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Deep Lake

A Lakehouse for Deep Learning

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Levon Ghukasyan
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* Image generated by AI

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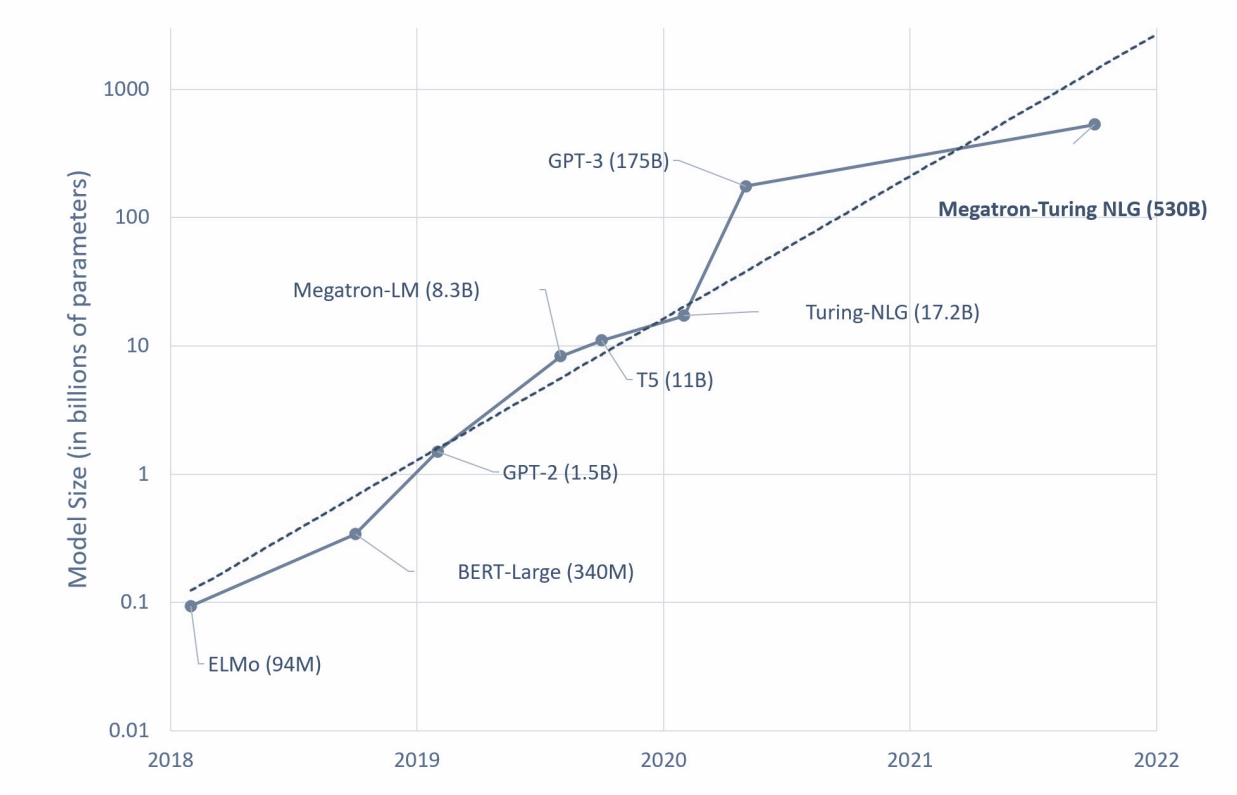
Deep Learning is growing at an unprecedented pace



The Data Problem

1 in

projects ends up on the ML project graveyard because of poor data development practices

Source: [Rackspace Technologies report]

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Solving the problem using data lakes

Benefits

> Break down Data Silos
> Enable data-driven Decision Making
> Improve Operational Efficiency
> Reduce Costs

Limitations

> Complex data isn’t supported
> No Deep Learning integration
> Missing gap between MLOps and MDS
> Queries only for analytics

