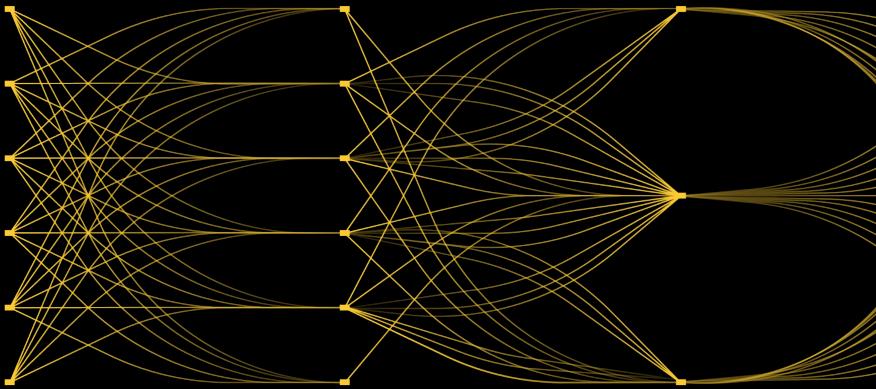




MLOps ZoomCamp: Experiment Tracking with Weight & Biases





Follow along at
wandb.me/mlops-zoomcamp





Find all code at

wandb.me/mlops-zoomcamp-github





Soumik Rakshit

Machine Learning Engineer at
Weights & Biases

Google Developer Expert (JAX)

`whatamidoing$>`

- Developing Tools for ML practitioners
- Building MLOps Pipelines for MonAI, Nvidia Frameworks, Keras, JAX...
- Training Computer Vision Models on TPUs
- Contributing to the Keras Ecosystem
- Playing The Legend of Zelda: Tears of the Kingdom
- Follow on [GitHub](#)/[Twitter](#)

Weights & Biases - MLOps Platform





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 spaCy

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 Run.ai

 Anyscale

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 Sagemaker

 Vertex AI

 Azure ML

 NVIDIA Triton

 Run.ai

 OctoML

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 Airflow

 Kubeflow

 Github Actions

 Jenkins

 Metaflow

 Flyte



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Gartner

COOL
VENDOR
2021



What is an ML Experiment?



Machine Learning is Highly Empirical

- Explore
- Train
- Evaluate
- Fine-tune
- Train again
- Try something else



Why Track An ML Experiment?

- Share Results
- Take Business Decisions
- Reproducibility





Tracking Experiments Traditionally

0000 p1 DRZ 3.11 - not super eval	0001 p2 DRZ 3.23
mag_threshold 0.21	mag threshold 0.12
2L 300N BLSTM (BasicLSTM)	2L 300N BLSTM_clean (LSTM & many
20D	reworks) - note, this was the
sigmoid	massive model rewrite
AdamOptimizer	20D
100 frames	sigmoid
dropout 1.0	AdamOptimizer
zero input and label	100 frames
log(x+1.0)	dropout 1.0
103300 training, 2000 CV	zero input and label
model:	log(x+1.0)
weights20170224-005946_v10.1419	10330 training, 2000 cv
(p1, loss .1419, epoch 40 [task0])	model:
MEAN IBM SDR GAIN: 2.324 -	weights20170224-032054_v10.1418
with 0.15 thresh during cluster	(p2, loss .1418, epoch 40 [task0])
STD IBM SDR GAIN: 2.276	MEAN IBM SDR GAIN: 2.056 -
MEAN IBM SDR GAIN: 2.110 -	with 0.15 thresh during cluster
with 0.32 threshold during cluster	STD IBM SDR GAIN: 2.214
STD IBM SDR GAIN: 2.254	MEAN IBM SDR GAIN: 2.068 -
	with 0.32 threshold during cluster
	STD IBM SDR GAIN: 2.205
	MEAN IBM SDR GAIN: 2.108 - with
	fancy best SDR of the two system
	(eval_sdr2.py)
	STD IBM SDR GAIN: 4.114
	MEAN IBM SDR GAIN: 5.915 -
	using EXACT script measuring both
	voices gain (SUPER_EVAL)
	STD IBM SDR GAIN: 4.349

```
0000 p1 DRZ 3.11 - not super eval
```

```
mag_threshold 0.21
2L 300N BLSTM (BasicLSTM)
20D
sigmoid
AdamOptimizer
100 frames
dropout 1.0
zero input and label
log(x+1.0)
103300 training, 2000 CV
model:
```

```
weights20170224-005946_v10
(p1, loss .1419, epoch 40
MEAN IBM SDR GAIN: 2.
with 0.15 thresh during cl
STD IBM SDR GAIN: 2.
MEAN IBM SDR GAIN: 2.
with 0.32 threshold during
STD IBM SDR GAIN: 2.
```

```
0001 p2 DRZ 3.23
```

```
mag threshold 0.12
2L 300N BLSTM_clean (LSTM & many
reworks) - note, this was the
massive model rewrite
20D
sigmoid
AdamOptimizer
100 frames
dropout 1.0
zero input and label
log(x+1.0)
```

A	B	◀ ▶	L	M	N	O	P
Experiment Name	Created		train_loss	valid_loss	acc	traffic_acc	road_acc
best car acc (50% data)	2021-04-14		0.5375041962	0.442730248	0.8823291659	0.8663836718	0.9399003386
best traffic acc (50% data))	2021-04-14		0.4919361174	0.4202951491	0.8879730701	0.8718349934	0.9439761043
best overall IOU (20% data)	2021-04-14		0.5095784068	0.4658596516	0.8725891709	0.8592621684	0.9359762073
major-sweep-196	2021-01-31		0.5705417991	0.4875227213	0.8698127866	0.8570468426	0.9454026222
swept-sweep-164	2021-01-31		0.5535062551	0.4849829972	0.8701210618	0.8567070365	0.9204238057
silver-sweep-139	2021-01-31		0.563354373	0.5251165628	0.871628046	0.846842885	0.9262287617
laced-sweep-115	2021-01-31		0.5277443528	0.5124291778	0.8705932498	0.8521561027	0.9389513731
eager-sweep-97	2021-01-31		0.5488699675	0.5005864501	0.8738754392	0.8612990975	0.913561523
rich-sweep-88	2021-01-31		0.5587444901	0.5211353302	0.8785927892	0.8512274623	0.9295567274
hopeful-sweep-33	2021-01-31		0.503461957	0.4650281966	0.8706912994	0.8560319543	0.9387732744
autumn-sweep-24	2021-01-31		0.5777919888	0.500880897	0.8755427003	0.8561192751	0.9181208611
decent-sweep-21	2021-01-31		0.5714729428	0.4979581237	0.8745227456	0.8490597606	0.9463140965
vague-sweep-5	2021-01-31		0.6230331063	0.473508656	0.8732874393	0.8601382971	0.9297611117
Second best acc	2021-01-31		0.4194990396	0.4509823024	0.8873019218	0.8705806732	0.9445936084



