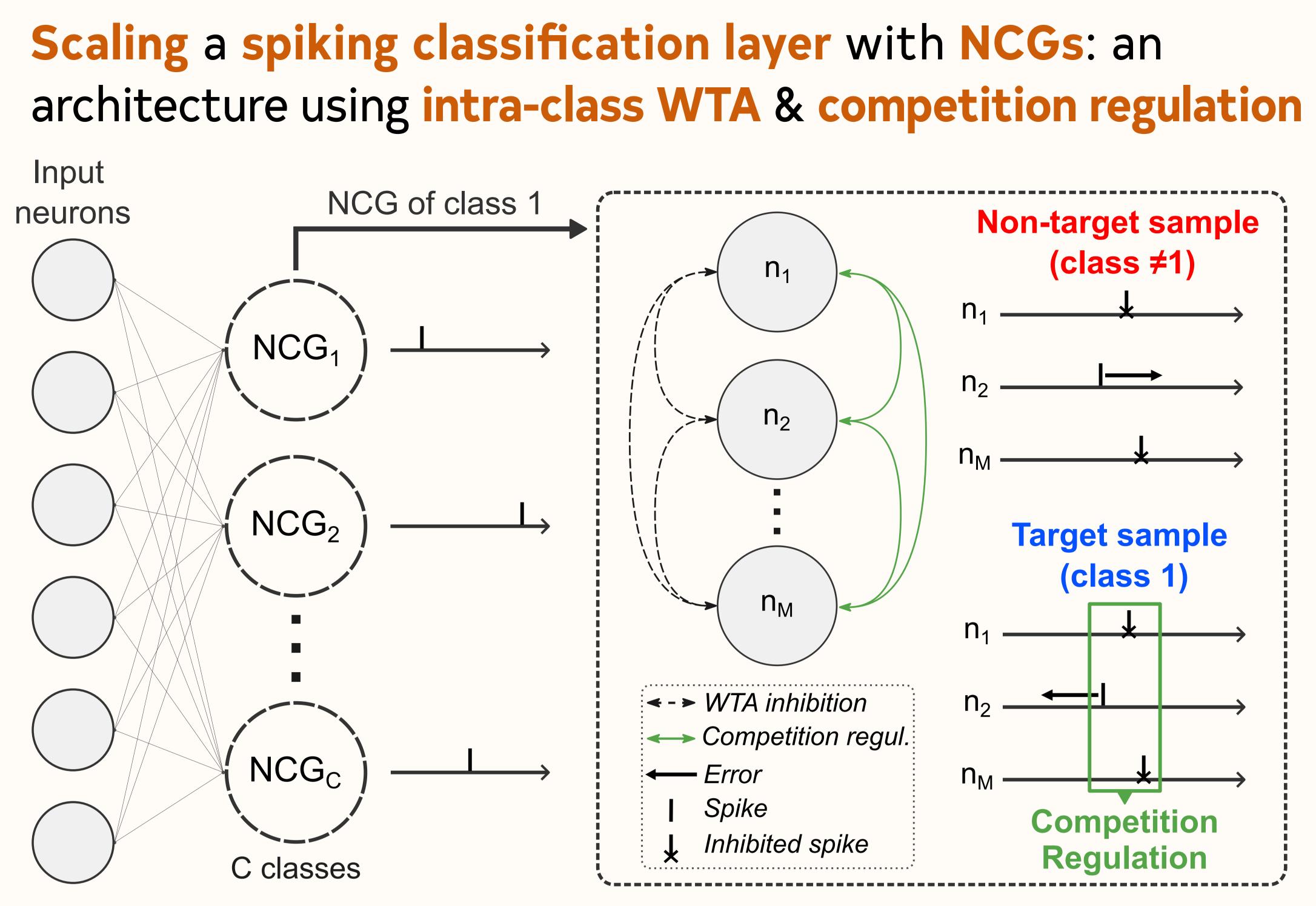
Intra-class winner-takes-all can improve classification in spiking neural networks by helping learn various class-specific patterns

Neuronal Competition Groups with Supervised STDP for Spike-Based Classification

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Full paper



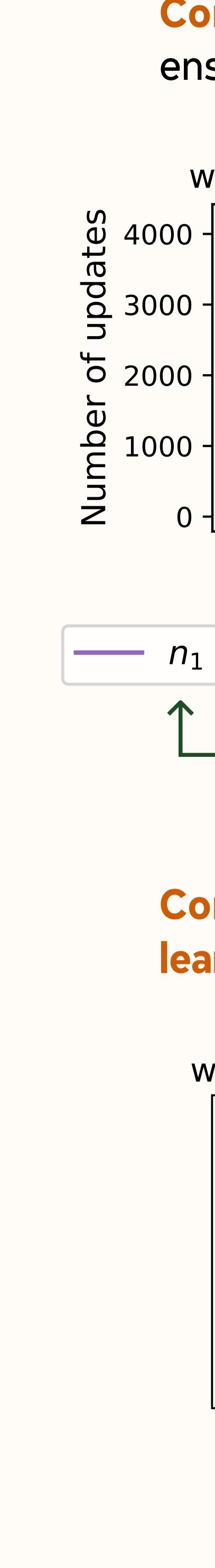


NCGs significantly improve the accuracy of spiking classification layers trained with SOTA supervised STDP rules