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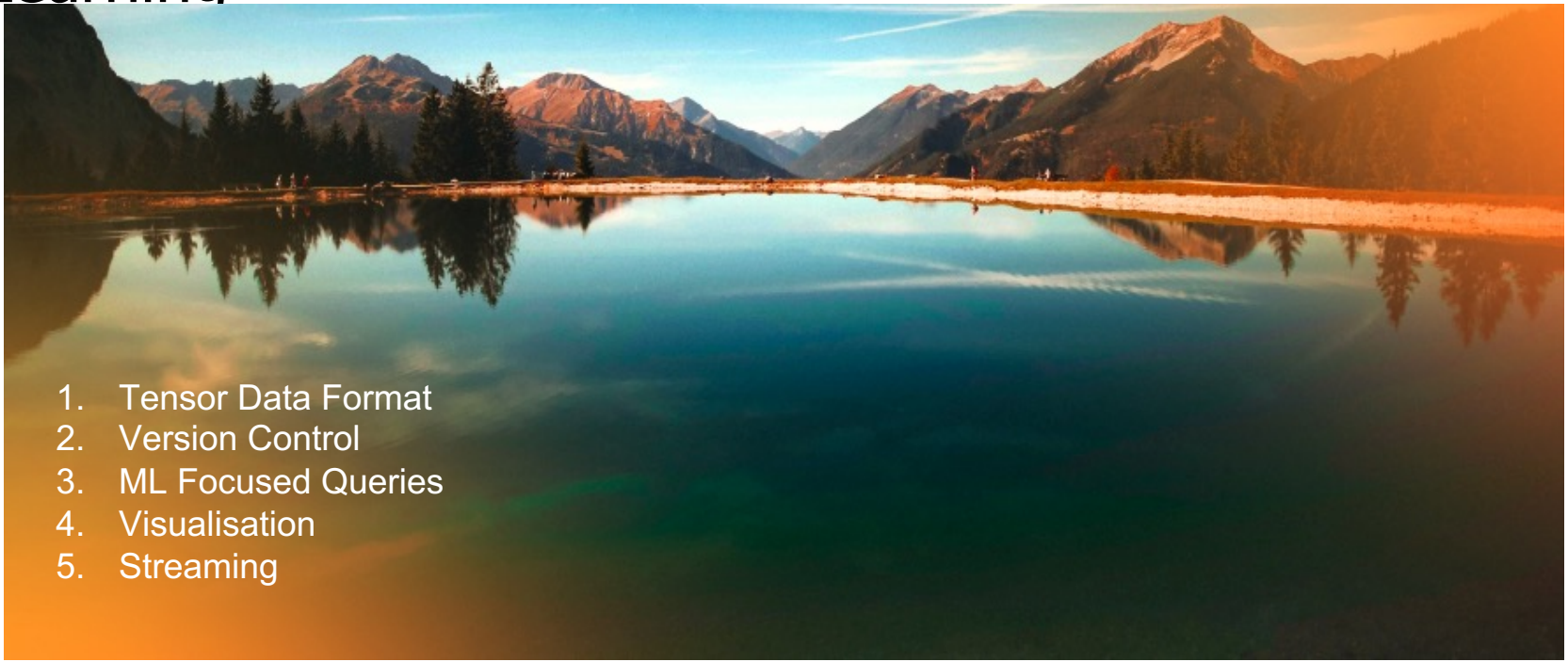
Introducing Deep Lake: Lakehouse for Deep Learning



