Автоматическое распознавание речи

Модель keyword spotting.

Сидорова Анна Павловна

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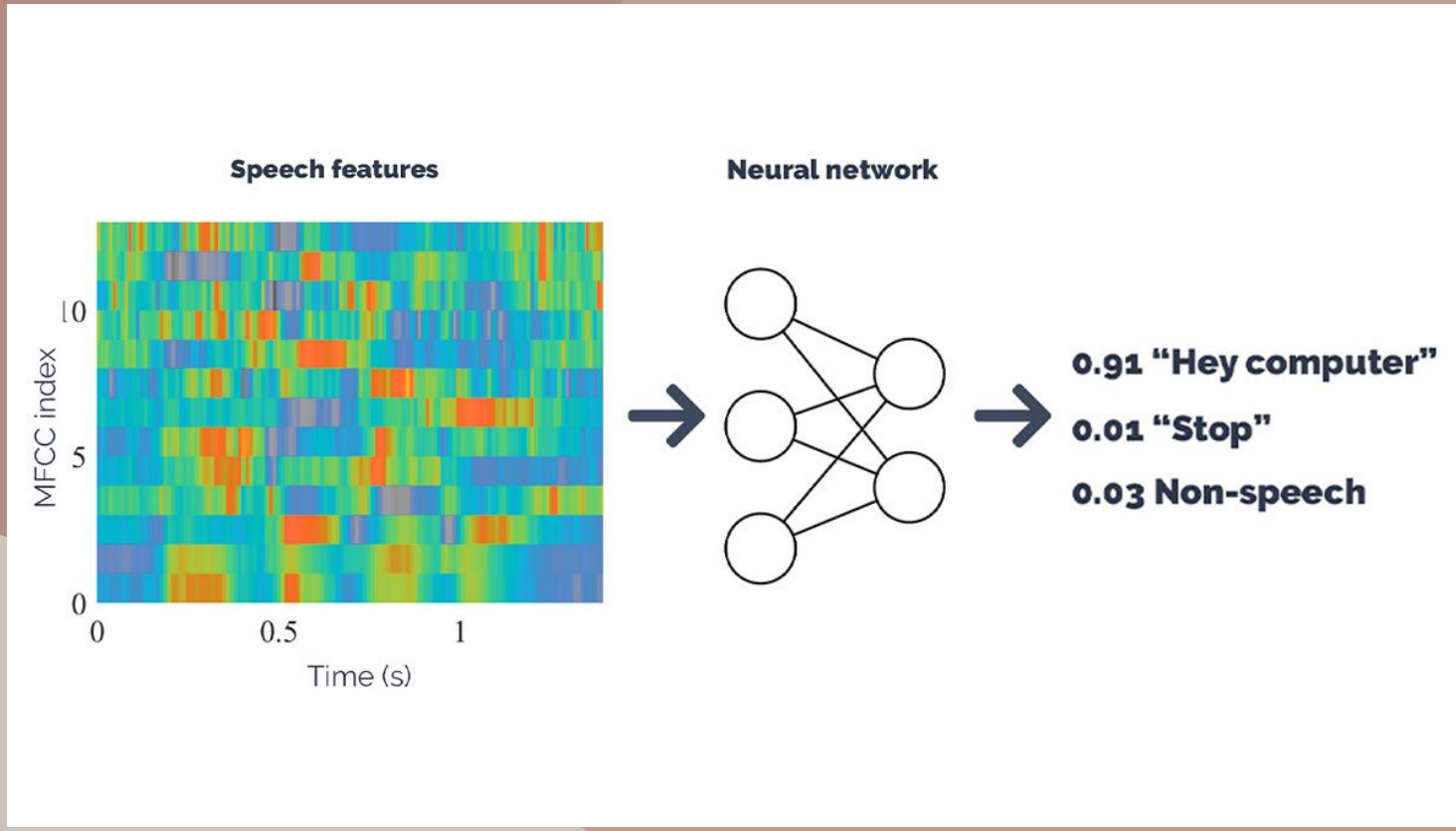
О задаче **keyword spotting**

Задача классификации конкретного слова или выражения.

01



02

О датасете

Был использован - Google speech command datasets v2.

Версия 2 была выпущена 11 апреля 2018 года и содержит 105 829 аудиофайлов.

	train	validation	test
v0.02	84848	9982	4890

03

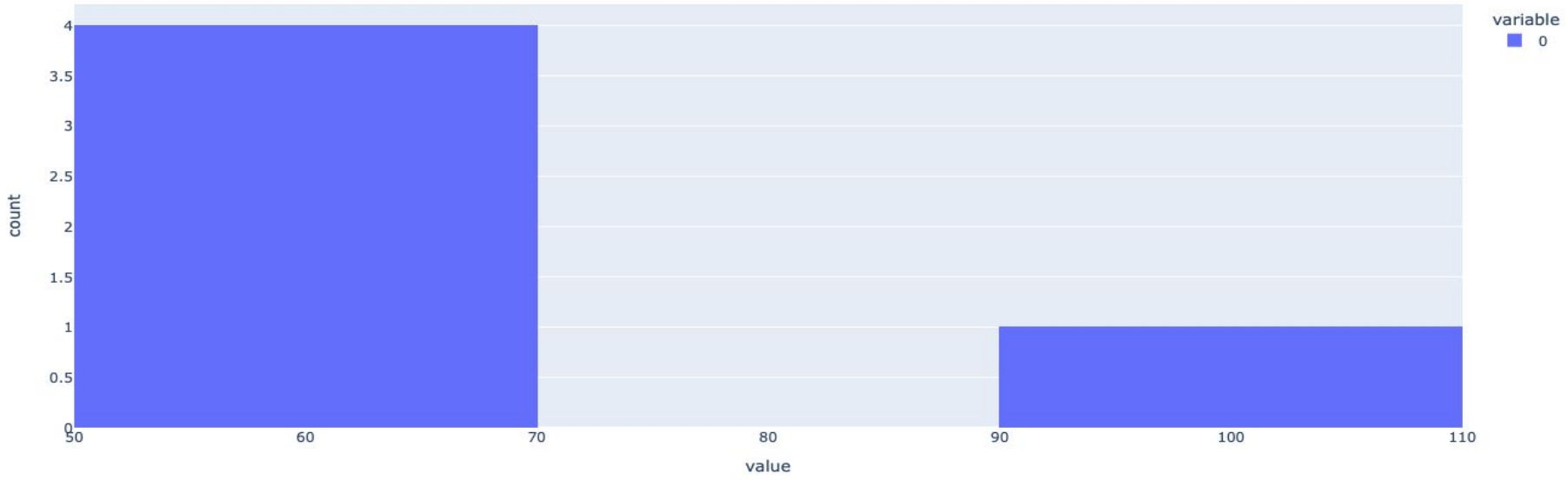
Выбор слова-триггера

	train	validation	test
Общее	84848	9982	4890
Marvin	1710	195	11
Sheila	1606	204	17

04

Анализ датасета

Обучающая



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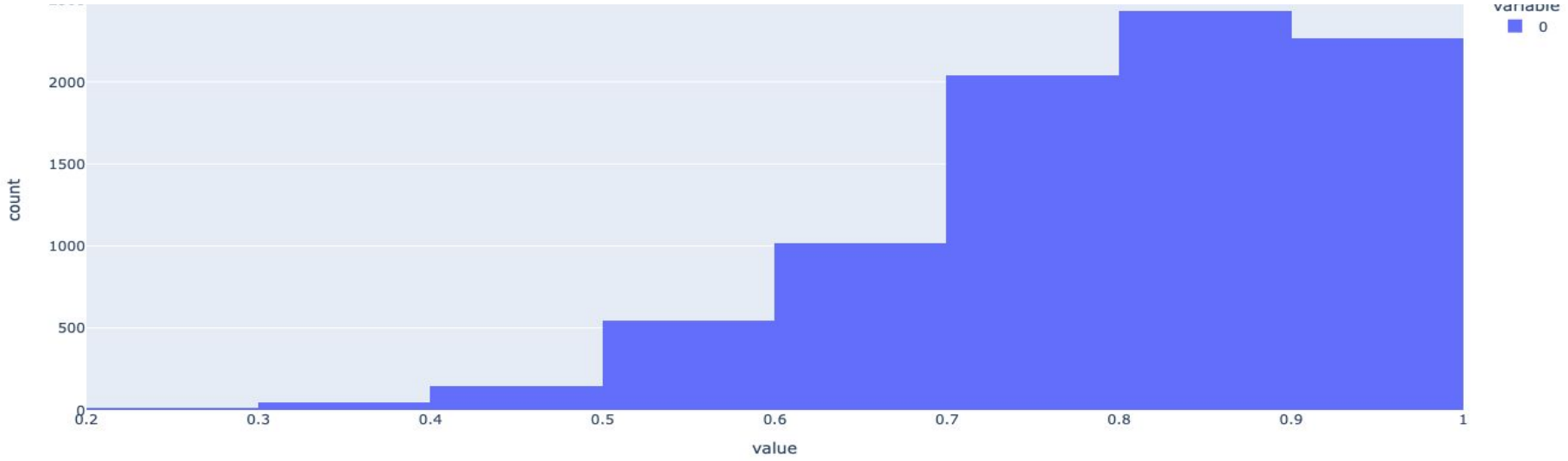

