

OpenCL Acceleration of FANN

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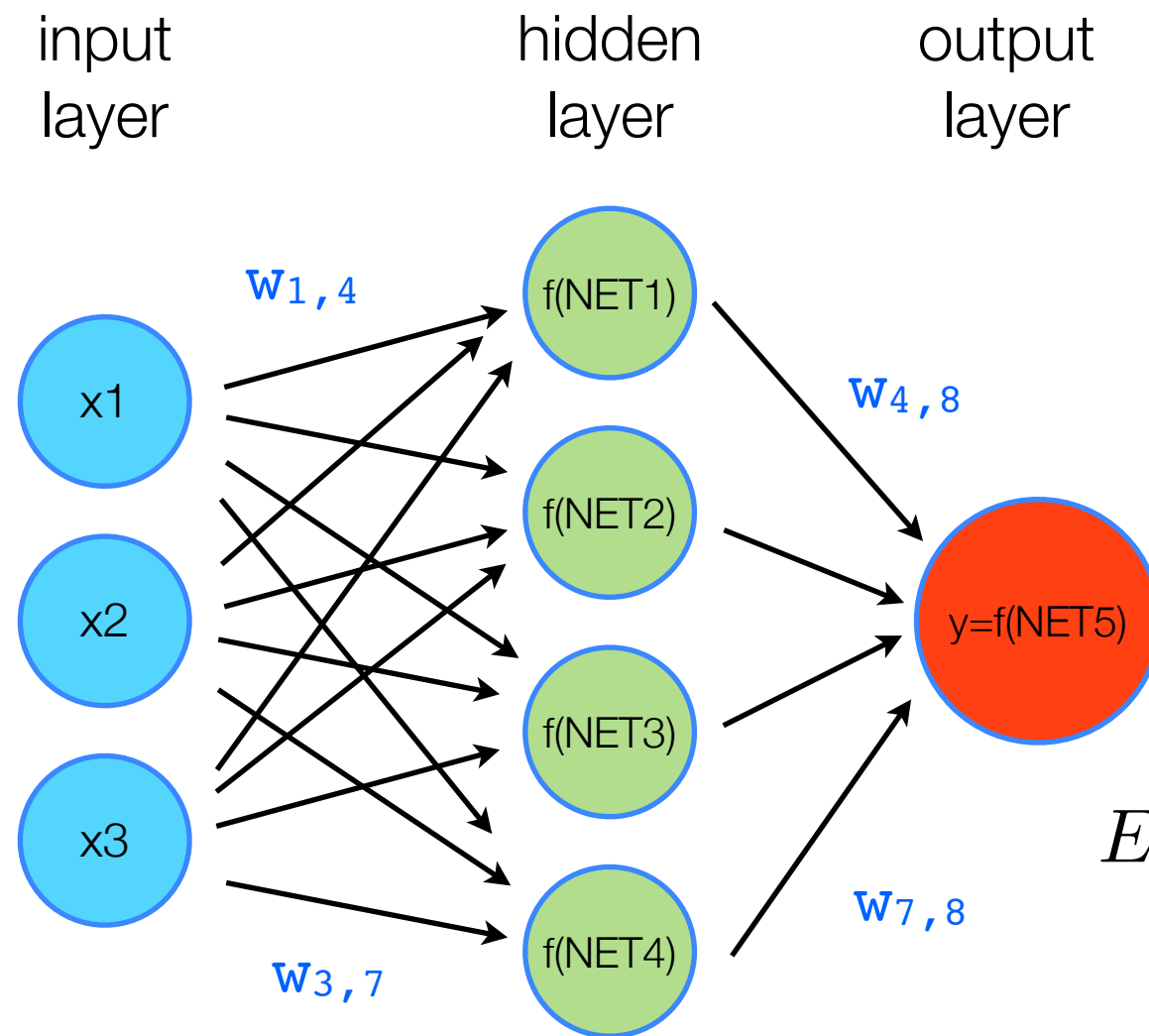
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OpenCL

- Open Computing Language
- Heterogeneous Platform
- GPU, CPU, FPGA, etc
- c.f CUDA