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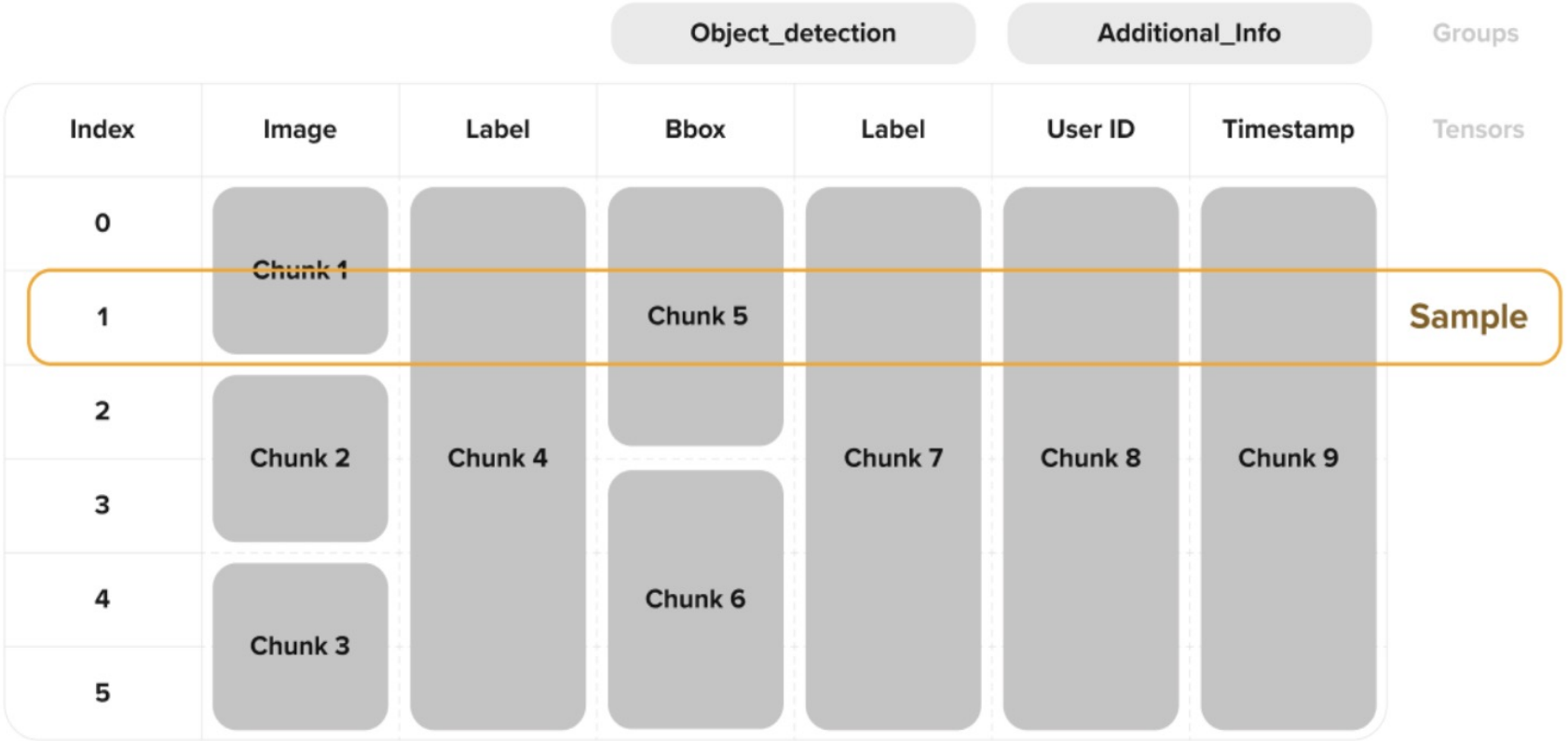
