



# KATIE-ANN

## Multi-purpose Artificial Neural Networks Software Library

by TOPALLI AI Consultancy Ltd. ([topalli-ai.com](http://topalli-ai.com))

Katie-Ann is our company’s proprietary solution for Neural Network applications. It is a generic software tool which is customisable for different AI problems to be solved by “Supervised Learning”.

The architecture of Katie-Ann is based on the Multilayer Perceptron (MLP) which is a large class of feedforward neural networks with neurons arranged in layers. In this structure, all neurons in adjacent layers are connected to through uni-directional links called synaptic weights. Figure 1 shows a four-layer MLP structure.

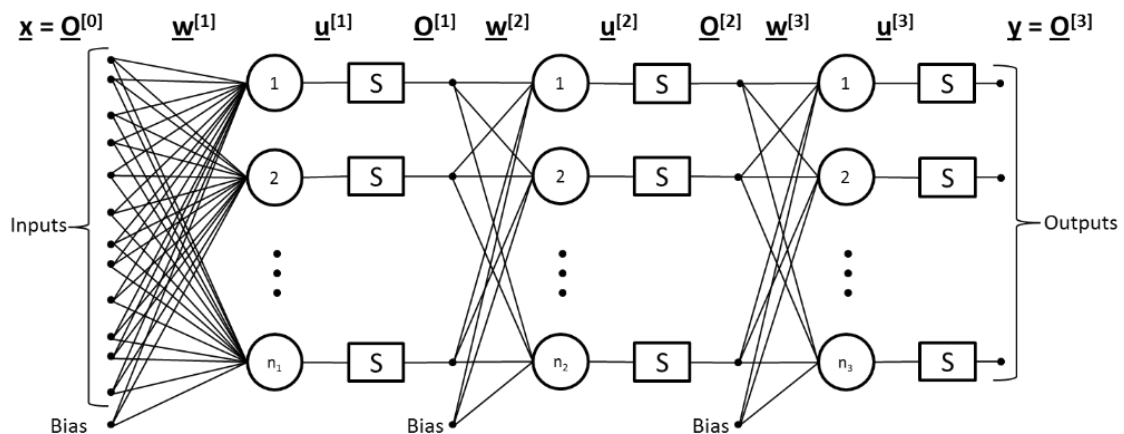


Figure 1. Architecture of the four-layer perceptron used in Katie-Ann.

Learning of the MLP consist of the adaptation of all synaptic weights in such a way that the discrepancy between the actual output signals and the desired signals, averaged over all learning examples, is as small as possible. The standard back propagation algorithm which uses the “Steepest-Descent Gradient Approach” to minimize the mean-squared error function is used during the training phase.



Katie-Ann is a standalone PC software tool. There is no need to know any programming languages to use it. It accepts IO data in tabular format and produces output as a CSV file.

Several screenshots of Katie-Ann GUI are given in Figures 2 – 7 below.