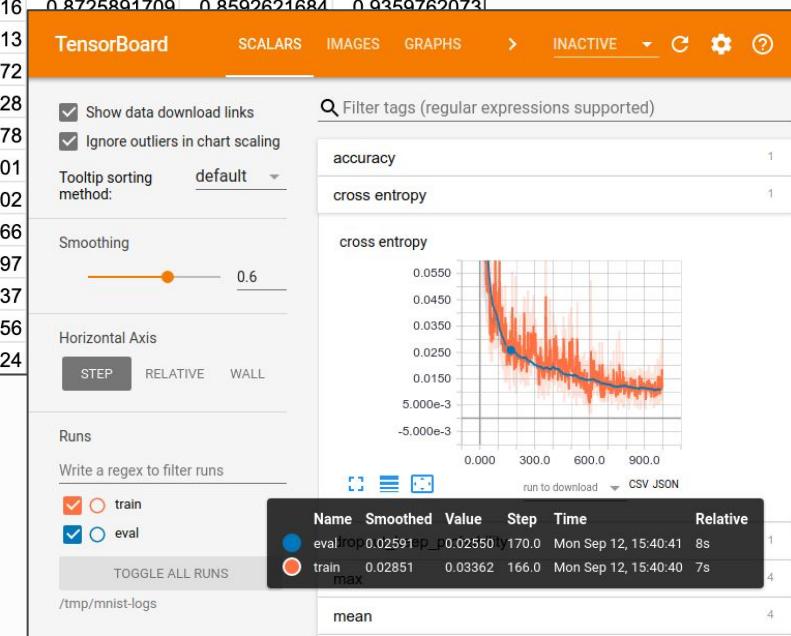
0000 p1 DRZ 3.11 - not super eval

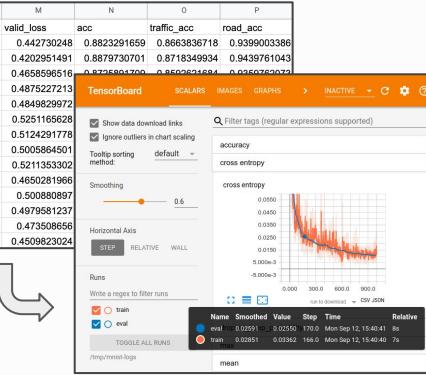
mag_threshold 0.21
2L 300N BLSTM (BasicLSTM)
20D
sigmoid
AdamOptimizer
100 frames
dropout 1.0
zero input and label
 $\log(x+1.0)$
103300 training, 2000 CV
model:
weights20170224-005946_v10

0001 p2 DRZ 3.23

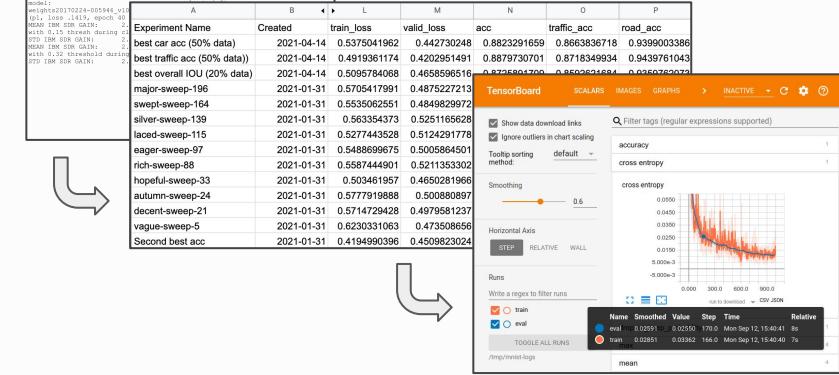
mag threshold 0.12
2L 300N BLSTM_clean (LSTM & many
reworks) - note, this was the
massive model rewrite
20D
sigmoid
AdamOptimizer
100 frames
dropout 1.0
zero input and label
 $\log(x+1.0)$

A	B	L	M	N	O	P
Experiment Name	Created	train_loss	valid_loss	acc	traffic_acc	road_acc
best car acc (50% data)	2021-04-14	0.5375041962	0.442730248	0.8823291659	0.8663836718	0.9399003386
best traffic acc (50% data))	2021-04-14	0.4919361174	0.4202951491	0.8879730701	0.8718349934	0.9439761043
best overall IOU (20% data)	2021-04-14	0.5095784068	0.4658596516	0.8725891709	0.8502621684	0.939762073
major-sweep-196	2021-01-31	0.5705417991	0.4875227213			
swept-sweep-164	2021-01-31	0.5535062551	0.4849829972			
silver-sweep-139	2021-01-31	0.563354373	0.5251165628			
laced-sweep-115	2021-01-31	0.5277443528	0.5124291778			
eager-sweep-97	2021-01-31	0.5488699675	0.5005864501			
rich-sweep-88	2021-01-31	0.5587444901	0.5211353302			
hopeful-sweep-33	2021-01-31	0.503461957	0.4650281966			
autumn-sweep-24	2021-01-31	0.5777919888	0.500880897			
decent-sweep-21	2021-01-31	0.5714729428	0.4979581237			
vague-sweep-5	2021-01-31	0.6230331063	0.473508656			
Second best acc	2021-01-31	0.4194990396	0.4509823024			

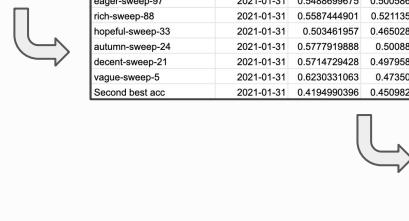




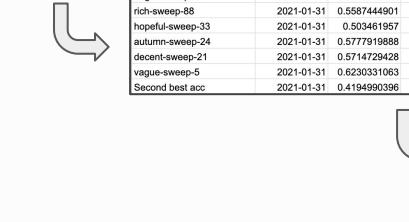
A	B
0000 p1 DRZ 3.1.1 - not super eval	0001 p2 0.2.3
12 320N BLSM (baseline)	12 320N BLSM_clean (LDM A was removed)
sigmoid	this was the massive mode rewrite
AdagradOptimizer	202
dropout_1.0	sigmoid
rectify_1.0	AdagradOptimizer
dropblock_1.0	inf_norm
logpxel_1.0	dropout_1.0
logpxel_2000_CV	super sigmoid (old label)
model_0001	
model_0001_0002_00546_v1	
(p1, loss=141.9, epochs=100, batch_size=100, learning_rate=0.001)	
with 0.15 thresh during 2000 CV	
mean IBM SM GAN:	
with 0.15 thresh during 2000 IBM GAN	
Experiment Name	Created
best car acc (50% data)	2021-01-01
best traffic acc (50% data))	2021-01-01
best overall IOU (20% data)	2021-01-01
major-sweep-196	2021-01-01
swept-sweep-164	2021-01-01
silver-sweep-139	2021-01-01
laced-sweep-115	2021-01-01
eager-sweep-97	2021-01-01
rich-sweep-88	2021-01-01
hopeful-sweep-33	2021-01-01