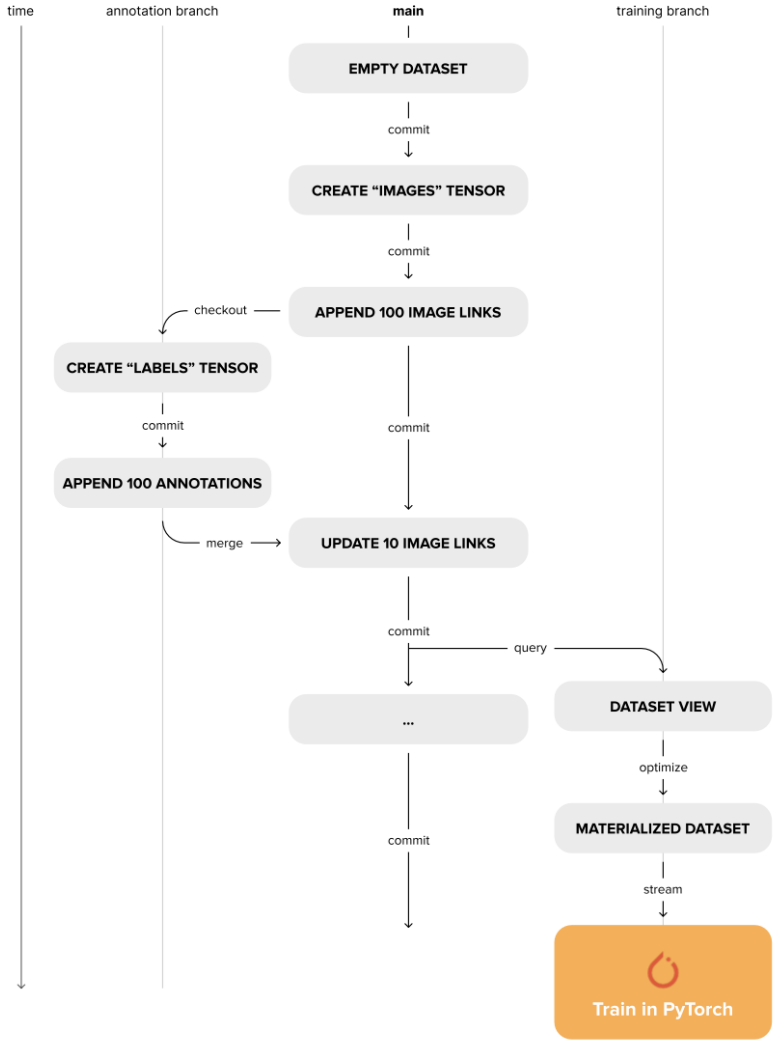
Tensor Storage Format: Native to Deep Learning