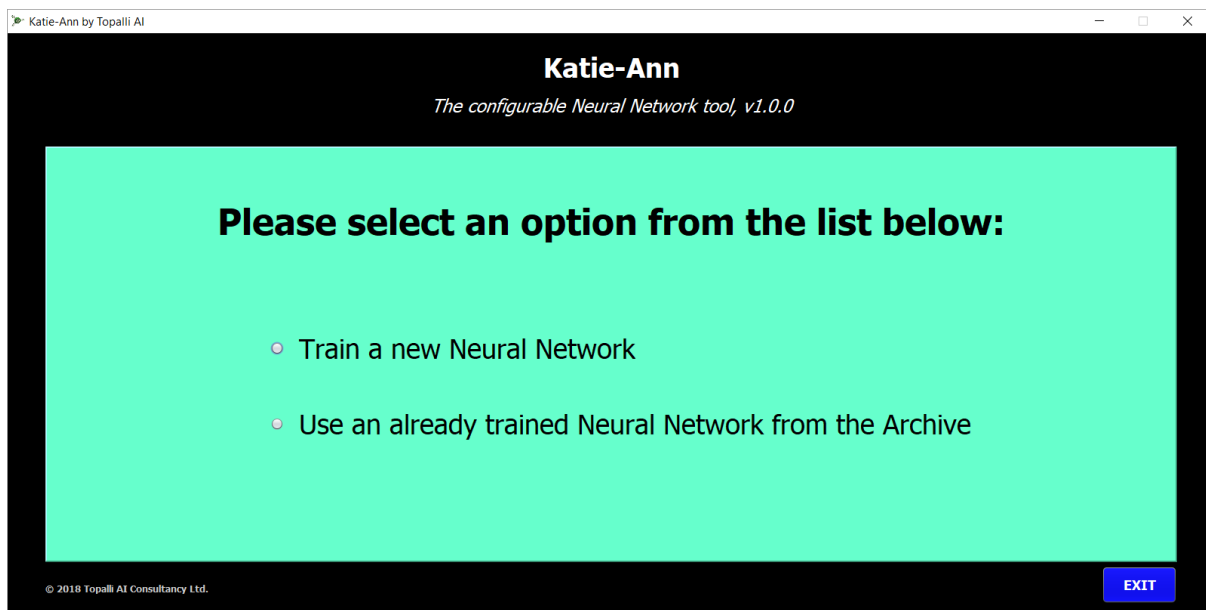


Figure 2. Selection screen, either for training a NN from scratch, or using a ready NN.

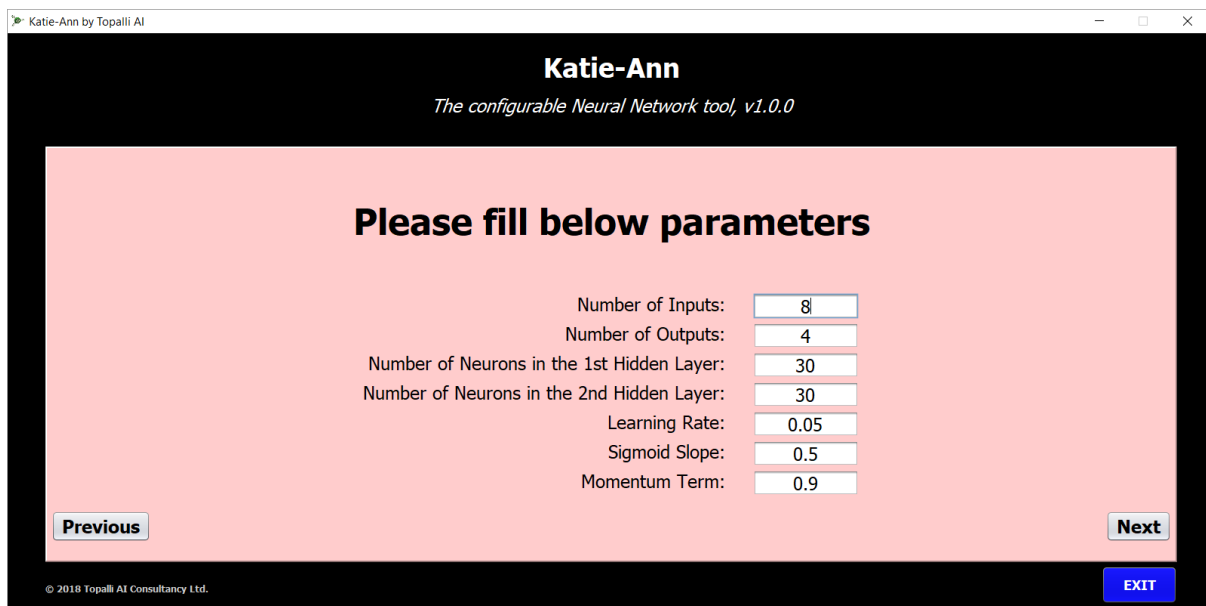


Figure 3. Parameters have default values, but they can also be changed by the user.

