



Figure 1: Empirical measurements conducted on the DVS-CIFAR10 dataset.

Table 1: Comparison results of performance and training costs across various timesteps. All units for time measurements are in seconds per batch. Experiments were conducted on NVIDIA GeForce RTX 4090, with training settings consistent with other experiments.

Datasets	Network	Method		Timesteps				
				T=1	T=2	T=4	T=8	T=16
CIFAR100	ResNet18	rate	Time of Eligibility Track	0.003	0.004	0.007	0.015	0.027
			Time of Backward	0.034	0.035	0.036	0.034	0.036
			Time of both	0.037	0.039	0.043	0.049	0.063
			Memory Allocated	1.8492	1.8488	1.8473	1.8496	1.8483
			Top-1 Acc [%]	74.60	76.04	78.24	79.24	79.37
		BPTT	Time of Backward	0.023	0.044	0.098	0.199	0.564
			Memory Allocated	1.4272	2.4454	4.4804	8.0460	15.685
			Top-1 Acc [%]	74.38	76.65	78.49	78.35	
	ResNet19	rate	Time of Eligibility Track	0.006	0.012	0.020	0.041	
			Time of Backward	0.083	0.083	0.082	0.083	
			Time of both	0.089	0.095	0.102	0.124	
			Memory Allocated [GB]	4.4787	4.4798	4.4788	4.4784	
			Top-1 Acc [%]	78.3	80.00	80.65	81.31	
		BPTT	Time of Backward	0.046	0.111	0.285	0.552	
			Memory Allocated [GB]	3.2556	5.6636	10.8978	20.3862	
			Top-1 Acc [%]	78.39	80.06	81.11	81.13	
	VGG11	rate	Time of Eligibility Track	0.003	0.003	0.006	0.011	0.020
			Time of Backward	0.017	0.017	0.017	0.017	0.018
			Time of both	0.020	0.020	0.023	0.028	0.038
			Memory Allocated [GB]	1.3624	1.3607	1.3619	1.3613	1.3601
			Top-1 Acc [%]	76.13	77.59	77.75	78.34	78.65
		BPTT	Time of Backward	0.010	0.021	0.054	0.135	0.384
			Memory Allocated [GB]	0.9911	1.6784	3.7363	6.6141	12.3768
			Top-1 Acc [%]	76.34	77.20	77.98	78.26	78.37
ImageNet	SEW-Resnet34	rate	Time of Eligibility Track	0.012	0.014	0.023		
			Time of Backward	0.074	0.074	0.074		
			Time of both	0.086	0.088	0.097		
			Memory Allocated [GB]	5.7887	5.7898	5.7883		
		BPTT	Time of Backward	0.046	0.095	0.233		
			Memory Allocated [GB]	3.9858	6.8654	12.5597		
	PreAct-Resnet34	rate	Time of Eligibility Track	0.007	0.009	0.020		
			Time of Backward	0.072	0.071	0.072		
			Time of both	0.079	0.080	0.092		
			Memory Allocated [GB]	5.4995	5.4982	5.4942		
		BPTT	Time of Backward	0.046	0.088	0.211		
			Memory Allocated [GB]	3.7017	6.4778	11.969		