Version Control: Track Data Lineag



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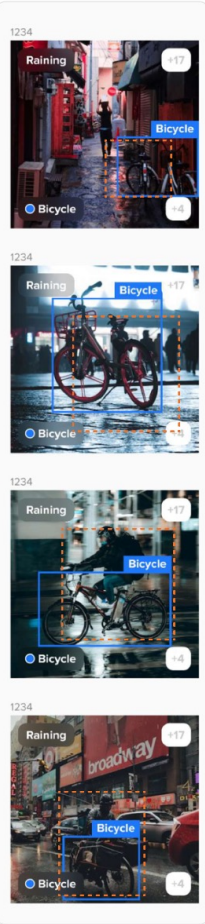
Query: Rapid queries with Tensor Query Language (**TQL**)

```
SELECT images [100:500, 100:500], boxes + ARRAY[-100, -100, 0, 0]
WHERE contains(categories, 'bicycle') and weather == 'raining'
ORDER BY AOI(boxes, prediction) desc
LIMIT 1000
```

Example query with indexing tensors inline with select and ordered by user-defined function computation.



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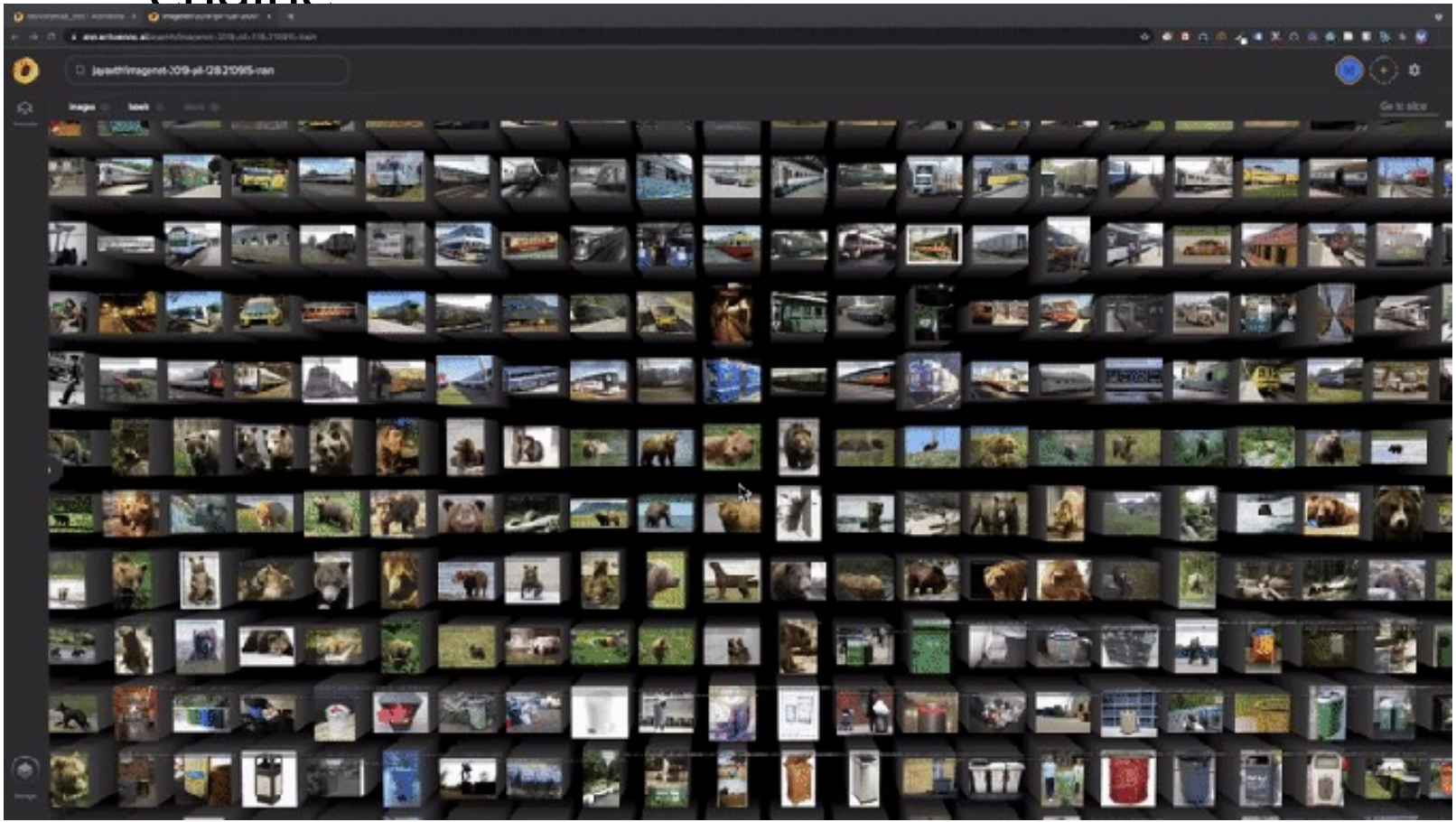
Visualize: In-browser visualization engine