Dataset	Method	Neurons per class	Accuracy (Mean±Std %)	
			STDP-CSNN*	SoftHebb-CNN
Fashion-MNIST	SSTDP	1	85.26 ± 0.17	89.36 ± 0.24
	SSTDP+NCG (ours)	5	87.59 ± 0.11	91.06 ± 0.10
	S2-STDP	1	85.89 ± 0.27	90.61 ± 0.19
	S2-STDP+NCG (ours)	5	88.72 ± 0.23	91.86 ± 0.14
CIFAR-10	SSTDP	1	60.87 ± 0.53	76.57 ± 0.58
	SSTDP+NCG (ours)	5	64.05 ± 0.48	78.53 ± 0.32
	S2-STDP	1	61.08 ± 0.17	76.90 ± 0.27
	S2-STDP+NCG (ours)	5	66.41 ± 0.17	79.55 ± 0.23
CIFAR-100	SSTDP	1	28.49 ± 0.49	48.73 ± 0.39
	SSTDP+NCG (ours)	5	31.19 ± 0.27	49.81 ± 0.23
	S2-STDP	1	29.39 ± 0.19	49.17 ± 0.29
	S2-STDP+NCG (ours)	5	35.90 ± 0.42	53.49 ± 0.18



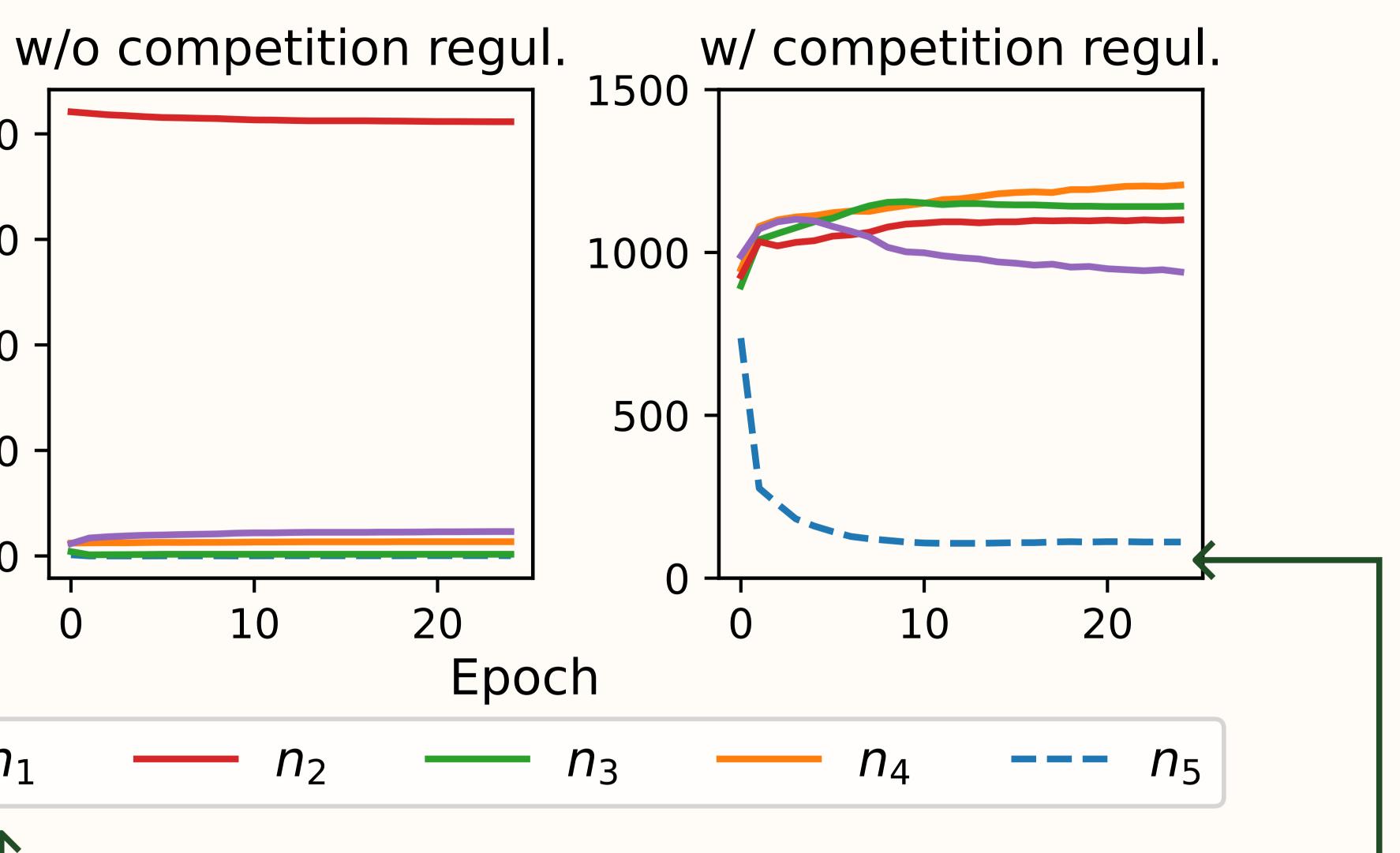






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Competition regulation is crucial for ensuring **balanced competition** within NCGs



Neurons from NCG of class 1

Neurons specializing toward non-target samples

NEURAL INFORMATION

PROCESSING SYSTEMS

Competition regulation enables the learning of various class-specific patterns

