The NeuCube

Spiking Neural Network Development System for Spatio- and Spectro-Temporal Data

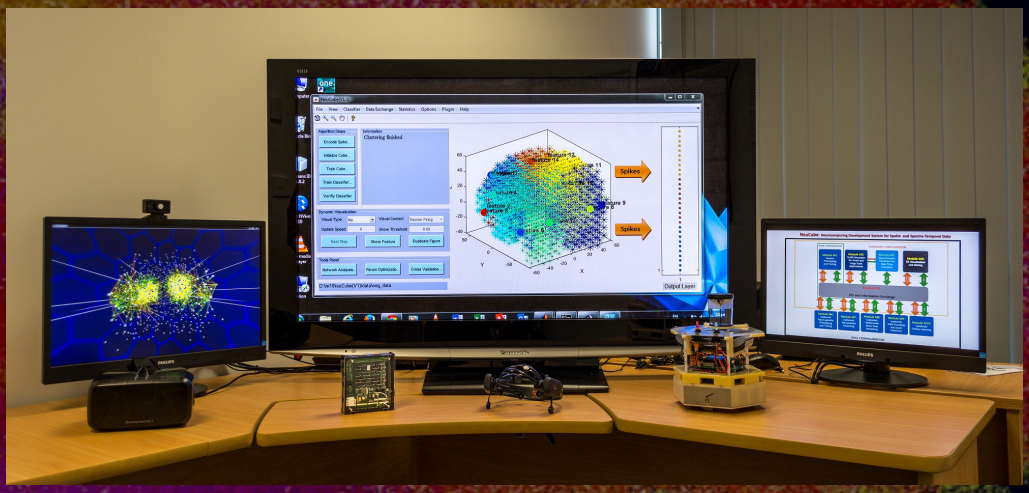

Fig. 1 The NeuCube software/hardware development environment.

The NeuCube is a development system for spiking neural network (SNN) applications on complex and large, temporal and/or spatio-/spectro- temporal data (SSTD). NeuCube is based on the evolving connectionist system (ECOS) principles and neuromorphic computations. It facilitates building spatio-temporal data machines (STDM) for problem solving such as classification, prediction, pattern recognition, data analysis and data understanding.

A STDM consists of several modules: an input module to encode input stream data into sequences of spikes; a 3D SNNcube that learns the encoded data in an unsupervised mode to capture spatio-temporal patterns; an evolving output classifier/regressor based on SNN; and an optimisation module.

The NeuCube architecture was first proposed for brain data modelling (N.Kasabov, 2014) and then it was further developed as a multi-modular software/hardware system for large scale applications (Kasabov et al., 2015). A limited trial version of NeuCube V1.0 is available for free from www.kedri.aut.ac.nz/neucube/.

For a full version or for a commercial application, a licence can be obtained from the Knowledge Engineering and Discovery Research Institute (KEDRI). The NeuCube software/hardware development system is intellectual property owned by Auckland University of Technology and PCT protected.

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Several modules are included in its full configuration as shown in Fig.2. Further detailed information on the NeuCube architecture and its applications are given in (Kasabov et al., 2015).

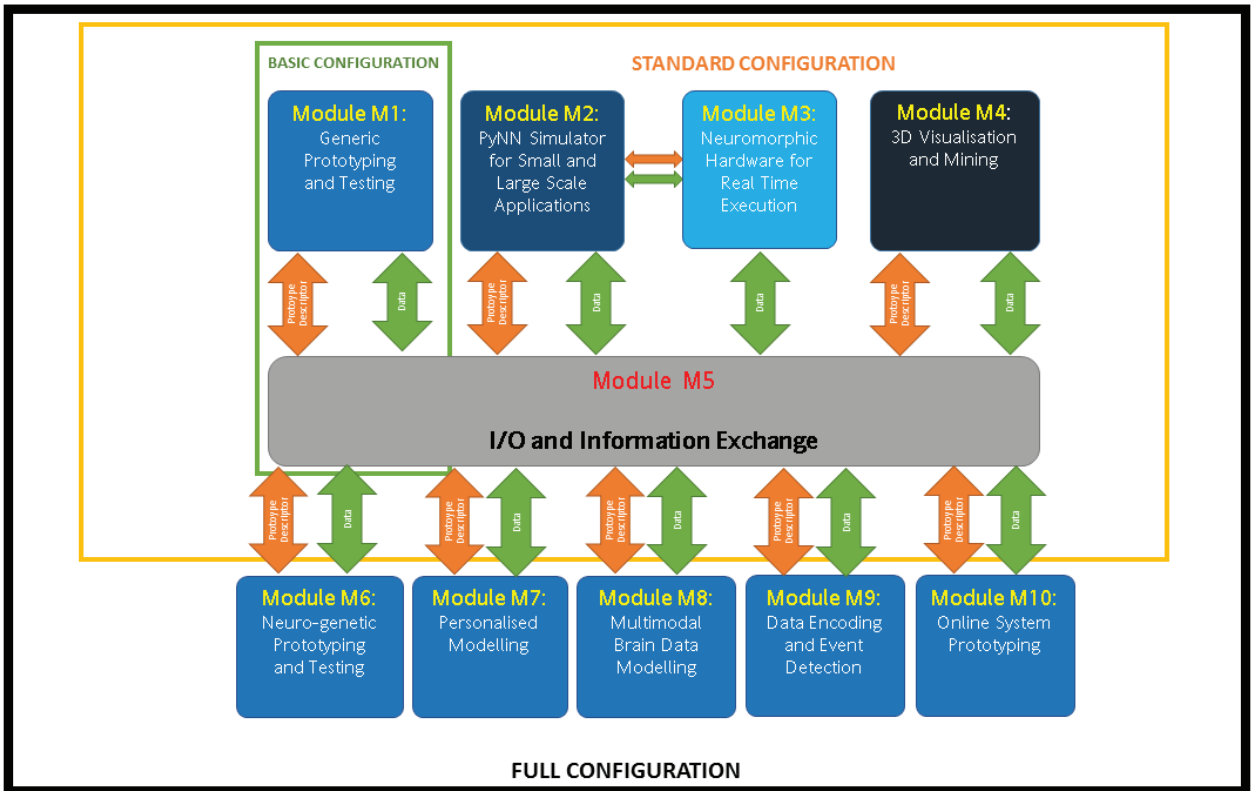

Fig. 2 The NeuCube with its 10 modules.

Fig. 3 The NeuCube-KEDRI team.

REFERENCES:

Kasabov, N. NeuCube: A Spiking Neural Network Architecture for Mapping, Learning and Understanding of Spatio-Temporal Brain Data, Neural Networks vol.52 (2014), pp. 62-76.

N.Kasabov, V.Feigin, Z.Hou, Y.Chen, Improved method and system for predicting outcomes based on spatio/spectro-temporal data, PCT patent, WO2015/030606 A2, priority date: 26.08.2013.

N.Kasabov et al, Design methodology and selected applications of evolving spatio- temporal data machines in the NeuCube neuromorphic framework, Neural Networks, 2015