0000 p1 DRZ 3.1 - not sugar eval		0051 p2 DRZ 3.2 - not sugar eval	
		2L IRON BLOX class	1L IRON BLOX class (LSTM & many neurons)
sigmoid			the massive model rewrite
softmax			
100 frames			
1000 frames			
deco input and label			
10000 frames			
100000 training, 2000 CV			
weights02102224-00549e_14.h5			
A	B	C	D
best car acc (50% data)	Experiment Name	Created	train
best traffic IOU (50% data)		2021-04-14 0	
best overall IOU (20% data)		2021-04-14 0	
major-sweep-196		2021-01-31 0	
sweep-sweep-164		2021-01-31 0	
silver-sweep-139		2021-01-31 0	
laced-sweep-115		2021-01-31 0	

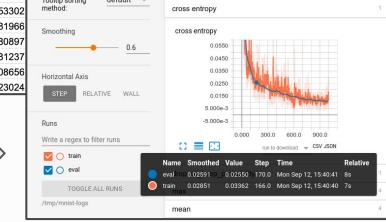


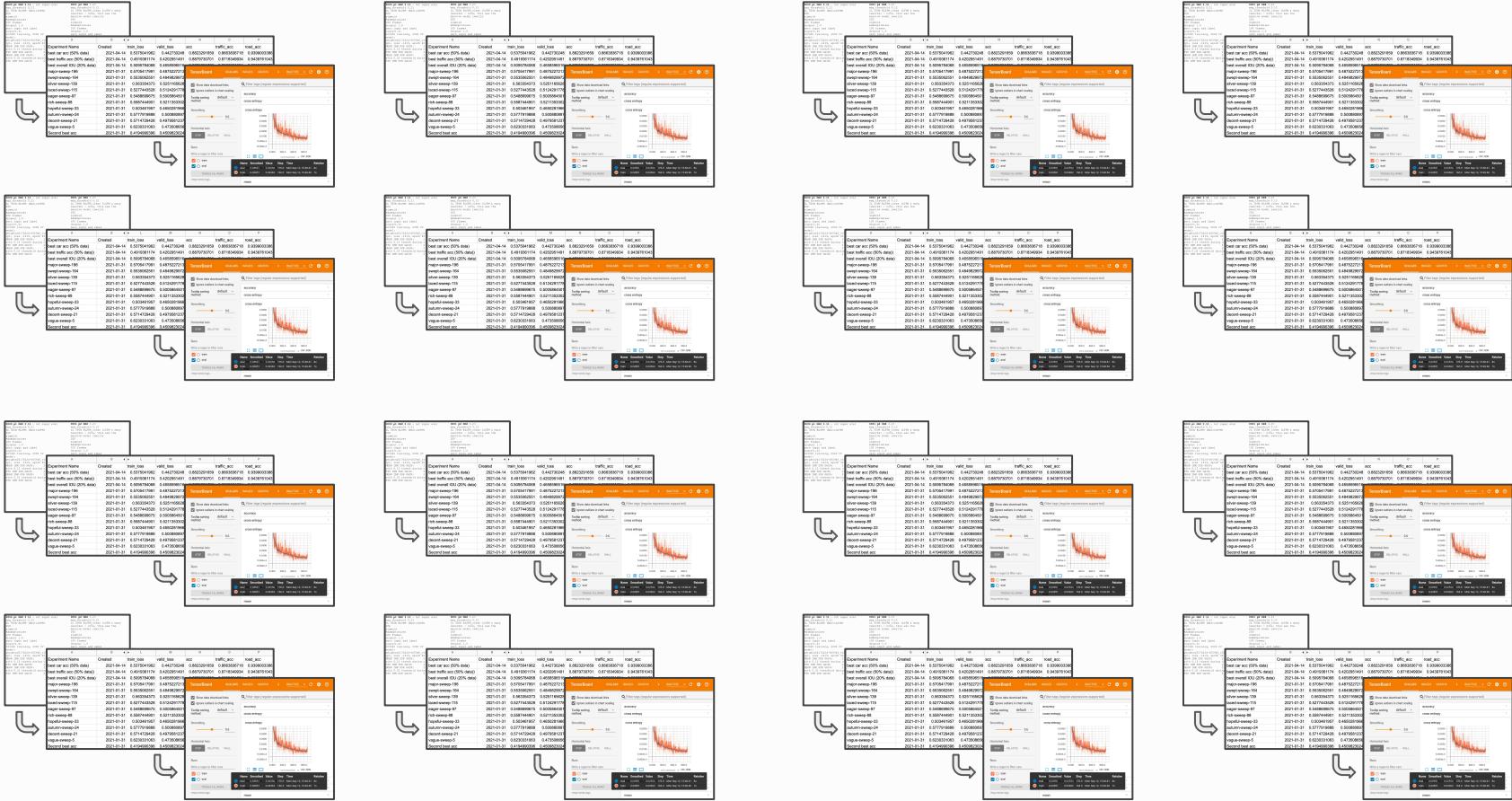
A	B
Experiment Name	Created
best car acc (50% data)	2021-04-01
best traffic acc (50% data)	2021-04-01
best overall IOU (20% data)	2021-04-01
major-sweep-16	2021-01-01
swept-sweep-16	2021-01-01
silver-sweep-13	2021-01-01
laiced-sweep-115	2021-01-01



The figure shows a histogram of accuracy values for a neural network. The x-axis ranges from 0.8823 to 0.9390, and the y-axis represents frequency. The distribution is centered around 0.90. Training data (blue) and validation data (red) are shown.

Bin Range	Training Frequency	Validation Frequency
[0.8823, 0.8843)	~10	~10
[0.8843, 0.8863)	~10	~10
[0.8863, 0.8883)	~10	~10
[0.8883, 0.8903)	~10	~10
[0.8903, 0.8923)	~10	~10
[0.8923, 0.8943)	~10	~10
[0.8943, 0.8963)	~10	~10
[0.8963, 0.8983)	~10	~10
[0.8983, 0.9003)	~10	~10
[0.9003, 0.9023)	~10	~10
[0.9023, 0.9043)	~10	~10
[0.9043, 0.9063)	~10	~10
[0.9063, 0.9083)	~10	~10
[0.9083, 0.9103)	~10	~10
[0.9103, 0.9123)	~10	~10
[0.9123, 0.9143)	~10	~10
[0.9143, 0.9163)	~10	~10
[0.9163, 0.9183)	~10	~10
[0.9183, 0.9203)	~10	~10
[0.9203, 0.9223)	~10	~10
[0.9223, 0.9243)	~10	~10
[0.9243, 0.9263)	~10	~10
[0.9263, 0.9283)	~10	~10
[0.9283, 0.9303)	~10	~10
[0.9303, 0.9323)	~10	~10
[0.9323, 0.9343)	~10	~10
[0.9343, 0.9363)	~10	~10
[0.9363, 0.9383)	~10	~10
[0.9383, 0.9403)	~10	~10
[0.9403, 0.9423)	~10	~10
[0.9423, 0.9443)	~10	~10
[0.9443, 0.9463)	~10	~10
[0.9463, 0.9483)	~10	~10
[0.9483, 0.9503)	~10	~10
[0.9503, 0.9523)	~10	~10
[0.9523, 0.9543)	~10	~10
[0.9543, 0.9563)	~10	~10
[0.9563, 0.9583)	~10	~10
[0.9583, 0.9603)	~10	~10
[0.9603, 0.9623)	~10	~10
[0.9623, 0.9643)	~10	~10
[0.9643, 0.9663)	~10	~10
[0.9663, 0.9683)	~10	~10
[0.9683, 0.9703)	~10	~10
[0.9703, 0.9723)	~10	~10
[0.9723, 0.9743)	~10	~10
[0.9743, 0.9763)	~10	~10
[0.9763, 0.9783)	~10	~10
[0.9783, 0.9803)	~10	~10
[0.9803, 0.9823)	~10	~10
[0.9823, 0.9843)	~10	~10
[0.9843, 0.9863)	~10	~10
[0.9863, 0.9883)	~10	~10
[0.9883, 0.9903)	~10	~10
[0.9903, 0.9923)	~10	~10
[0.9923, 0.9943)	~10	~10
[0.9943, 0.9963)	~10	~10
[0.9963, 0.9983)	~10	~10
[0.9983, 1.0003)	~10	~10