Artificial Neural Network

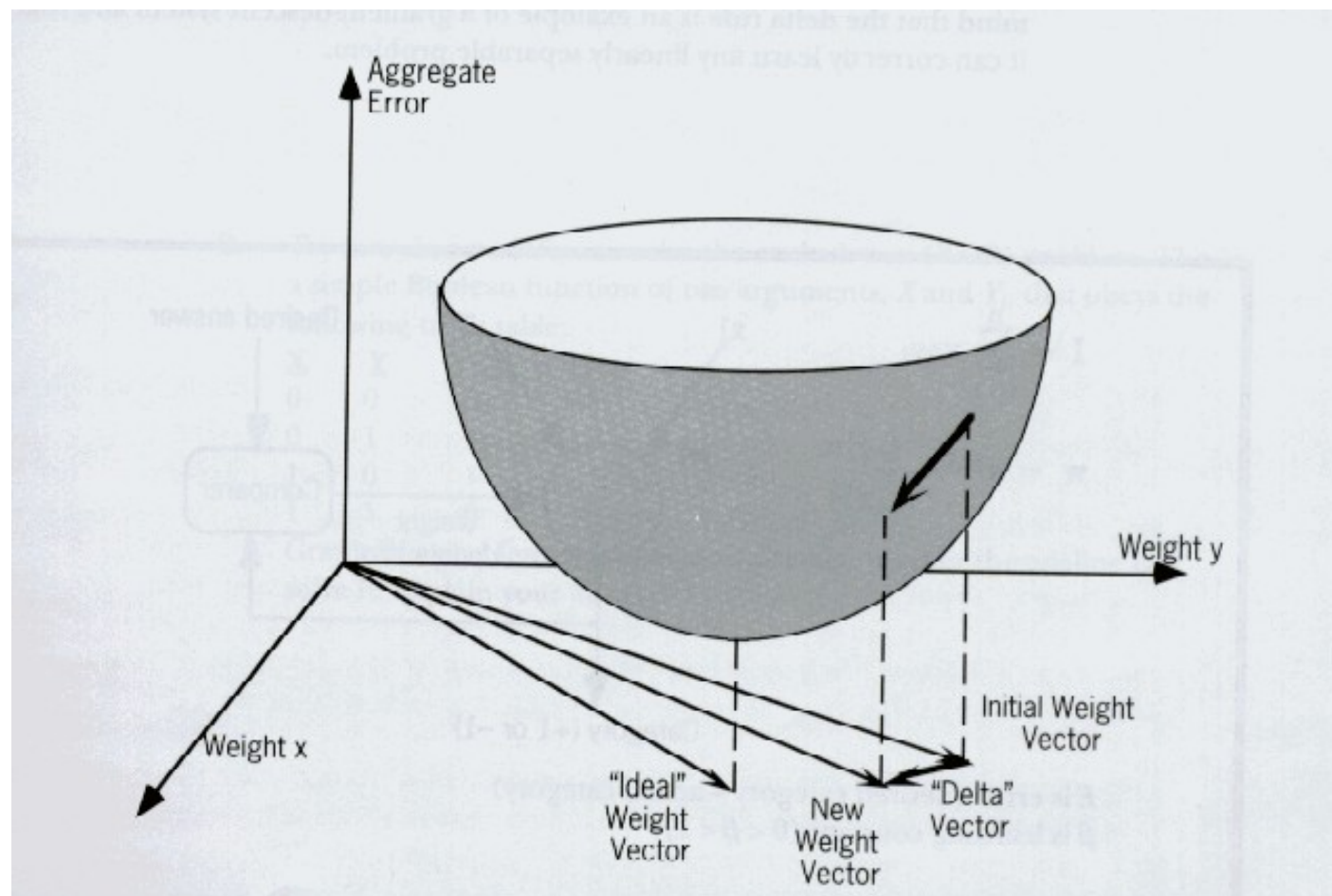


$$\text{NET} = \sum_1^n x_n w_n$$

$$f(\text{NET}) = \frac{1}{1 - \exp(-\lambda \text{NET})}$$