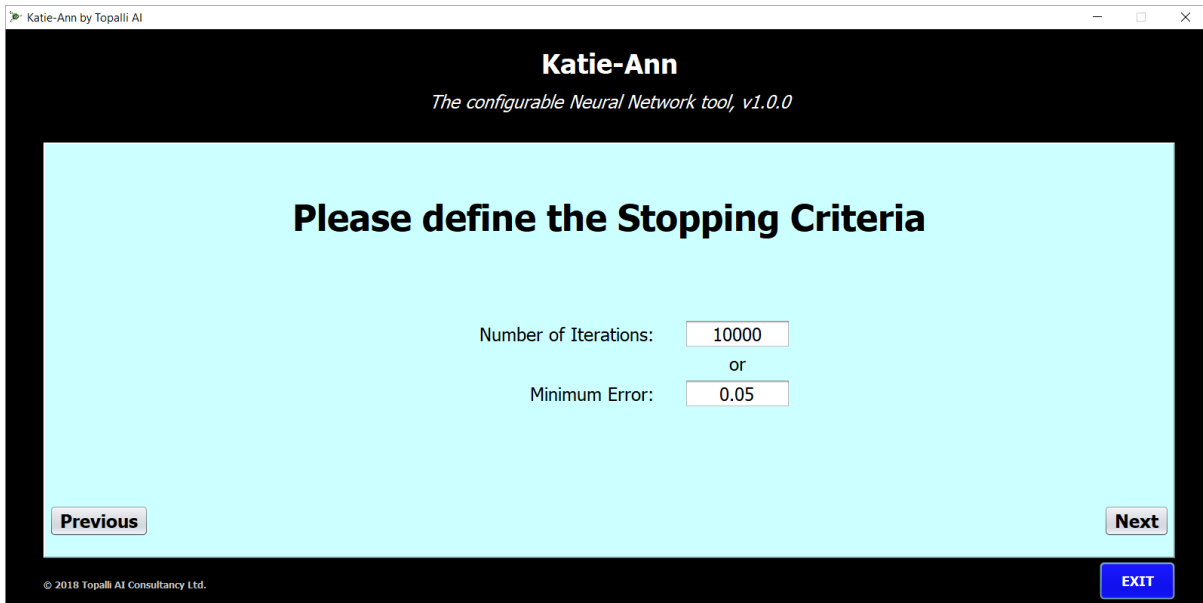


Figure 4. Stopping criteria can be the number of iterations or minimum error.

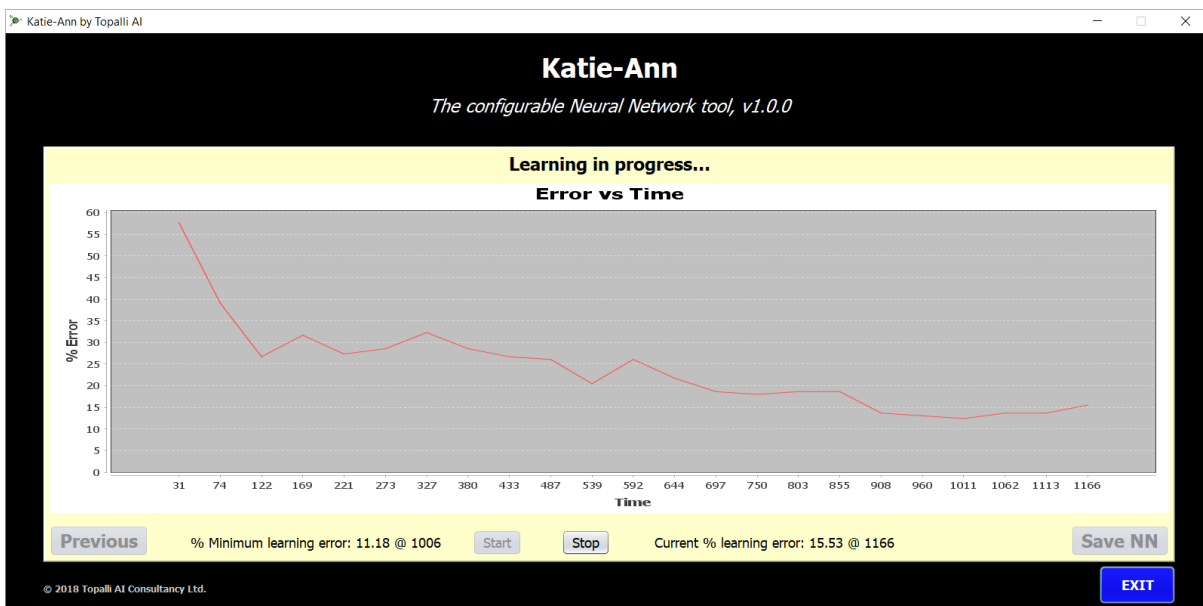


Figure 5. Graphical representation of the learning phase.