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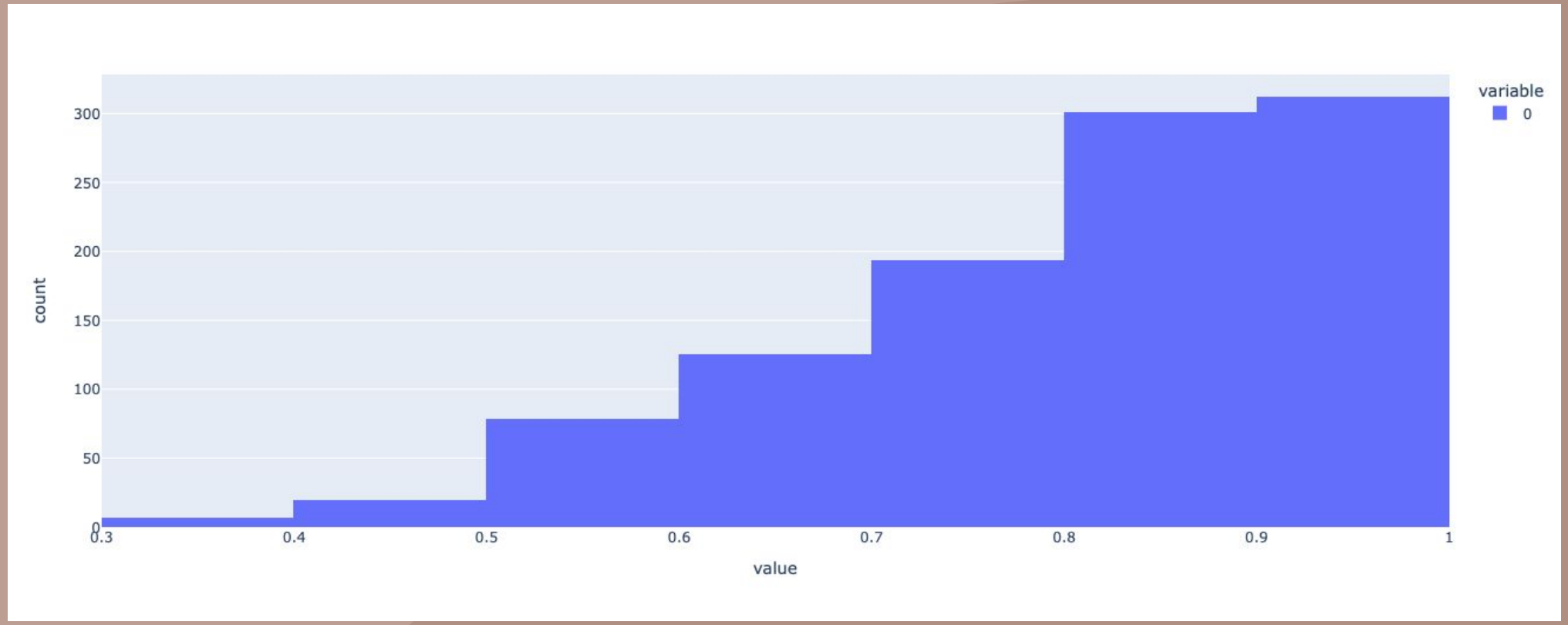


$t < 1$

05

Аугментация

Были применены следующие методы:

- Небольшое замедление голоса и его тона
- Реверберация
- Белый шум
- Добавление звуков на заднем фоне

06

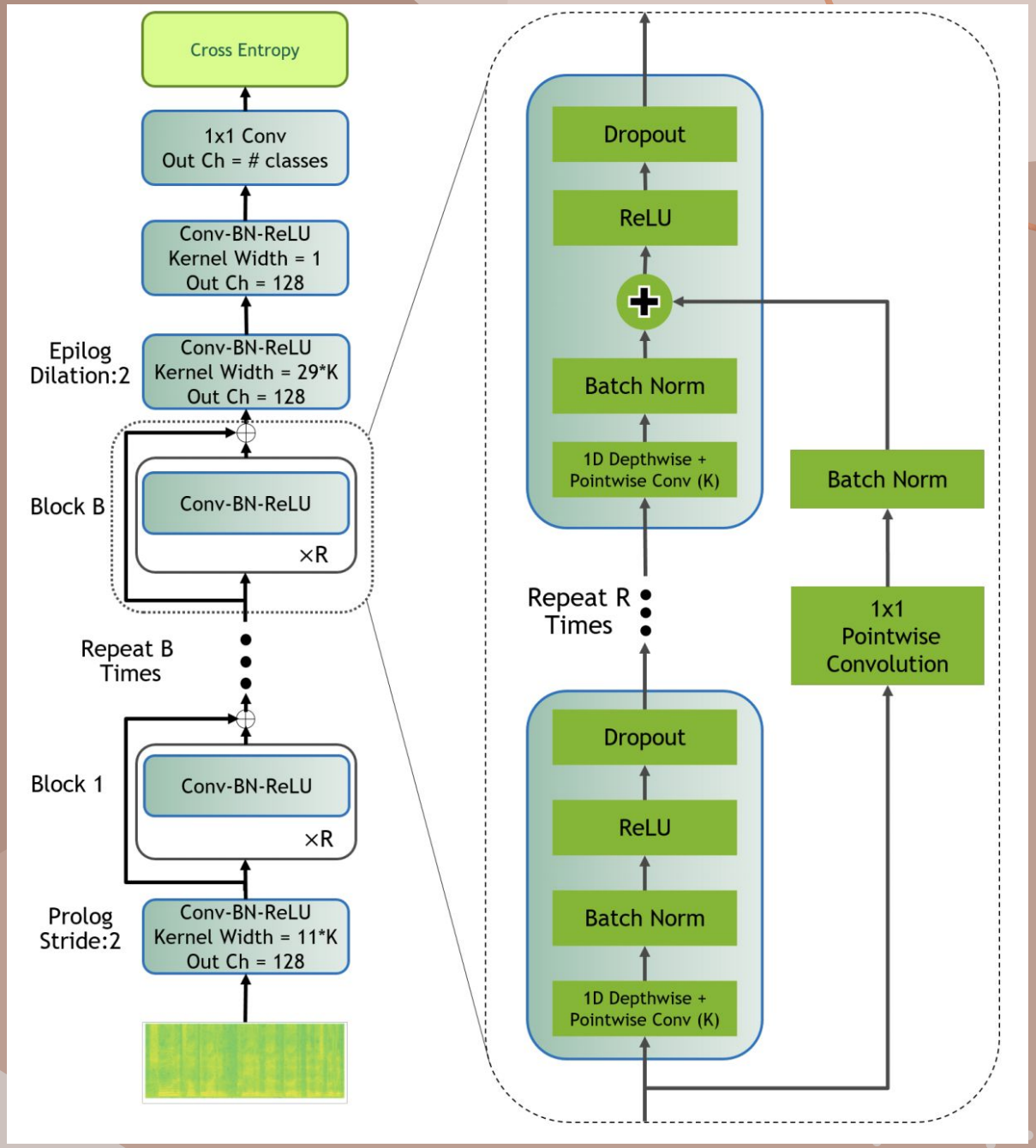
Метрики

Были использованы следующие метрики:

- **Accuracy**
- **Balanced accuracy**
- **F1-score**
- **Far per hour**

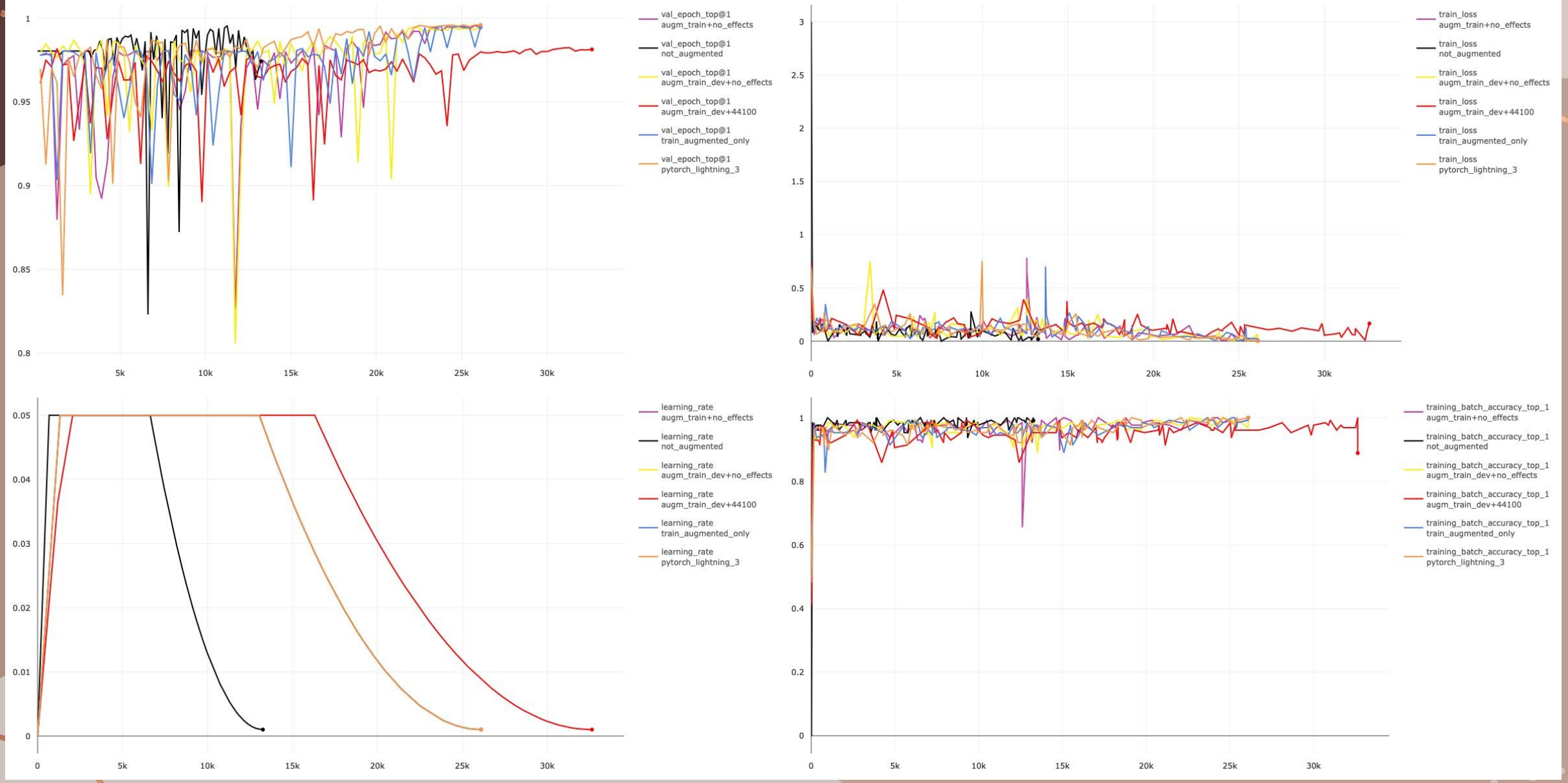
MatchboxNet

07



08

Эксперименты

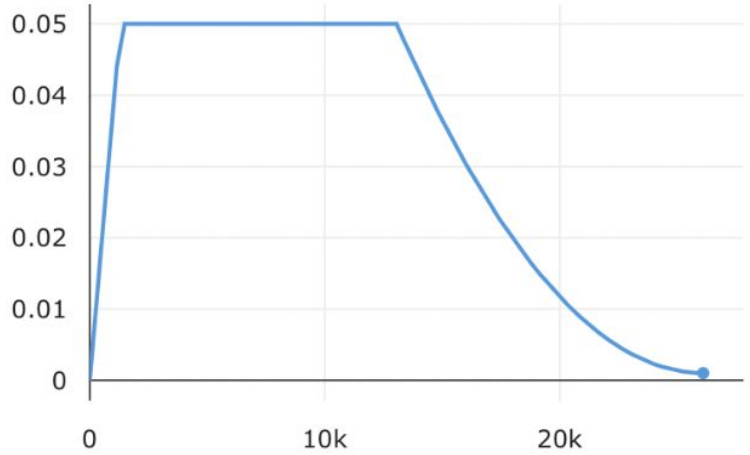


		Accuracy	Balanced Accuracy	F1-score	FAR per hour
Exp1 train + dev augm	train	99.85	99.85	99.85	81
	dev	99.61	99.61	99.62	
	test	99.84	90.85	99.92	
Exp2 only train augm	train	99.6	99.6	99.6	43
	dev	99.51	87.94	99.75	
	test	99.88	90.87	99.94	
Exp3 sr=44100	train	98.67	98.67	98.68	0
	dev	98.19	98.19	98.21	
	test	99.39	54.34	99.69	
Exp4 No effects All augm	train	99.65	99.65	99.65	3460
	dev	99.67	99.43	99.43	
	test	99.43	86.23	99.84	
Exp5 Not augmented	train	99.48	91.46	99.73	13
	dev	99.84	91.22	99.77	
	test	99.54	81.78	99.92	
Exp6 No effects train augm	train	99.7	99.7	99.7	3534
	dev	99.73	90.72	99.77	
	test	99.56	86.26	99.87	