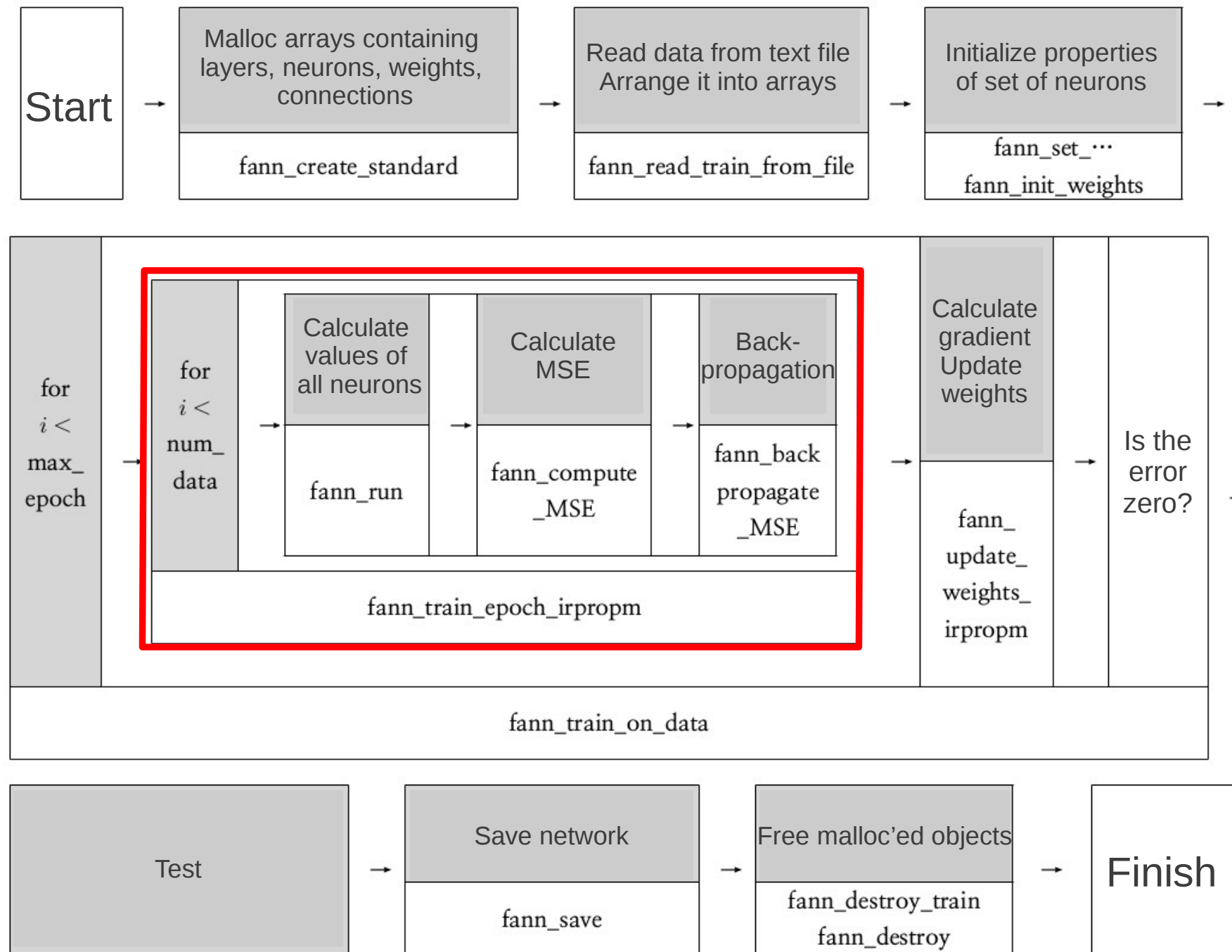
$$E_{\text{MSE}} = \frac{1}{d \cdot N} \sum_{n=1}^M ||y(x^n; \mathbf{w}) - \mathbf{t}^n||^2$$