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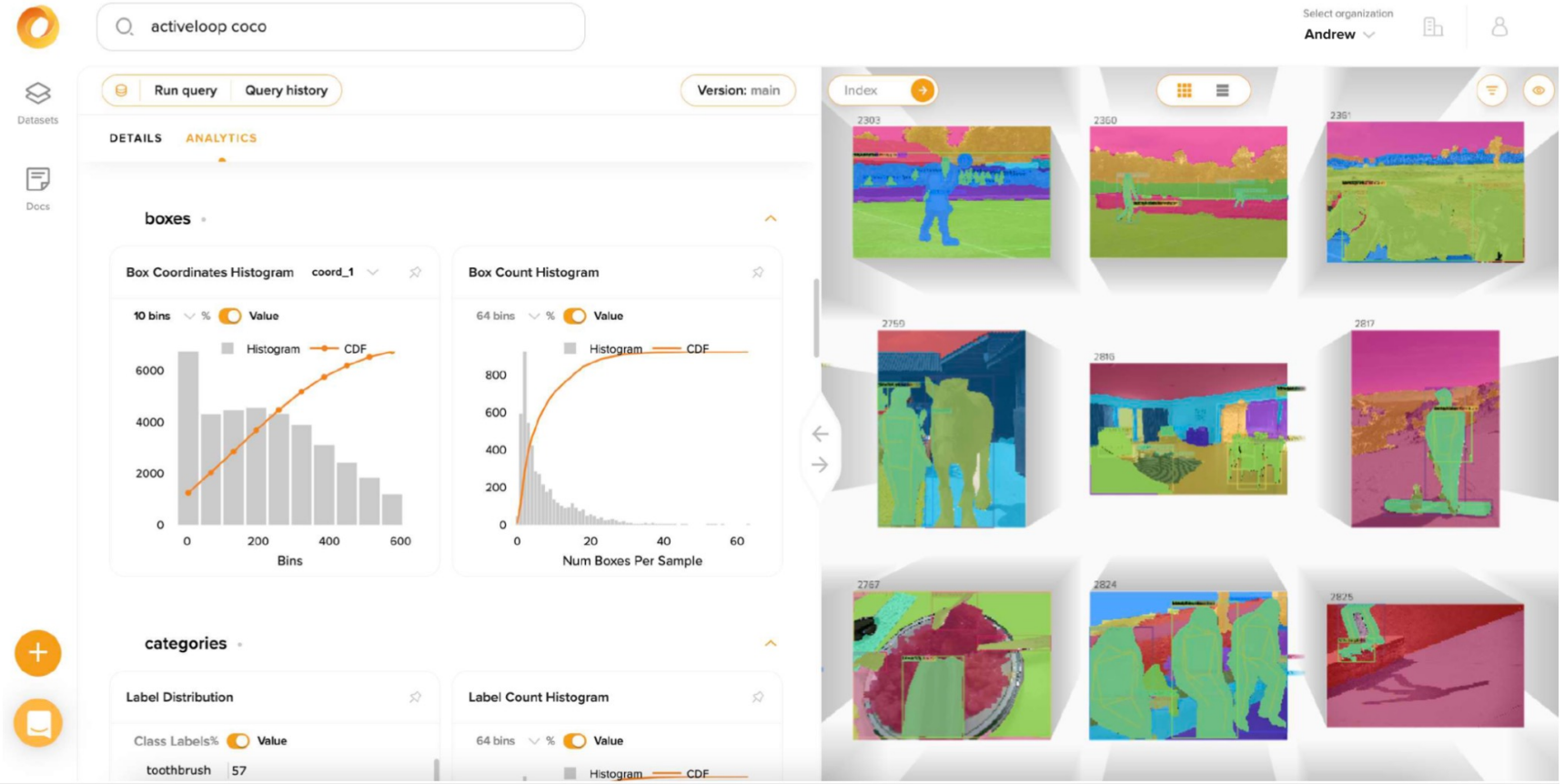