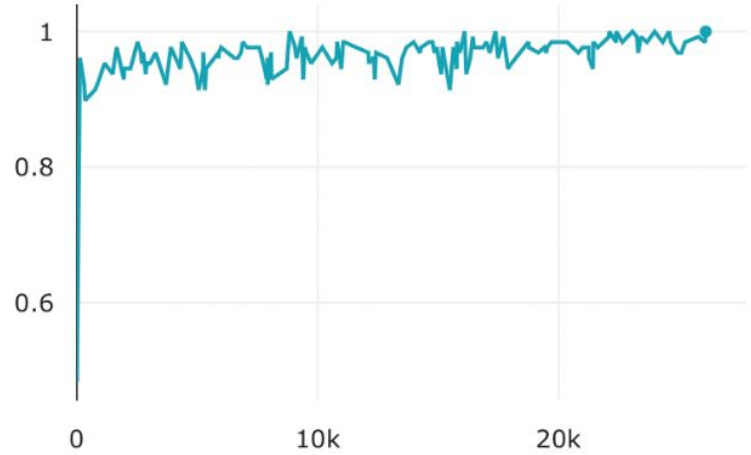
Эксперимент 1

test_epoch_top@1,test_loss

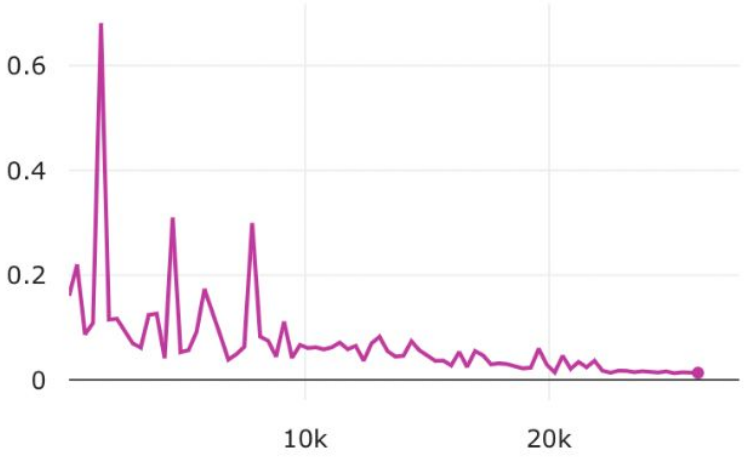
learning_rate



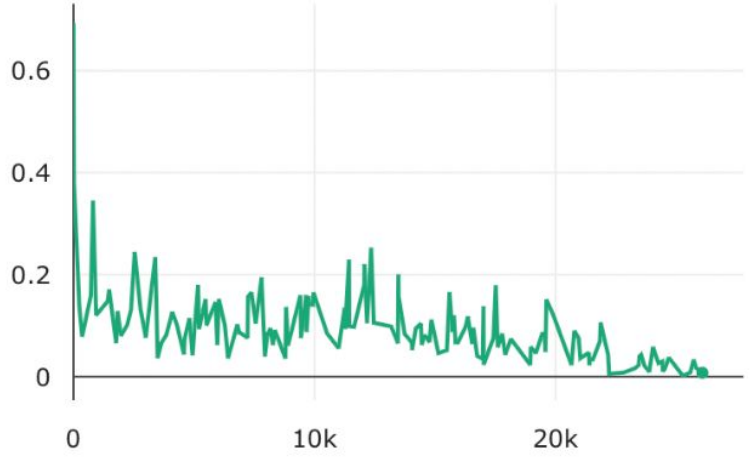
training_batch_accuracy_top_1



val_loss



loss



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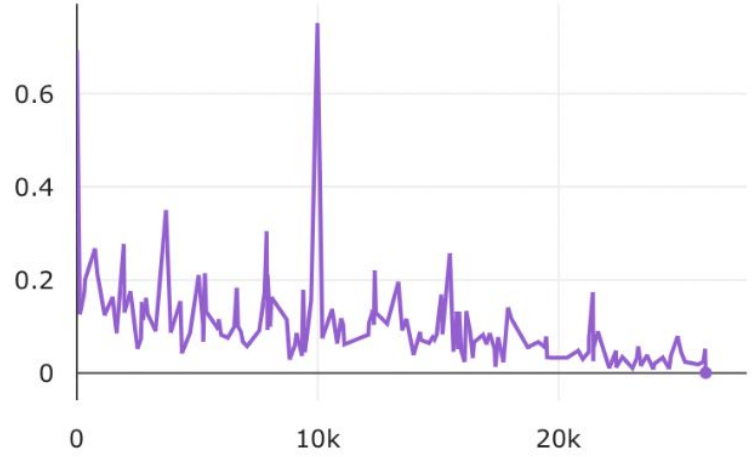
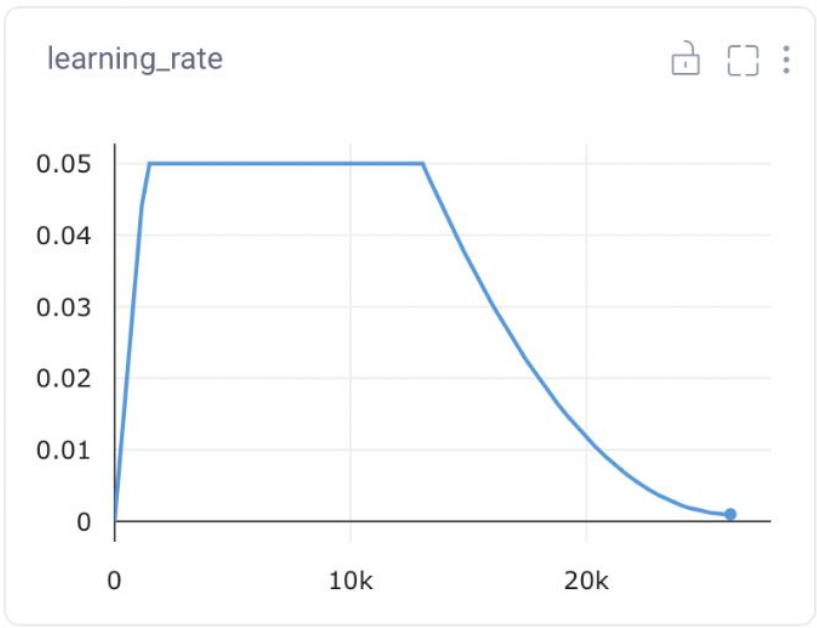
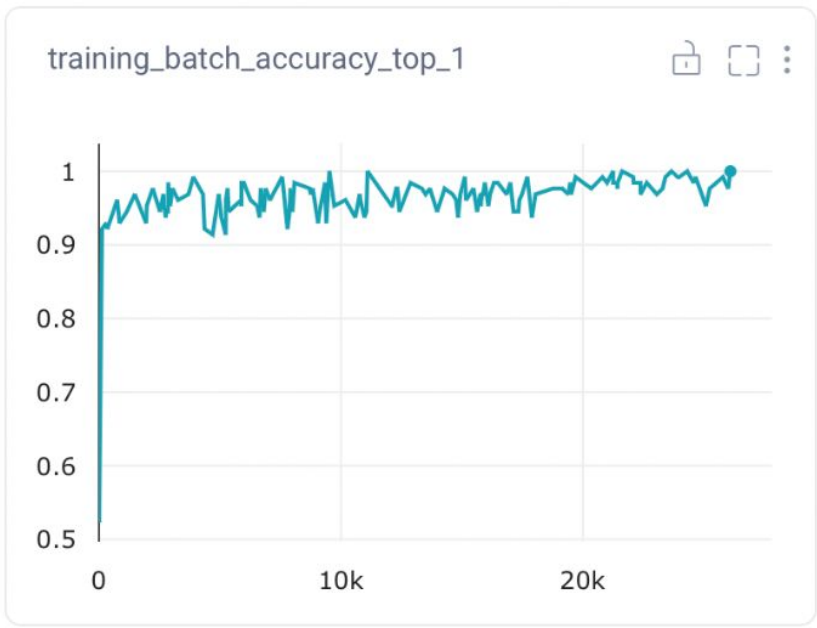
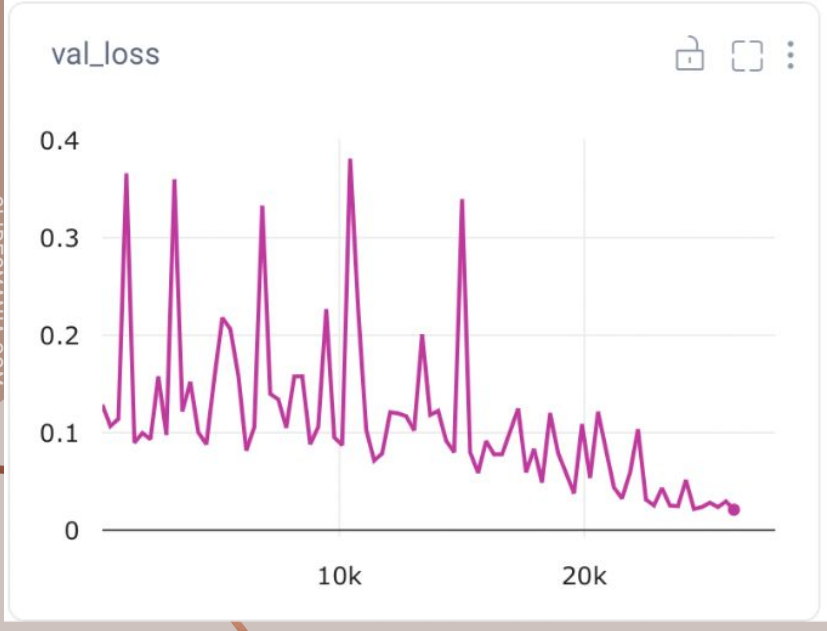


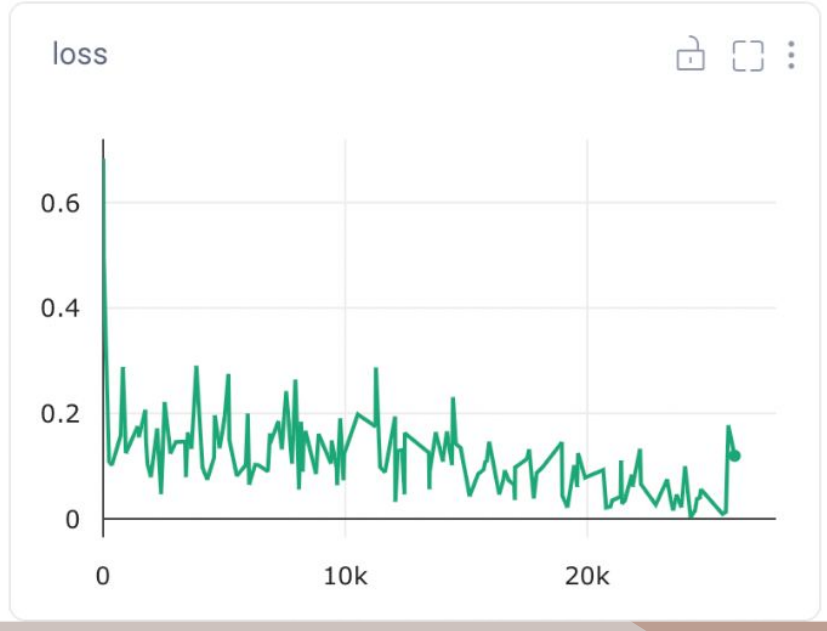
Эксперимент 1
Marvin

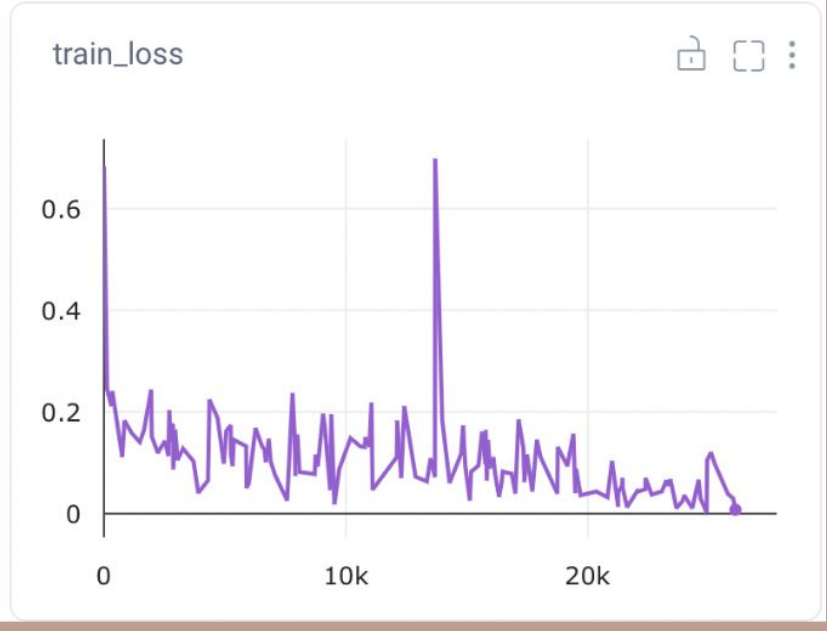
Эксперимент 2











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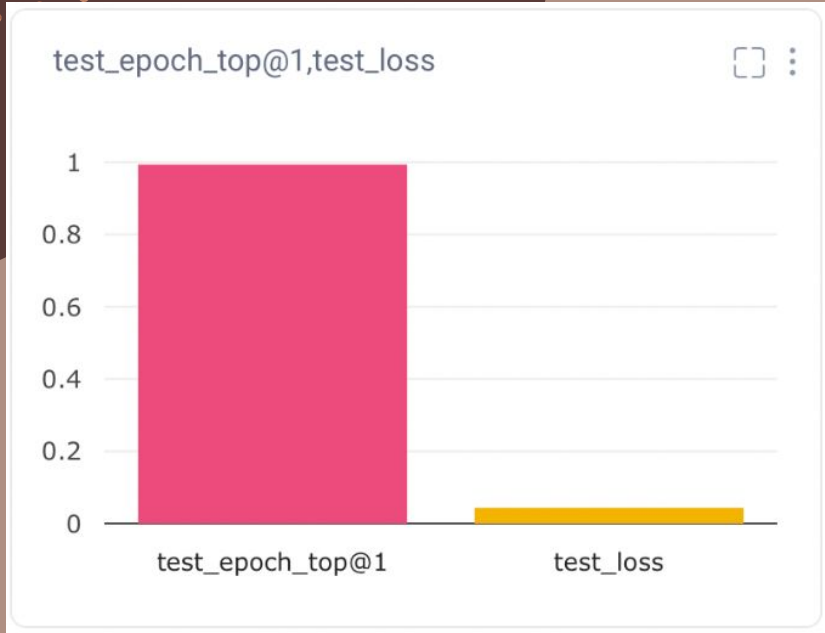