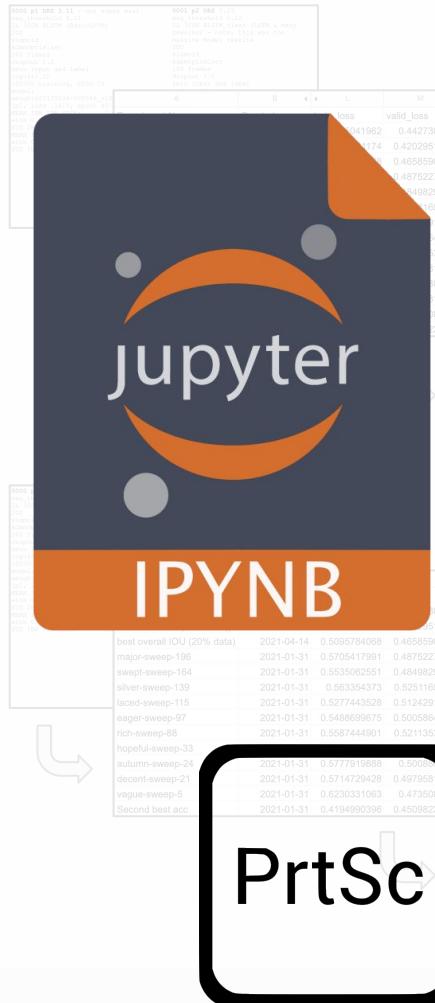




best overall IOU (20% data)	2021-04-14	0.5095784068	0.4658956516
major-sweep-196	2021-01-31	0.5705417981	0.4875227213
swept-sweep-164	2021-01-31	0.5535062581	0.4849829972
silver-sweep-139	2021-01-31	0.56353473	0.5251165628
laced-sweep-115	2021-01-31	0.5277443528	0.5124291778
eager-sweep-97	2021-01-31	0.5486696975	0.5005864501
rich-sweep-88	2021-01-31	0.5587444901	0.5211353302
hopeful-sweep-33	2021-01-31	0.503461957	0.4650281966
autumn-sweep-24	2021-01-31	0.5777918888	0.500808097
descent-sweep-21	2021-01-31	0.5714729428	0.4979581237
vague-sweep-5	2021-01-31	0.6230331063	0.4735086656
Second best acc	2021-01-31	0.4194993096	0.4509823024