Backpropagation

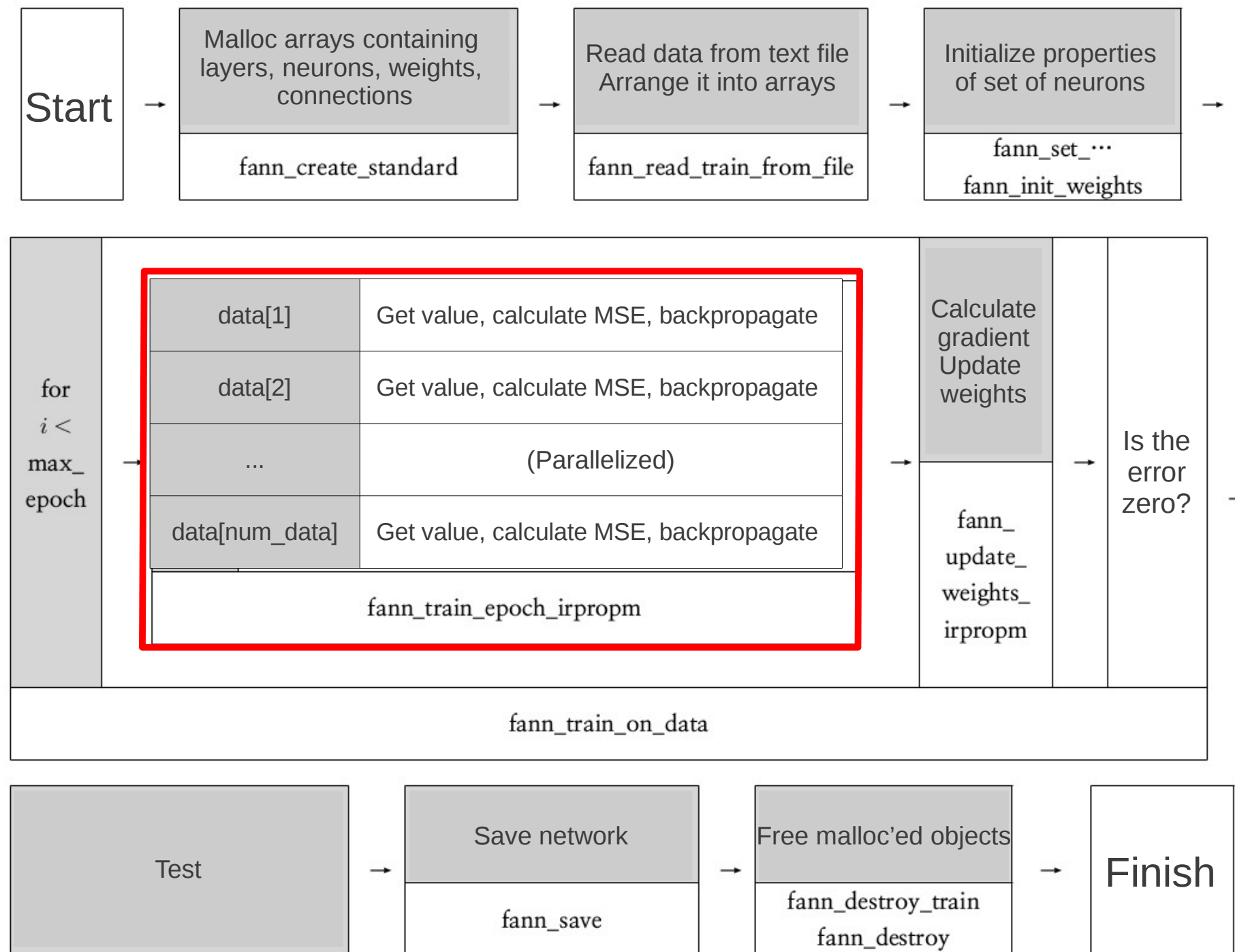


- Error (mean-squared-error, MSE) minimization
- Gradient descent method
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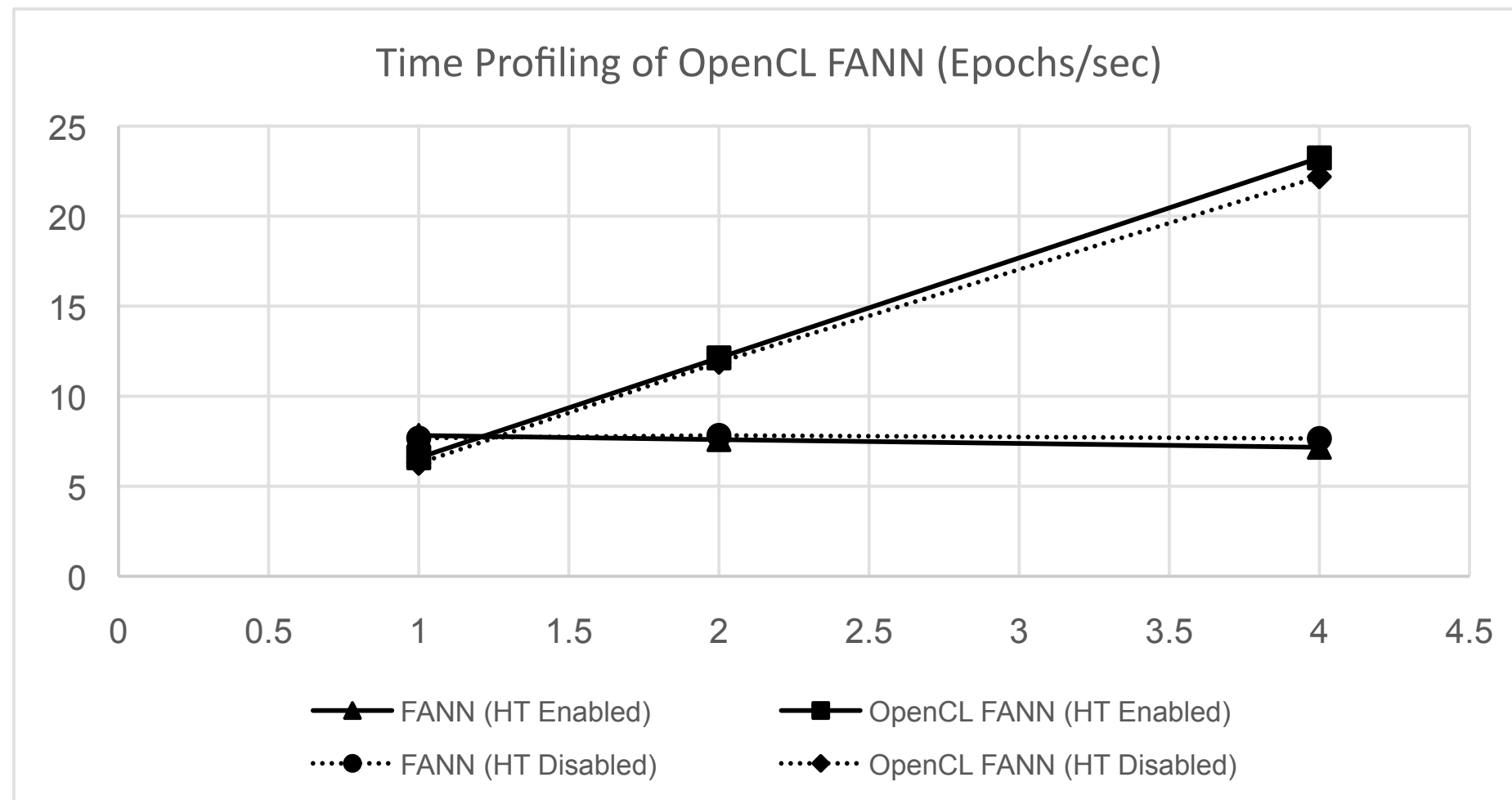
Workflow



Parallelization using OpenCL



Speedup



Outlook & Todo

- Application to low-latency Data Quality Check pipeline
 - Retraining of the ANN
- GA+ANN : to overcome slow-convergence of GA
 - parameter search
 - large population
- GPU acceleration