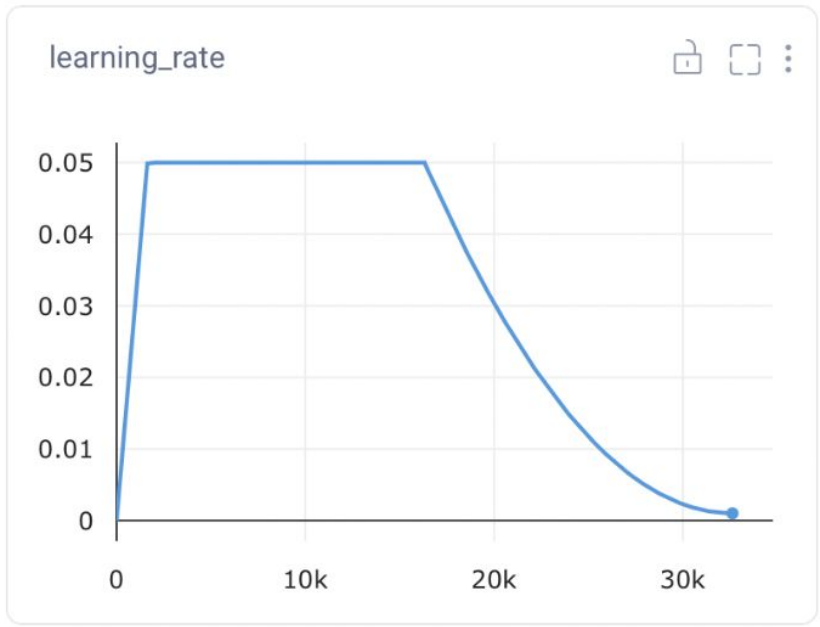

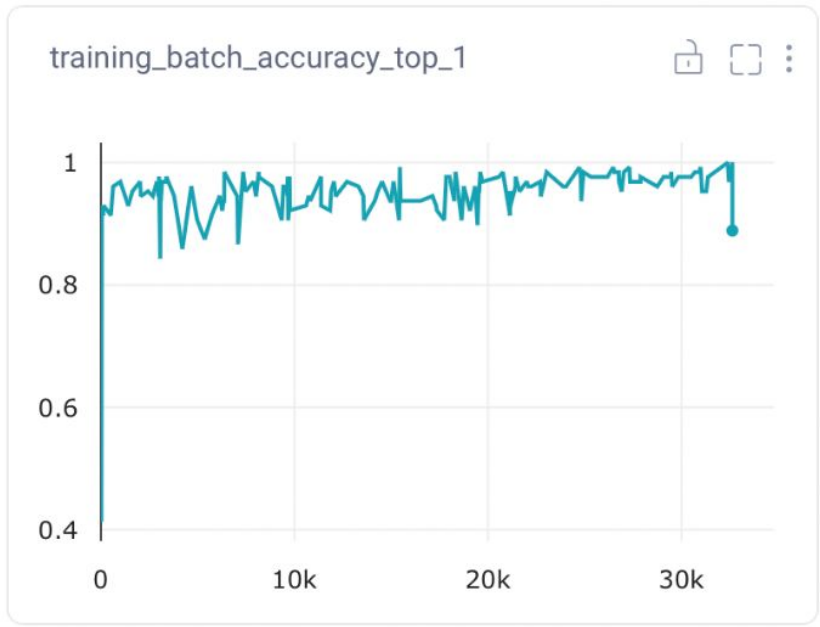

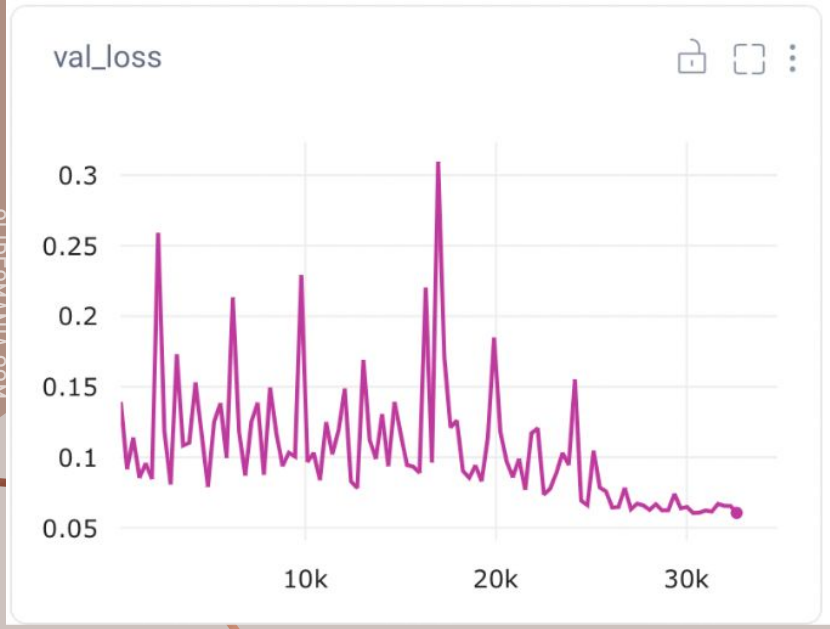

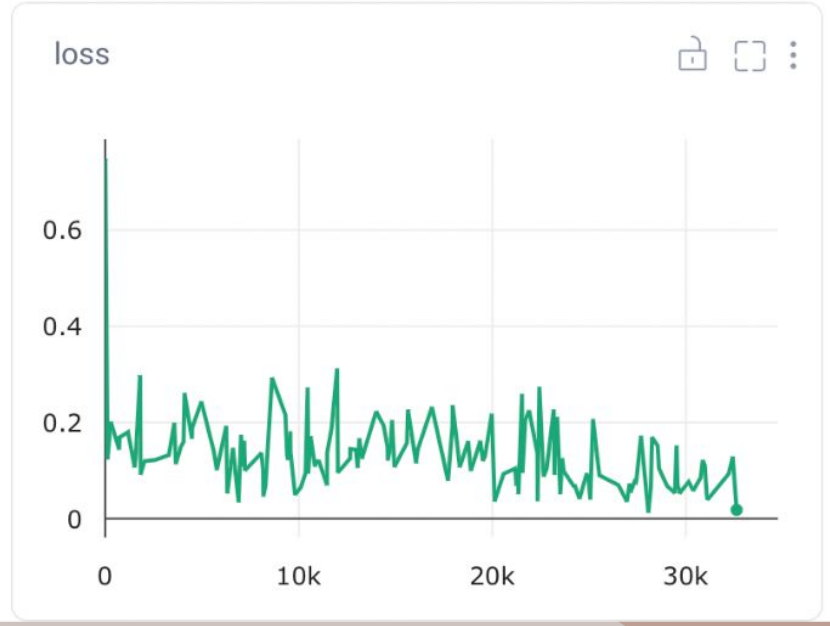

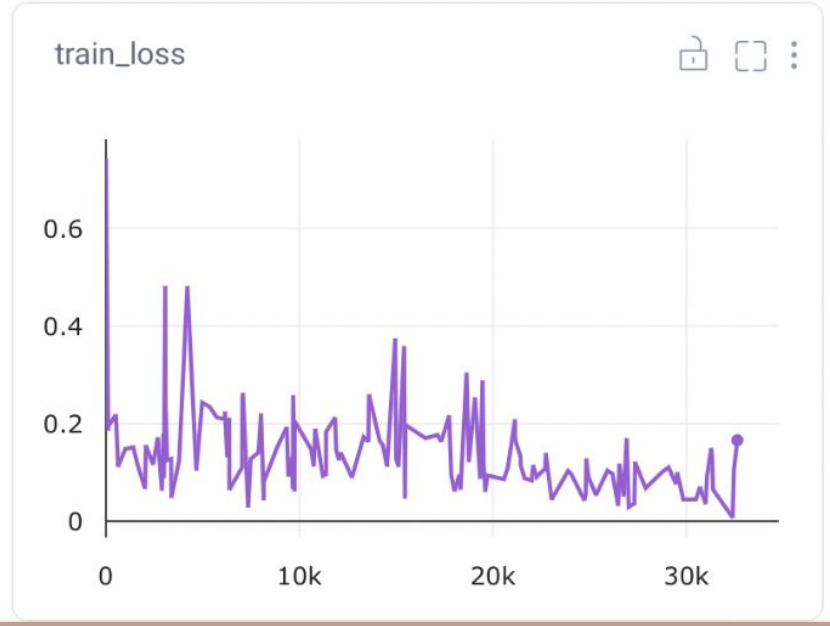

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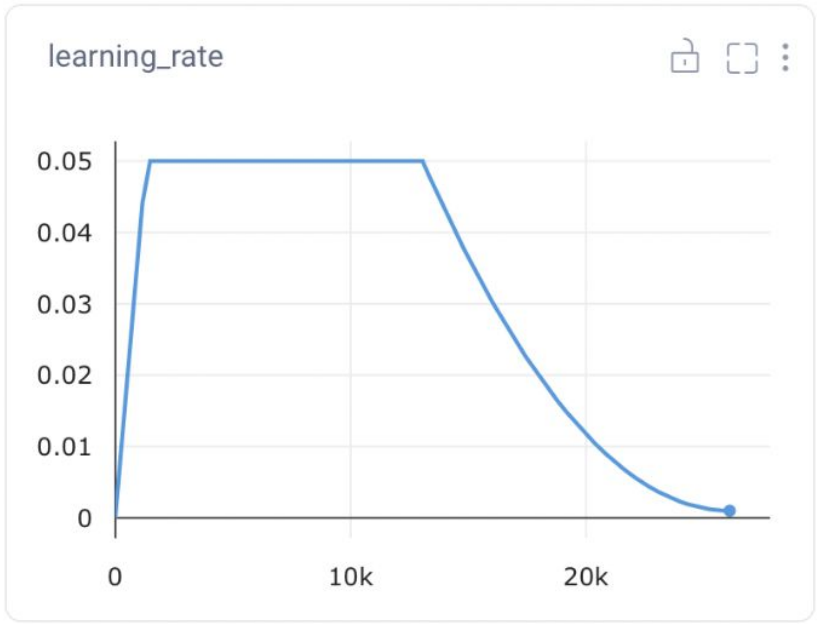