0000 pt 002 3-11	0001 pt 004 3-11	0002 pt 002 3-11	0003 pt 004 3-11
0.442730248	0.88232	0.4202991491	0.88797
0.465856516	0.87368	0.4875227213	0.88797
0.49829972	0.88797	0.556528	0.88797
0.5178	0.88797	0.54501	0.88797
0.5302	0.88797	0.51966	0.88797
0.5302	0.88797	0.51237	0.88797
0.5302	0.88797	0.50897	0.88797
0.5302	0.88797	0.50562	0.88797
0.5302	0.88797	0.50248	0.88797
0.5302	0.88797	0.50000	0.88797
0.5302	0.88797	0.49756	0.88797
0.5302	0.88797	0.49511	0.88797
0.5302	0.88797	0.49266	0.88797
0.5302	0.88797	0.49021	0.88797
0.5302	0.88797	0.48776	0.88797
0.5302	0.88797	0.48531	0.88797
0.5302	0.88797	0.48286	0.88797
0.5302	0.88797	0.48041	0.88797
0.5302	0.88797	0.47796	0.88797
0.5302	0.88797	0.47551	0.88797
0.5302	0.88797	0.47306	0.88797
0.5302	0.88797	0.47061	0.88797
0.5302	0.88797	0.46816	0.88797
0.5302	0.88797	0.46571	0.88797
0.5302	0.88797	0.46326	0.88797
0.5302	0.88797	0.46081	0.88797
0.5302	0.88797	0.45836	0.88797
0.5302	0.88797	0.45591	0.88797
0.5302	0.88797	0.45346	0.88797
0.5302	0.88797	0.45001	0.88797
0.5302	0.88797	0.44756	0.88797
0.5302	0.88797	0.44511	0.88797
0.5302	0.88797	0.44266	0.88797
0.5302	0.88797	0.44021	0.88797
0.5302	0.88797	0.43776	0.88797
0.5302	0.88797	0.43531	0.88797
0.5302	0.88797	0.43286	0.88797
0.5302	0.88797	0.43041	0.88797
0.5302	0.88797	0.42796	0.88797
0.5302	0.88797	0.42551	0.88797
0.5302	0.88797	0.42306	0.88797
0.5302	0.88797	0.42061	0.88797
0.5302	0.88797	0.41816	0.88797
0.5302	0.88797	0.41571	0.88797
0.5302	0.88797	0.41326	0.88797
0.5302	0.88797	0.41081	0.88797
0.5302	0.88797	0.40836	0.88797
0.5302	0.88797	0.40591	0.88797
0.5302	0.88797	0.40346	0.88797
0.5302	0.88797	0.40001	0.88797
0.5302	0.88797	0.39756	0.88797
0.5302	0.88797	0.39511	0.88797
0.5302	0.88797	0.39266	0.88797
0.5302	0.88797	0.39021	0.88797
0.5302	0.88797	0.38776	0.88797
0.5302	0.88797	0.38531	0.88797
0.5302	0.88797	0.38286	0.88797
0.5302	0.88797	0.38041	0.88797
0.5302	0.88797	0.37796	0.88797
0.5302	0.88797	0.37551	0.88797
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0.5302	0.88797	0.35346	0.88797
0.5302	0.88797	0.35001	0.88797
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0.5302	0.88797	0.34021	0.88797
0.5302	0.88797	0.33776	0.88797
0.5302	0.88797	0.33531	0.88797
0.5302	0.88797	0.33286	0.88797
0.5302	0.88797	0.33041	0.88797
0.5302	0.88797	0.32796	0.88797
0.5302	0.88797	0.32551	0.88797
0.5302	0.88797	0.32306	0.88797
0.5302	0.88797	0.32061	0.88797
0.5302	0.88797	0.31816	0.88797
0.5302	0.88797	0.31571	0.88797
0.5302	0.88797	0.31326	0.88797
0.5302	0.88797	0.31081	0.88797
0.5302	0.88797	0.30836	0.88797
0.5302	0.88797	0.30591	0.88797
0.5302	0.88797	0.30346	0.88797
0.5302	0.88797	0.30001	0.88797
0.5302	0.88797	0.29756	0.88797
0.5302	0.88797	0.29511	0.88797
0.5302	0.88797	0.29266	0.88797
0.5302	0.88797	0.29021	0.88797
0.5302	0.88797	0.28776	0.88797
0.5302	0.88797	0.28531	0.88797
0.5302	0.88797	0.28286	0.88797
0.5302	0.88797	0.28041	0.88797
0.5302	0.88797	0.27796	0.88797
0.5302	0.88797	0.27551	0.88797
0.5302	0.88797	0.27306	0.88797
0.5302	0.88797	0.27061	0.88797
0.5302	0.88797	0.26816	0.88797
0.5302	0.88797	0.26571	0.88797
0.5302	0.88797	0.26326	0.88797
0.5302	0.88797	0.26081	0.88797
0.5302	0.88797	0.25836	0.88797
0.5302	0.88797	0.25591	0.88797
0.5302	0.88797	0.25346	0.88797
0.5302	0.88797	0.25001	0.88797
0.5302	0.88797	0.24756	0.88797
0.5302	0.88797	0.24511	0.88797
0.5302	0.88797	0.24266	0.88797
0.5302	0.88797	0.24021	0.88797
0.5302	0.88797	0.23776	0.88797
0.5302	0.88797	0.23531	0.88797
0.5302	0.88797	0.23286	0.88797
0.5302	0.88797	0.23041	0.88797
0.5302	0.88797	0.22796	0.88797
0.5302	0.88797	0.22551	0.88797
0.5302	0.88797	0.22306	0.88797
0.5302	0.88797	0.22061	0.88797
0.5302	0.88797	0.21816	0.88797
0.5302	0.88797	0.21571	0.88797
0.5302	0.88797	0.21326	0.88797
0.5302	0.88797	0.21081	0.88797
0.5302	0.88797	0.20836	0.88797
0.5302	0.88797	0.20591	0.88797
0.5302	0.88797	0.20346	0.88797
0.5302	0.88797	0.20001	0.88797
0.5302	0.88797	0.19756	0.88797
0.5302	0.88797	0.19511	0.88797
0.5302	0.88797	0.19266	0.88797
0.5302	0.88797	0.19021	0.88797
0.5302	0.88797	0.18776	0.88797
0.5302	0.88797	0.18531	0.88797
0.5302	0.88797	0.18286	0.88797
0.5302	0.88797	0.18041	0.88797
0.5302	0.88797	0.17796	0.88797
0.5302	0.88797	0.17551	0.88797
0.5302	0.88797	0.17306	0.88797
0.5302	0.88797	0.17061	0.88797
0.5302	0.88797	0.16816	0.88797
0.5302	0.88797	0.16571	0.88797
0.5302	0.88797	0.16326	0.88797
0.5302	0.88797	0.16081	0.88797
0.5302	0.88797	0.15836	0.88797
0.5302	0.88797	0.15591	0.88797
0.5302	0.88797	0.15346	0.88797
0.5302	0.88797	0.15001	0.88797
0.5302	0.88797	0.14756	0.88797
0.5302	0.88797	0.14511	0.88797
0.5302	0.88797	0.14266	0.88797
0.5302	0.88797	0.14021	0.88797
0.5302	0.88797	0.13776	0.88797
0.5302	0.88797	0.13531	0.88797
0.5302	0.88797	0.13286	0.88797
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0.5302	0.88797	0.12551	0.88797
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0.5302	0.88797	0.11816	0.88797
0.5302	0.88797	0.11571	0.88797
0.5302	0.88797	0.11326	0.88797
0.5302	0.88797	0.11081	0.88797
0.5302	0.88797	0.10836	0.88797
0.5302	0.88797	0.10591	0.88797
0.5302	0.88797	0.10346	0.88797
0.5302	0.88797	0.10001	0.88797
0.5302	0.88797	0.09756	0.88797
0.5302	0.88797	0.09511	0.88797
0.5302	0.88797	0.09266	0.88797
0.5302	0.88797	0.09021	0.88797
0.5302	0.88797	0.08776	0.88797
0.5302	0.88797	0.08531	0.88797
0.5302	0.88797	0.08286	0.88797
0.5302	0.88797	0.08041	0.88797
0.5302	0.88797	0.07796	0.88797
0.5302	0.88797	0.07551	0.88797
0.5302	0.88797	0.07306	0.88797
0.5302	0.88797	0.07061	0.88797
0.5302	0.88797	0.06816	0.88797
0.5302	0.88797	0.06571	0.88797
0.5302	0.88797	0.06326	0.88797
0.5302	0.88797	0.06081	0.88797
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0.5302	0.88797	0.05346	0.88797
0.5302	0.88797	0.05001	0.88797
0.5302	0.88797	0.04756	0.88797
0.5302	0.88797	0.04511	0.88797
0.5302	0.88797	0.04266	0.88797
0.5302	0.88797	0.04021	0.88797
0.5302	0.88797	0.03776	0.88797
0.5302	0.88797	0.03531	0.88797
0.5302	0.88797	0.03286	0.88797
0.5302	0.88797	0.03041	0.88797
0.5302	0.88797	0.02796	0.88797
0.5302	0.88797	0.02551	0.88797
0.5302	0.88797	0.02306	0.88797
0.5302	0.88797	0.02061	0.88797
0.5302	0.88797	0.01816	0.88797
0.5302	0.88797	0.01571	0.88797
0.5302	0.88797	0.01326	0.88797
0.5302	0.88797	0.01081	0.88797
0.5302	0.88797	0.00836	0.88797
0.5302	0.88797	0.00591	0.88797
0.5302	0.88797	0.00346	0.88797
0.5302	0.88797	0.00101	0.88797
0.5302	0.88797	-0.00154	0.88797





Ben Sherman (wandb.com)

See strange results in cell 28?

Not sure what's going on here. Can you take a look?