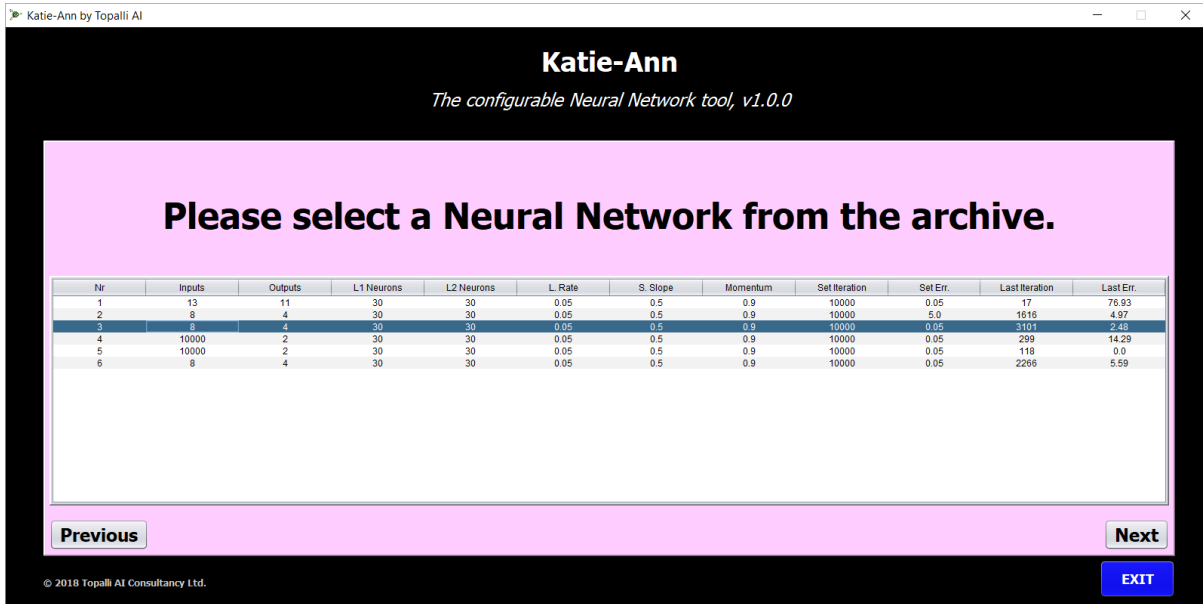


Figure 6. Previously trained NNs are stored in the archive for later use.

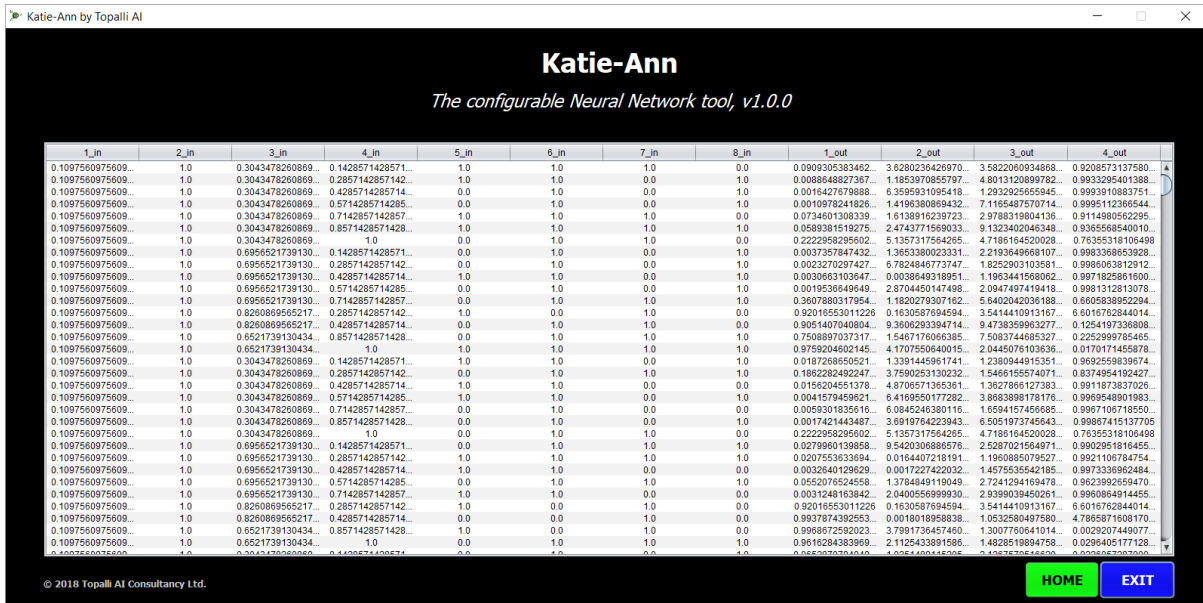


Figure 7. IO data are shown on the screen and also saved as a CSV file.



Current status of Katie-Ann as technology level is TRL 6 (System/subsystem model or prototype demonstration in a relevant environment). So far, it's been used in following works:

- "User Profiling for Tv Program Recommendation Based on Hybrid Television Standards Using Controlled Clustering with Genetic Algorithms and Artificial Neural Networks", İhsan Topallı, Selçuk Kılınç, Turkish Journal of Electrical Engineering & Computer Sciences, Volume 28, Issue 3, 1567-1583, 2020.
- "A Smart Program Recommender System Based on the Hybrid Broadcast Broadband Television", İhsan Topallı, Selçuk Kılınç, Journal of Science and Engineering, Volume 20, Issue 58, 64-74, January, 2018.
- "Modelling User Habits and Providing Recommendations Based on The Hybrid Broadcast Broadband Television Using Neural Networks", İhsan Topallı, Selçuk Kılınç, IEEE Transactions on Consumer Electronics, 62 (2), 182-190, 2016.