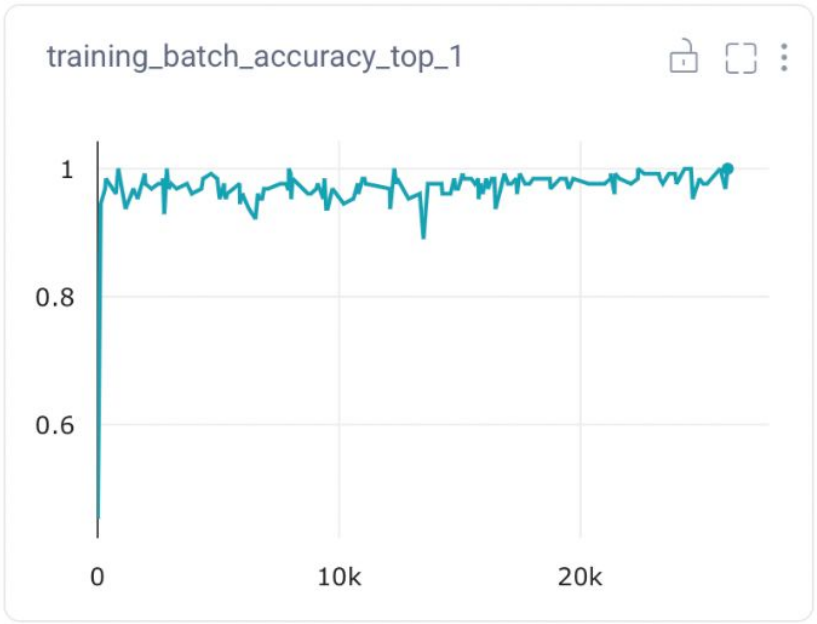

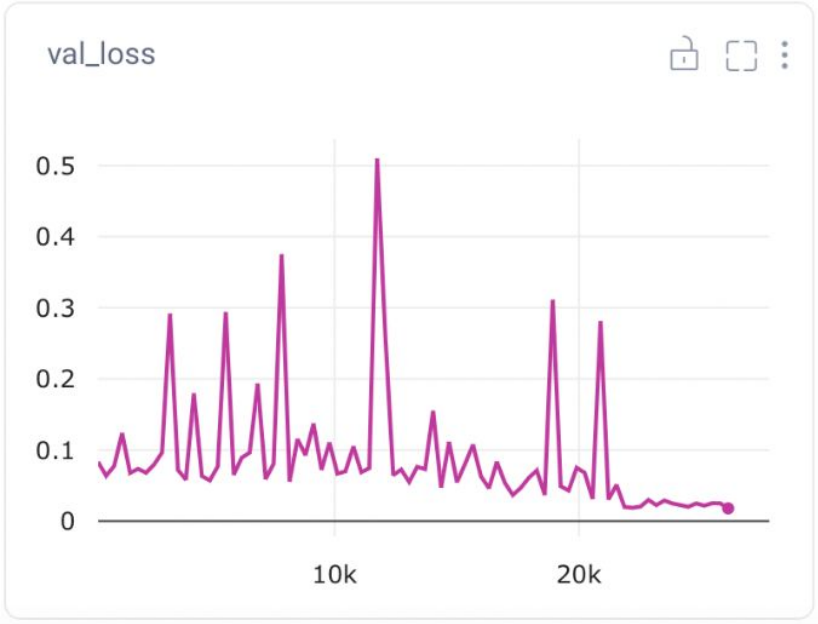

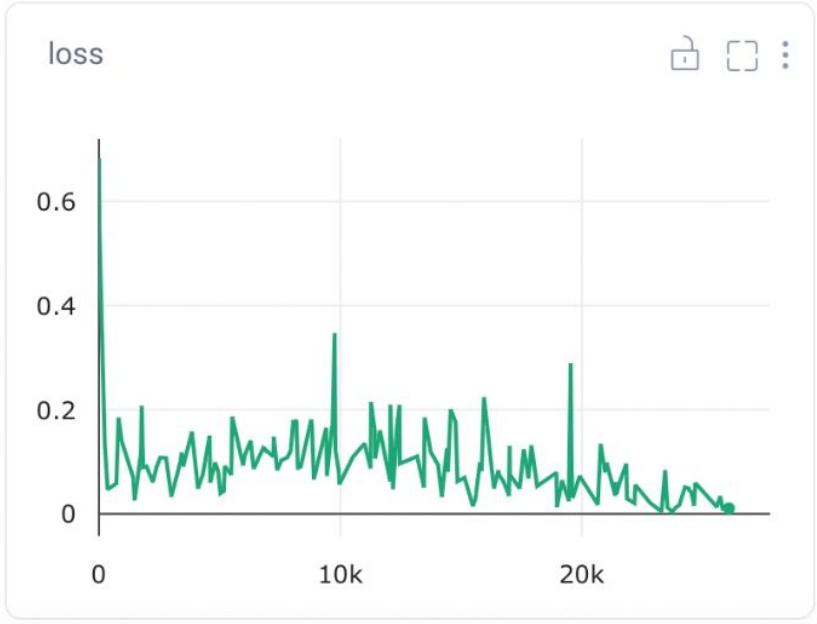

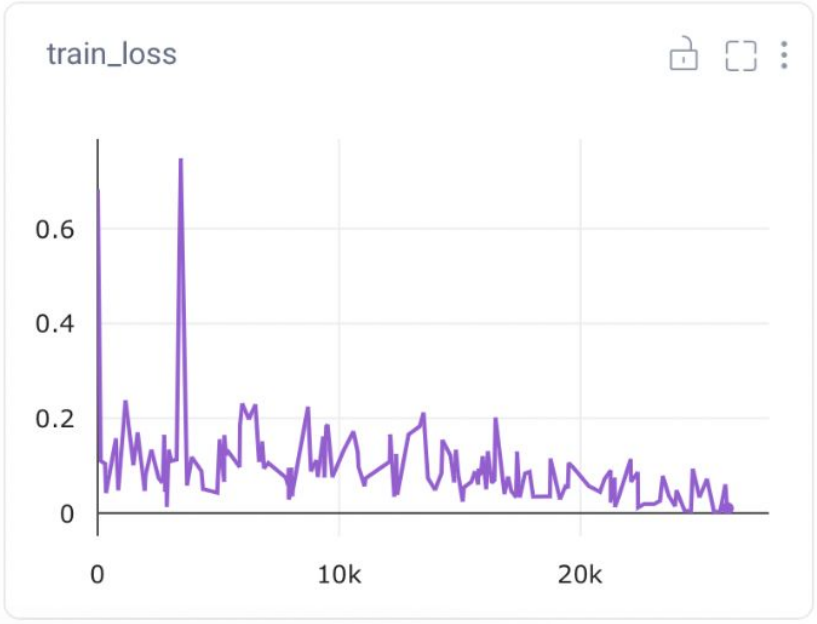

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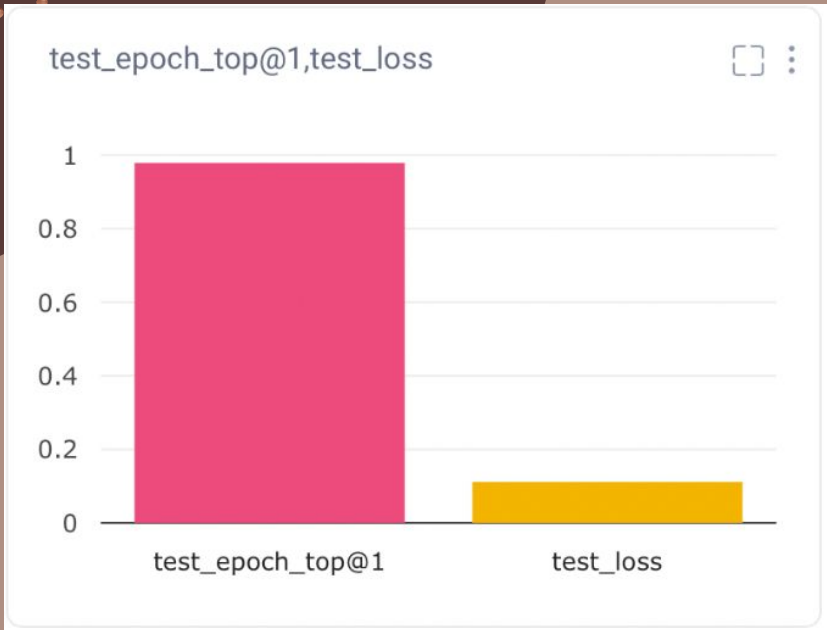