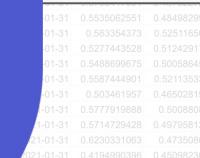


com

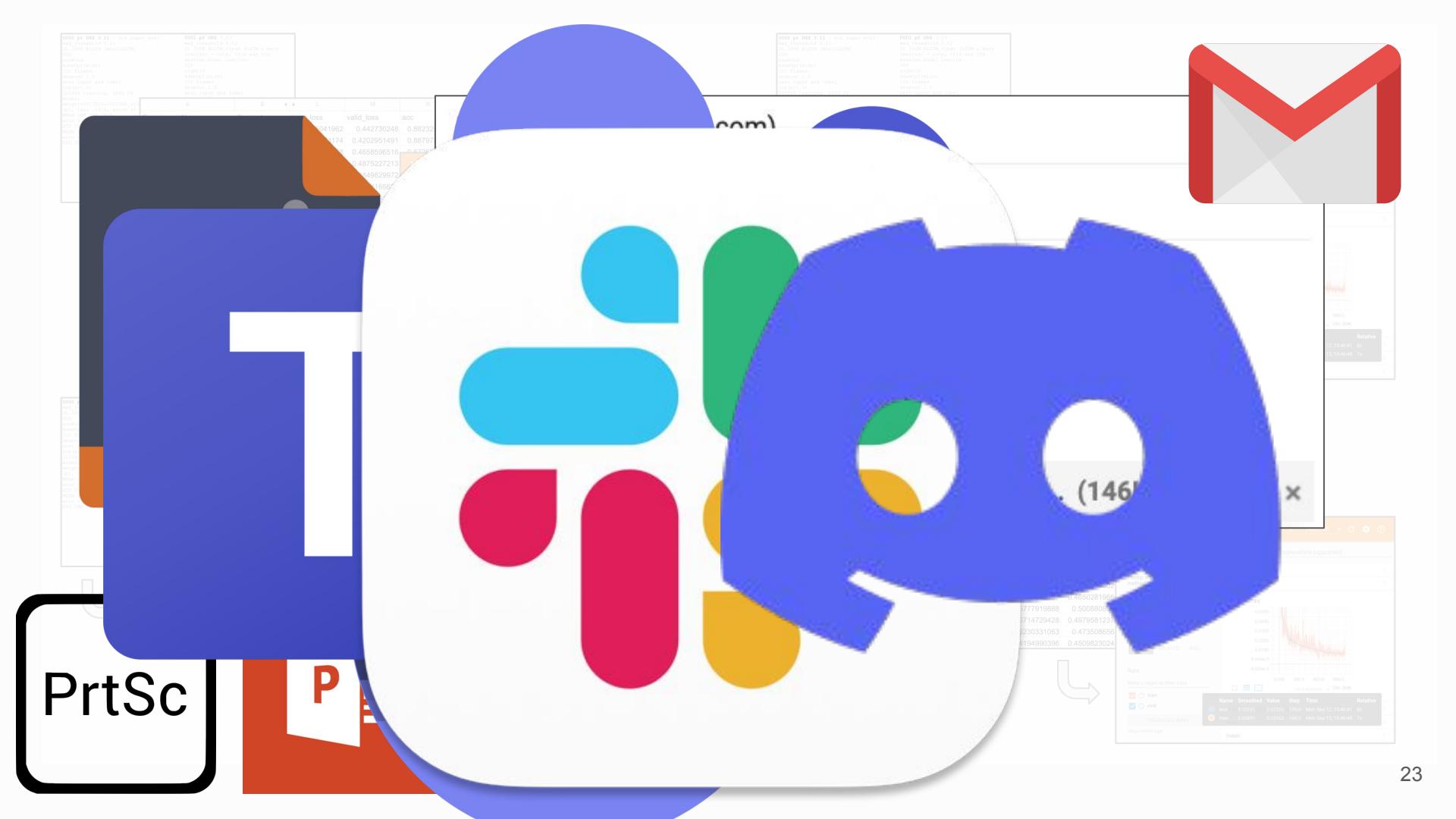
A cell

going on here. Can I take a look?

PrtSc







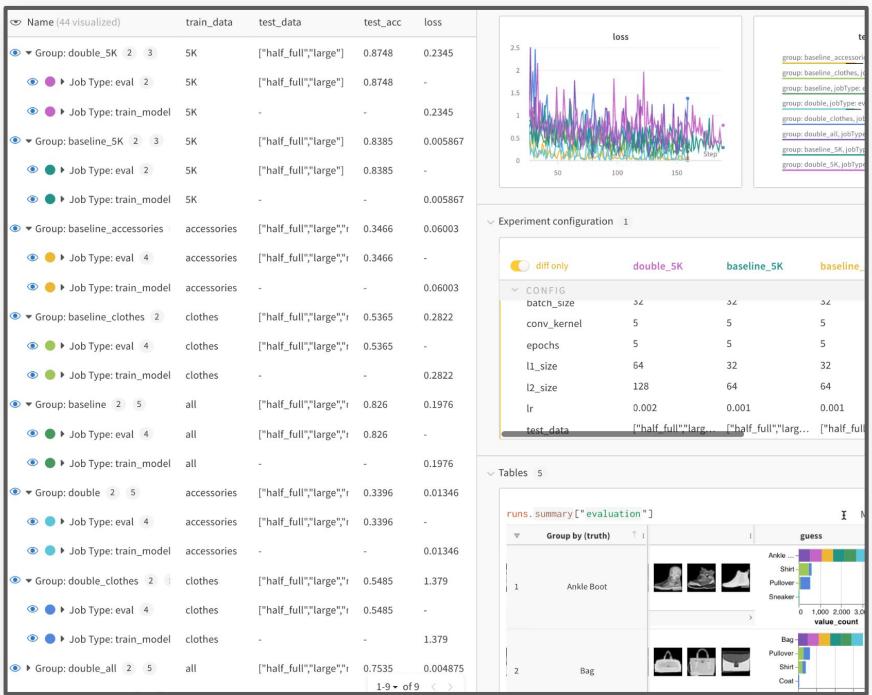


PrtScn



A System of Record for all ML Workflows







```
!pip install wandb # Install W&B  
  
wandb.init() # Start experiment  
wandb.log(metrics) # Log metrics + more!
```



The screenshot displays the WandB interface with the following sections:

- Name (44 visualized)**: A table showing experimental runs. Columns include Name, train_data, test_data, test_acc, and loss. Rows represent various configurations like "Group: double_5K" and "Job Type: eval".
- Experiment configuration 1**: A table showing specific configuration parameters for three runs: double_5K, baseline_5K, and baseline_. The parameters include batch_size, conv_kernel, epochs, l1_size, l2_size, lr, and test_data.
- Tables 5**: A section titled "runs.summary [*evaluation*]" showing two tables:
 - Group by (truth)**: A table with rows for "Ankle Boot" and "Bag". For "Ankle Boot", there are four images of shoes and a bar chart of value counts for "Ankle", "Shirt", "Pullover", and "Sneaker". For "Bag", there are three images of bags and a bar chart for "Bag", "Pullover", "Shirt", and "Coat".
 - guess**: A table showing the predicted classes for each group, with corresponding images.

