handle the rest.

- ## NeurEco Pro

This version adapts to almost any way of working. It includes all the features and interfaces available in the Essential version.

It comes with two additional APIs for Python3 and MATLAB, making the interaction with standard AI environments much easier.

It comes equipped with a diverse exporter, capable of exporting to multiple platforms, ensuring integration with any development or production environment and deployability on a larger number of potential devices.

Take advantage of our limited introductory offer: 50% off perpetual single-user licenses

(Reduction included in the prices displayed below)

		NeurEco Essential	NeurEco Pro
Perpetual single-user license		€ 3,500	€ 7,500
Perpetual single-user license for companies with less than 10 employees		€ 1,750	€ 3,750
Operating system	Windows	Yes	Yes
	Linux	Yes	Yes
Automatic creation of neural networks		Yes	Yes
Graphical User Interface		Yes	Yes
Graphical processing acceleration [1]		Yes	Yes
Python and MATLAB APIs		No	Yes
ONNX Exporter [2]		No	Yes
C Exporter		No	Yes
FMU Exporter		No	Yes

(1) To be able to accelerate computation using a GPU, the system needs to be equipped with a recent NVidia GPU and the latest NVidia driver.

(2) ONNX (Open Neural Network Exchange), is an open format built to represent machine learning models. NeurEco, gives the user the possibility to export a model built using any platform, to ONNX format, which enables them to load it and use it with any other framework compatible with ONNX format (Tensorflow, Caffe, PyTorch, Matlab…)

For floating licenses, please contact us.

Point of contact: For all your remarks, inquiries, questions, suggestions … please contact our NeurEco support team at the following address: **support@adagos.com**

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