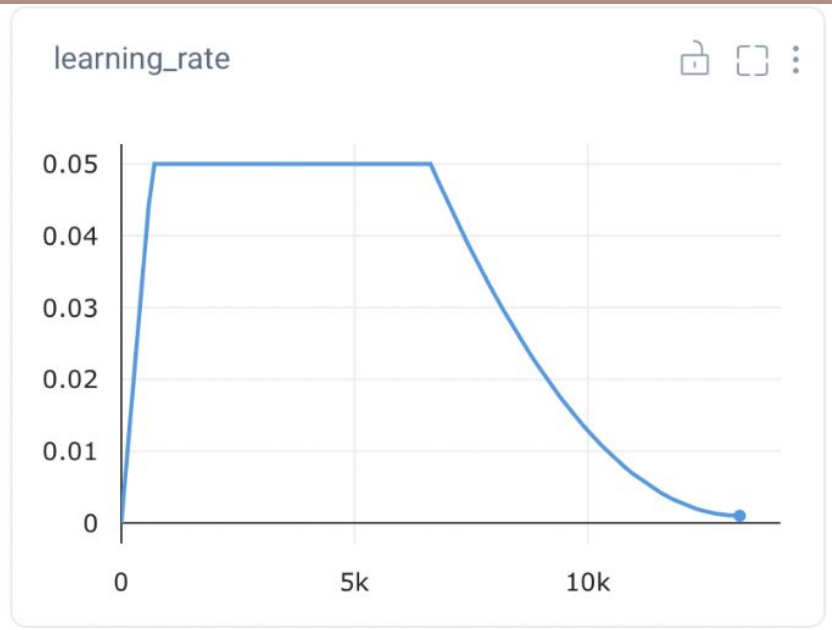

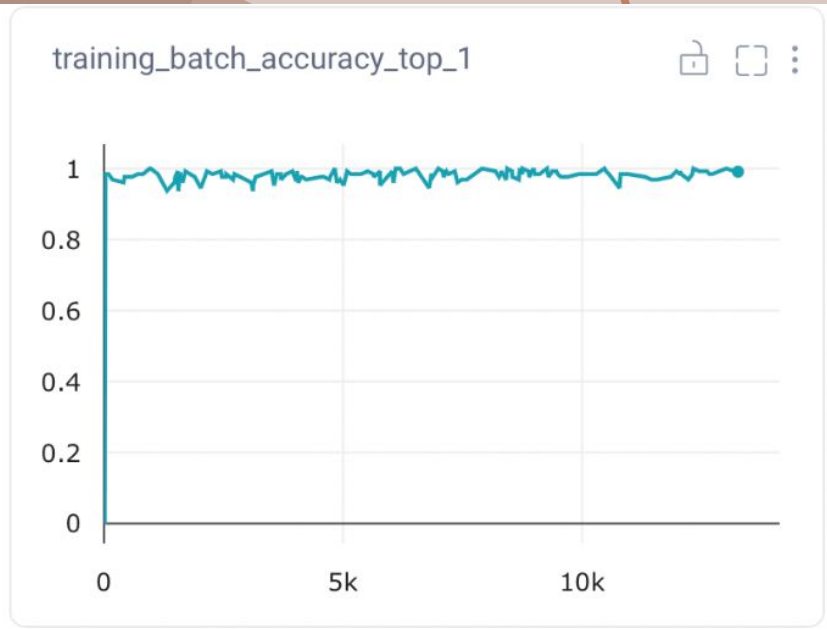

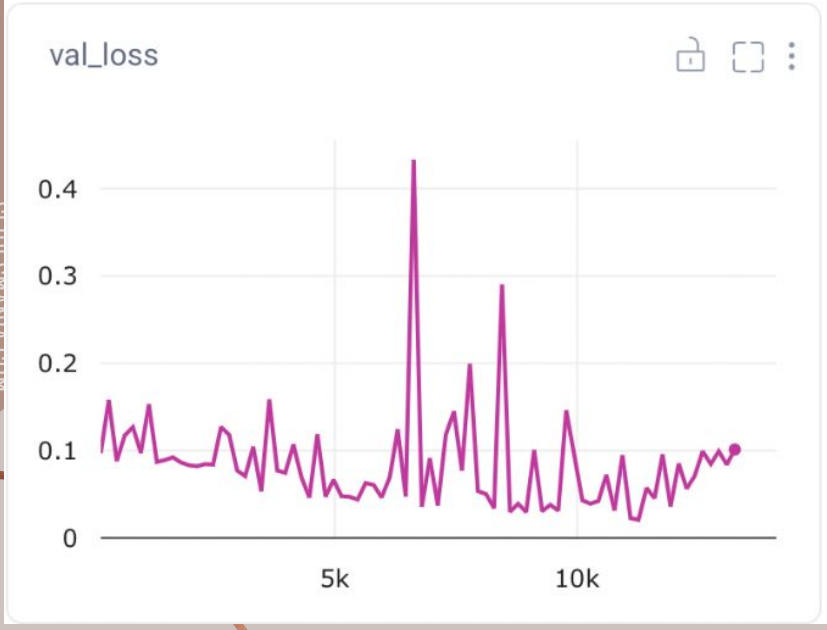

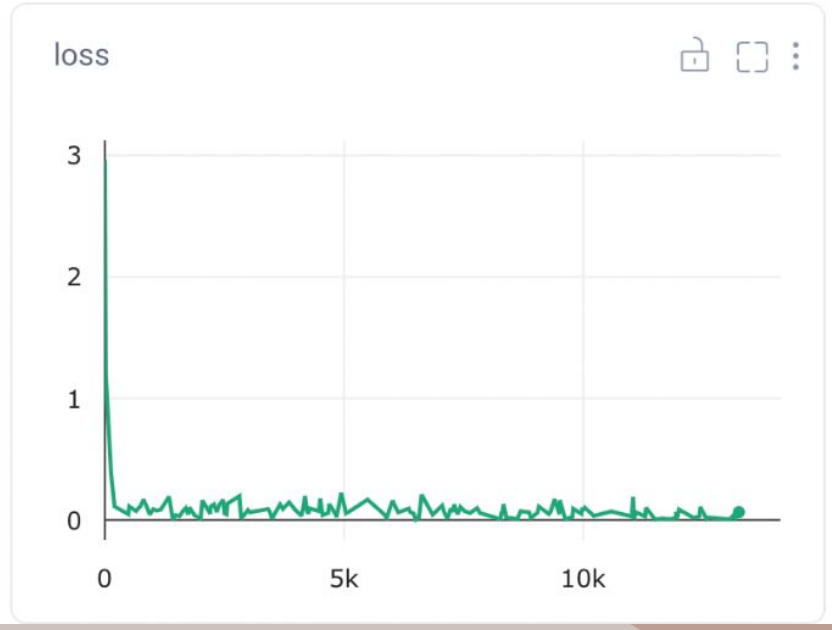

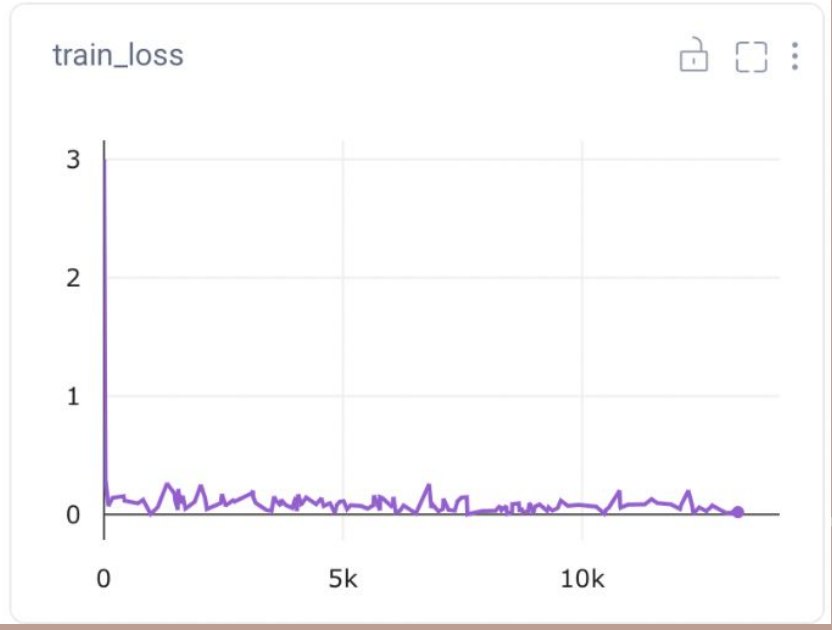

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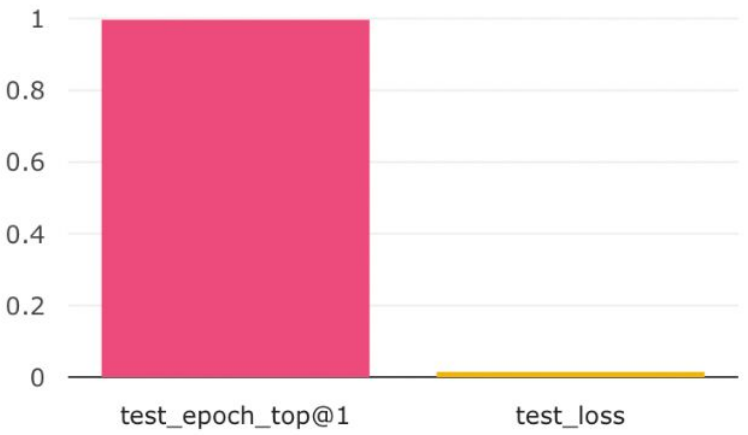
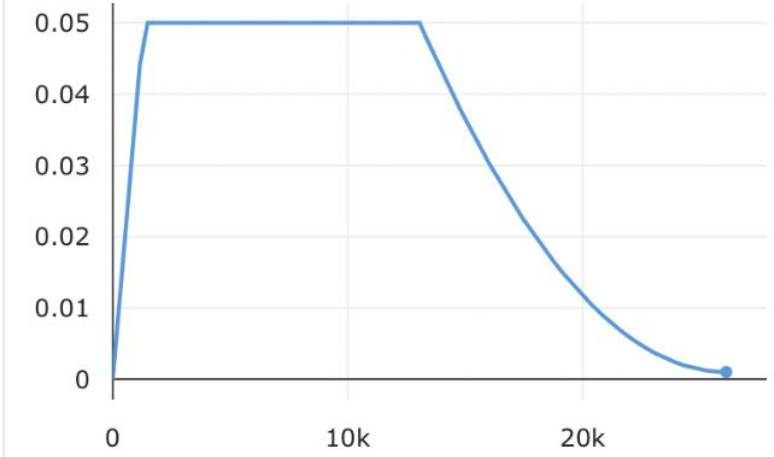
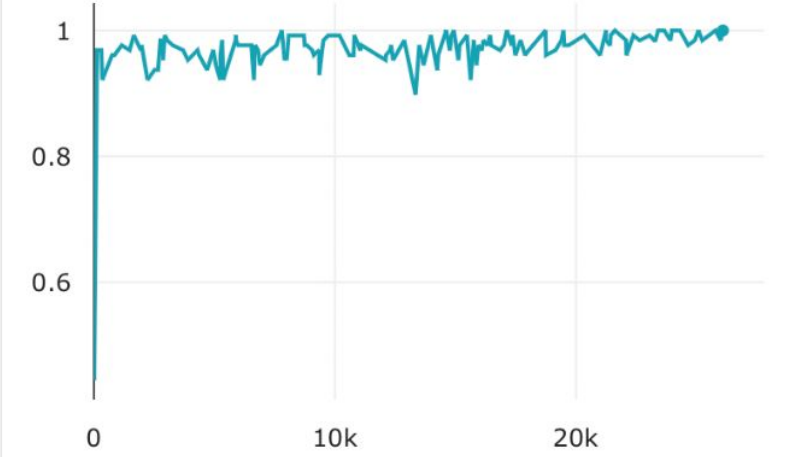