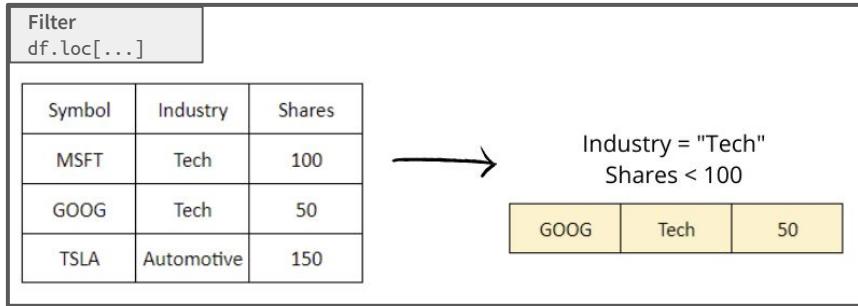


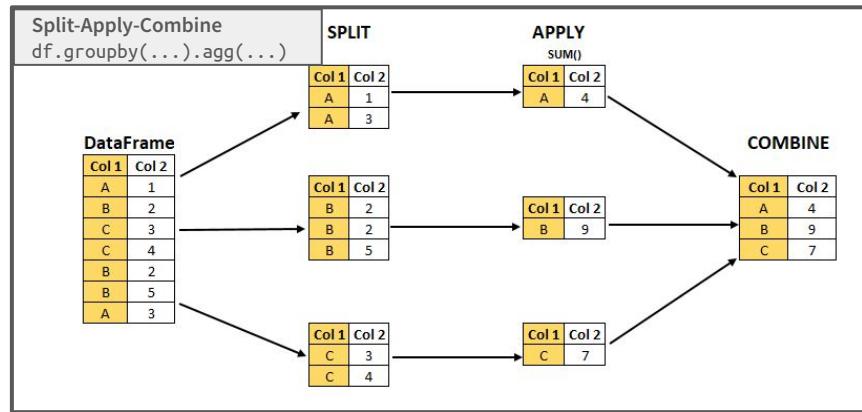
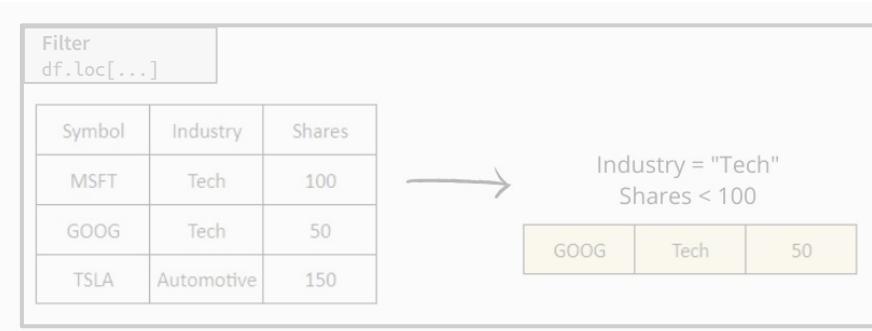
Time for a Demo!!!

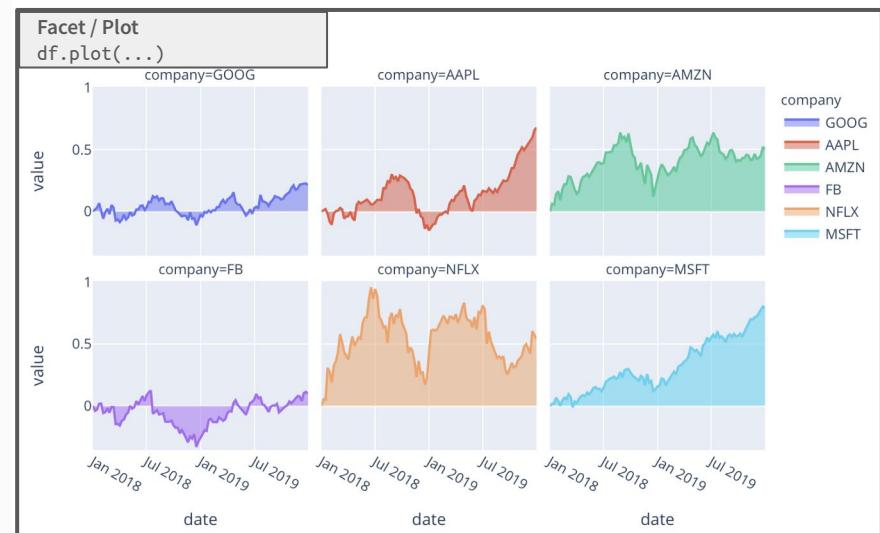
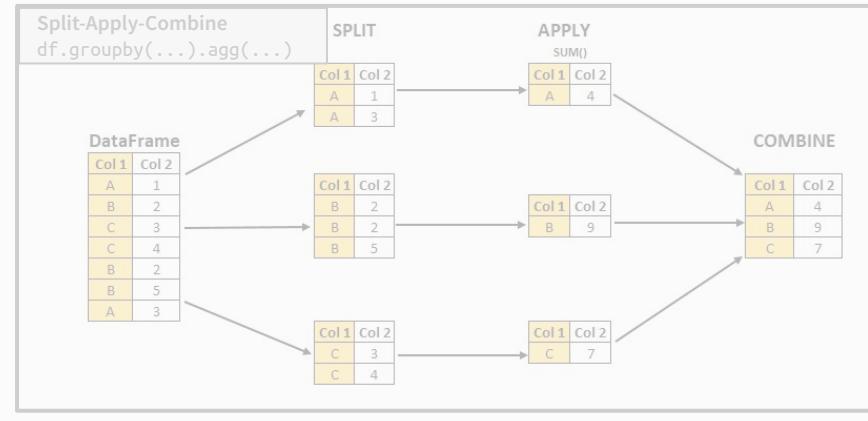
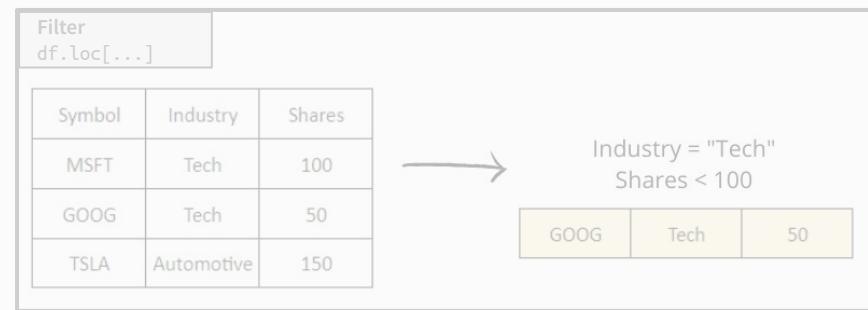




Asking Questions about Your Data and Model









Interactive Dataframes with Rich Media Support...

wandb.Table



Time for a Demo!!!



