Spike-by-Spike Neural Network

Structure

Input layer

IP Spike

Hidden layer

IP Spike   IP neurons

SbS network

Noise robustness

CNN   **SbS**

Noise η

η = 0   η = 0.25

η = 0.5   η = 0.75

η = 1.0   η = 1.25

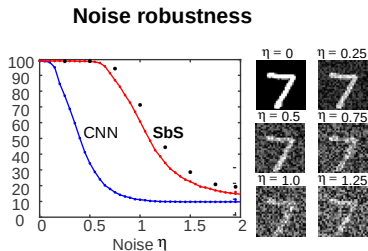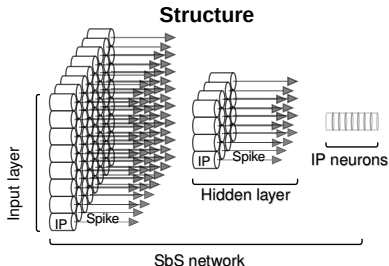## Neuron update

$$h_\mu^{new}(i) = \frac{1}{1+\epsilon}\left(h_\mu(i) + \epsilon \frac{h_\mu(i)W(s_t|i)}{\sum_j h_\mu(j)W(s_t|j)}\right)$$

Non-negativity $0 \leq W(s_t|j) \leq 1$

Normalized $\sum_{s_t=0}^{M-1} W(s_t|j) = 1$