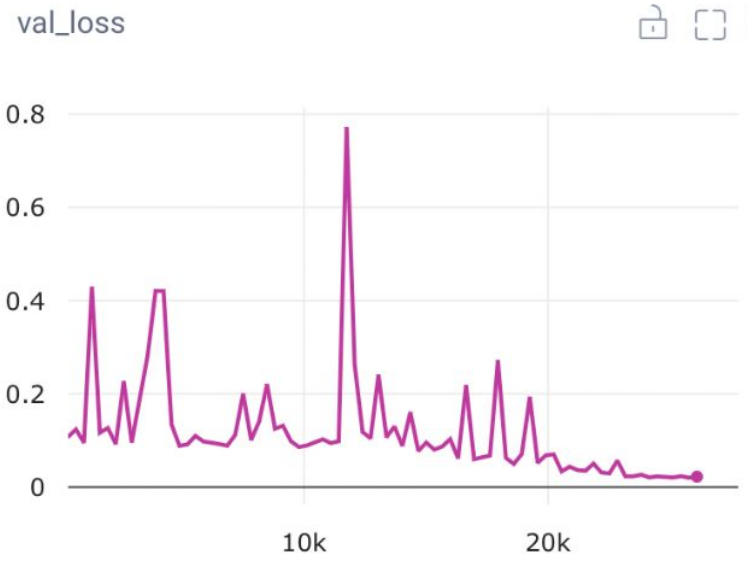
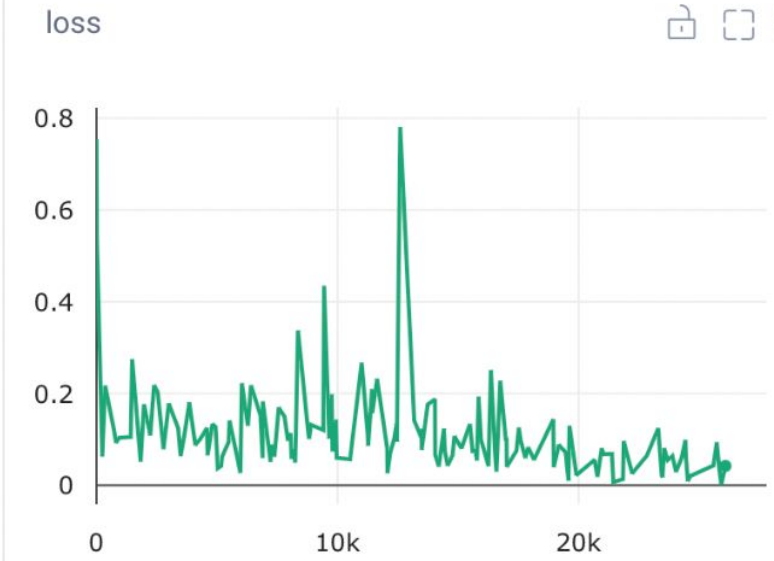
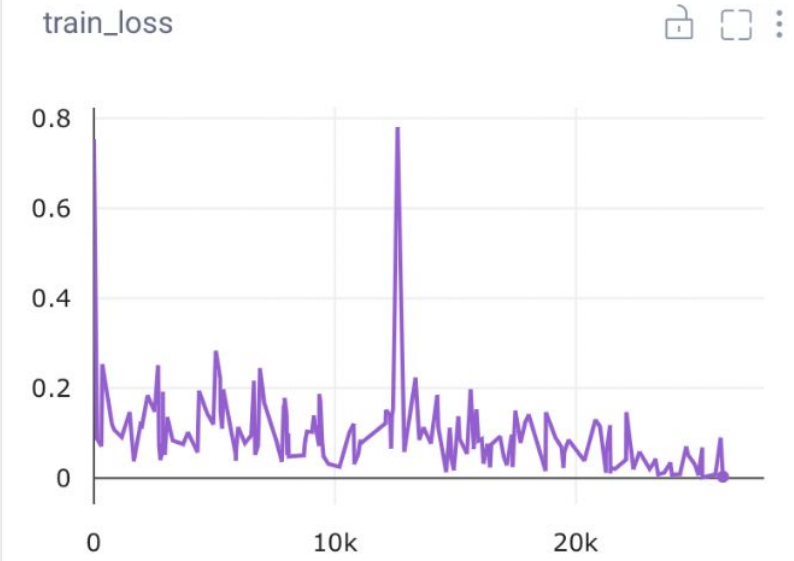










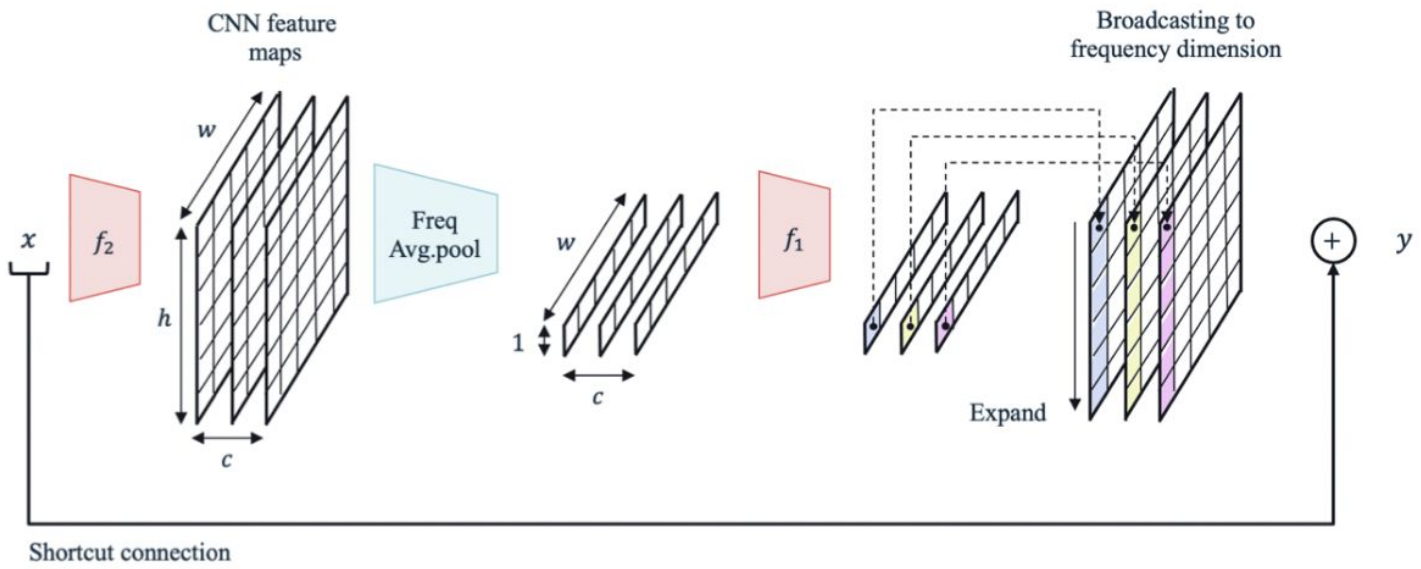


09

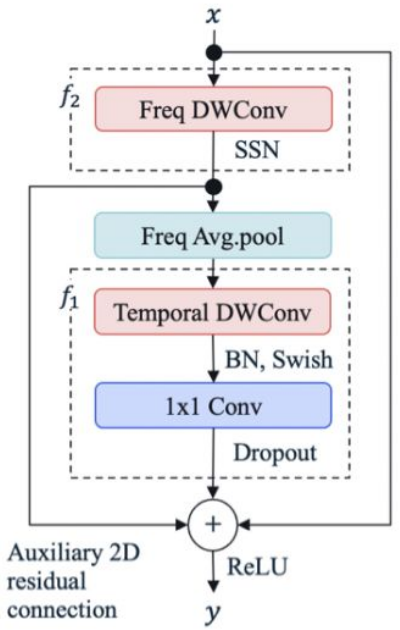
Задумка нс

Основа - **Broadcasted Residual Learning**

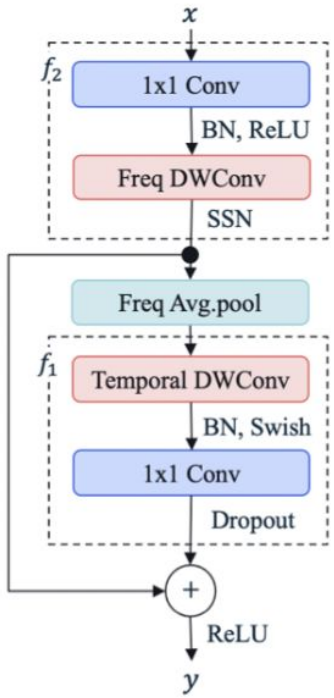
Broadcasted Residual Learning



Normal block



Transition block



Спасибо за внимание!