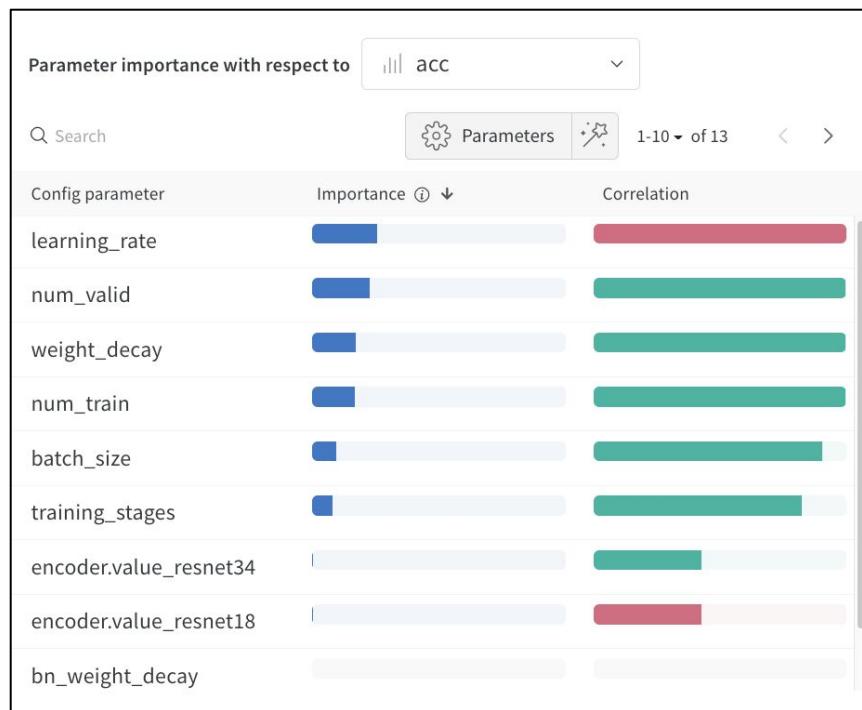
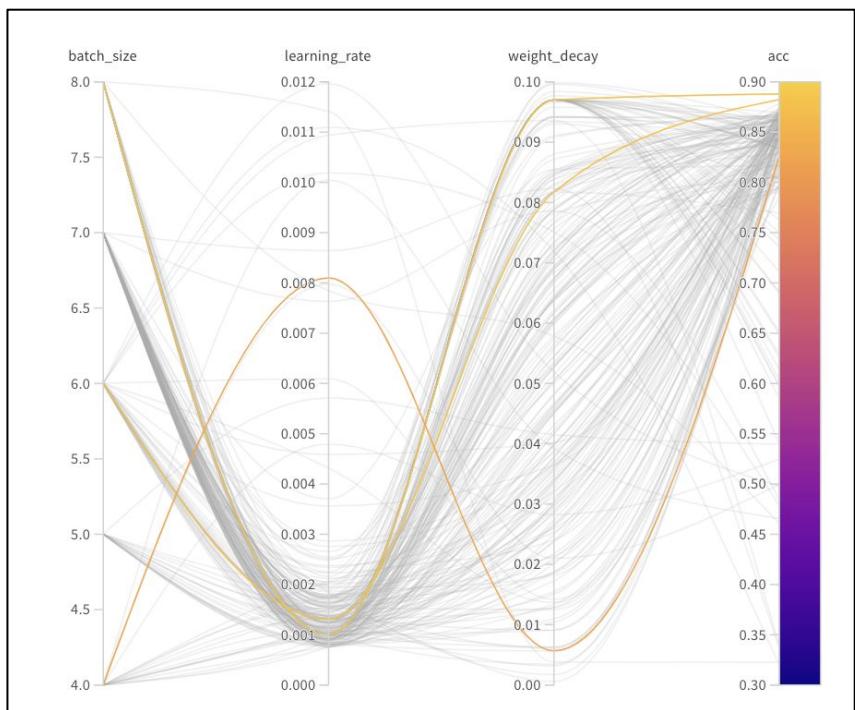
Training Better Models



Asking Questions about Training



Easily and systematically search hyperparameters





Sweeps – Easily search hyperparameters

Ask questions about your data (and models)



```
program: train.py
method: bayes
metric:
  name: valid_loss
  goal: minimize
parameters:
  batch_size:
    values: [32, 64]
  mixup_alpha:
    values: [0.2, 0.5, 0.8]
  optimizer:
    values: ["adam", "ranger"]
  encoder:
    values: ["resnet18", "resnet34", "resnet50", "resnet101"]
```

OUR MACHINE

central sweep server

YOUR MACHINES

agent 1

agent 2

agent 3



Unified Reporting and Dashboarding



Sharing and Presenting Your Work



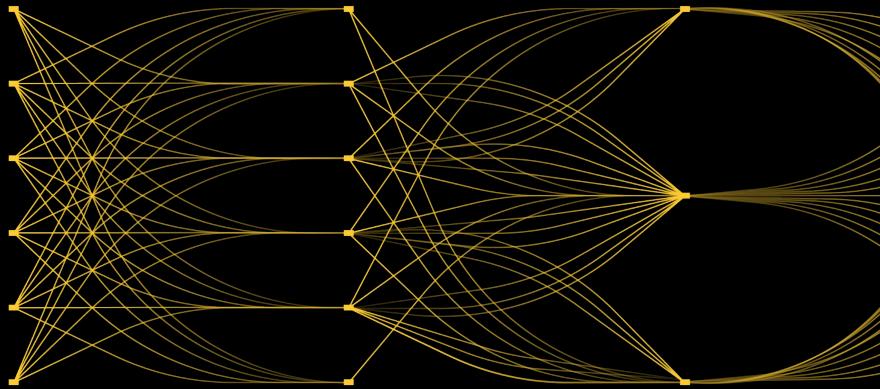
Time for a Demo!!!



How to use Weights &
Biases with framework X on
platform Y???

Weights & Biases

Integrations



Fits into your workflow



Integrated into every popular ML framework



Instrumented into over 6,000 popular ML repos



Catalyst

Runs on every cloud or in your own infra



Google Cloud





How do I learn more about Weights & Biases???



Check out Tutorials:
docs.wandb.ai/tutorials

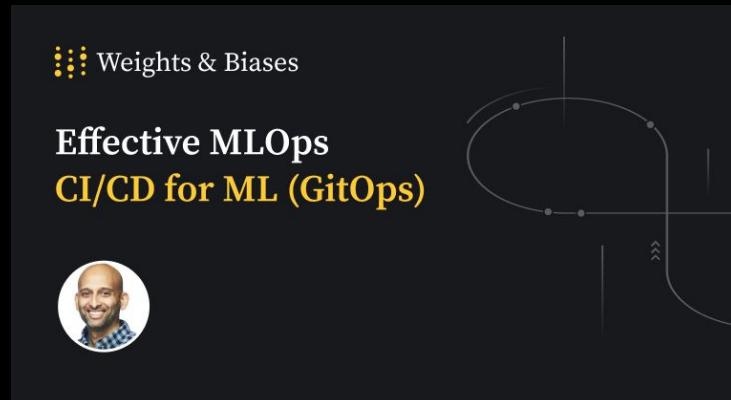


Read ML Reports at:
wandb.ai/fully-connected



The W&B Courses:

www.wandb.courses



Effective MLOps
CI/CD for ML (GitOps)



Model Development, CICD, LLMs(upcoming)



Effective MLOps
Model Development



Free courses with a
certificate!



Time for some Homework!!!

wandb.me/mlops-zoomcamp-quiz



Winners get 🎭🐝😎
Swags 😎

Submit by 6 June, 23:00 (Berlin time)



Questions???

Thank You

