

Waveform Processing using Artificial Neural Networks

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With the advent of digital electronics, signals from detectors can be sampled and processed by complex algorithms.

Such processing can be performed online, in FPGA and/or in computer farms.

In some cases, sampled signals are also registered on disk for offline re-processing : in nuclear physics, this is the case for the gamma-ray tracking array AGATA and the neutron detector NEDA.

Machine Learning technics could be applied at different stages along the processing chain. We will present some results based on data from an AGATA/NEDA/DIAMANT

experiment , data on which several neural network architectures (Multilayer Perceptron, Convolutional Network and Long Short Term Memory) have been applied to performed neutron-gamma discrimination in NEDA.

Some studies on auto encoders, in particular for data reduction, anomaly detections and signal generation, will be presented. Foreseen applications of Machine Learning technologies will be also underlined.

Auteurs principaux: STEZOWSKI, Olivier (IP2I); BAULIEU, Guillaume (IP2I); FABIAN, Xavier (IPN Lyon); DUCROUX, Laurent (IPNL/UCBL); Dr DUDOUE, Jérémie (IP2I)

Orateur: STEZOWSKI, Olivier (IP2I)

Classification de thématique: ML for data reduction : Application of Machine Learning to data reduction, reconstruction, building/tagging of intermediate object