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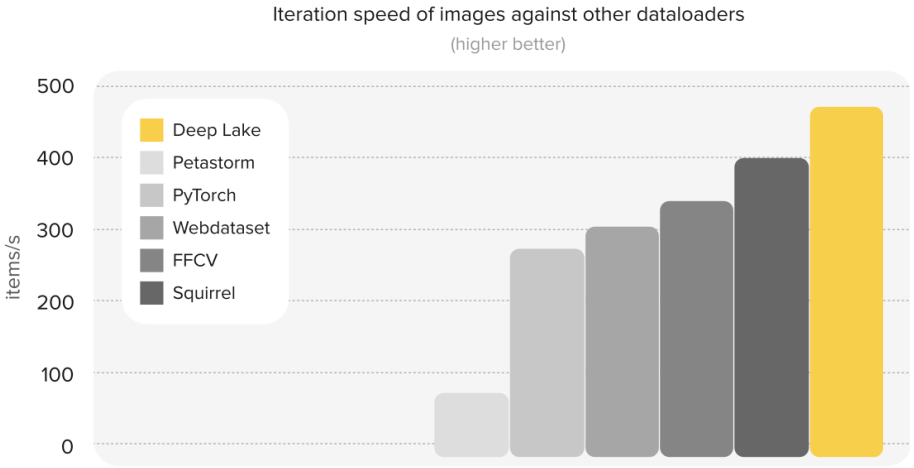
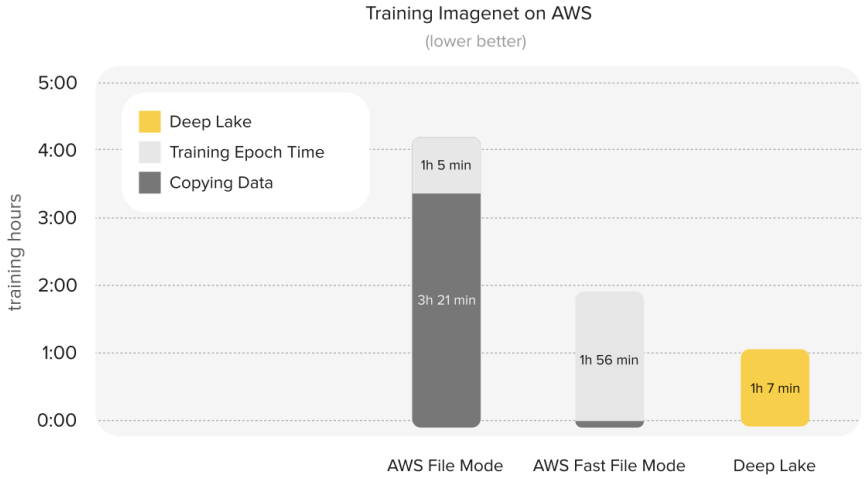
Stream: Streaming Data Loaders up to 4x faster*





*Ofeidis et. al; ***An Overview of the Dataloader Landscape. Challenges and Promises***

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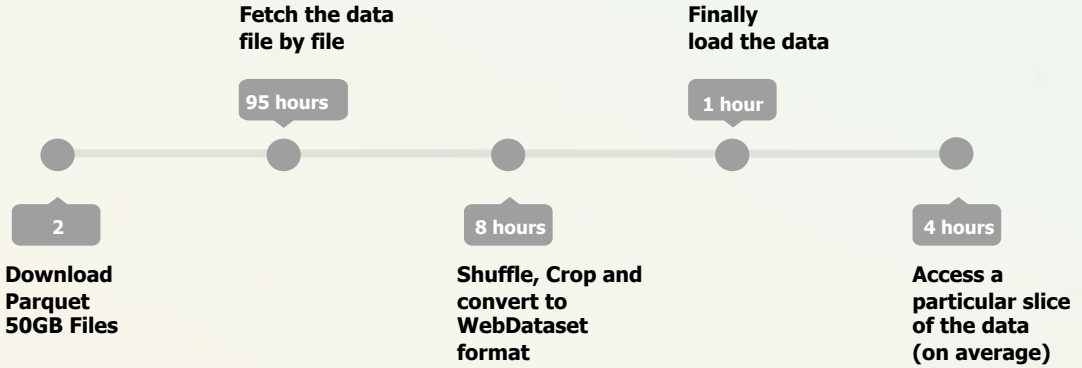
Save Time: Access LAION Dataset in <5 Seconds

100 hrs+

with in-house solutions

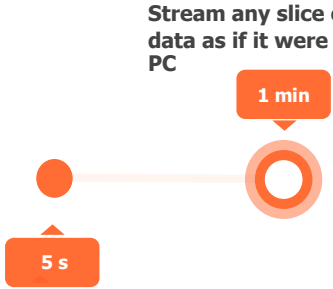


Before: no indexing and shuffling with WebDataset

After with DeepLake: + upload in ~6 hr

5 seconds

with activeloop




```
import deeplake
ds = deeplake.load('hub://laion/laion-400M')
dsv = ds.query('select * where …')
dl = dsv.pytorch(num_workers=16)
```

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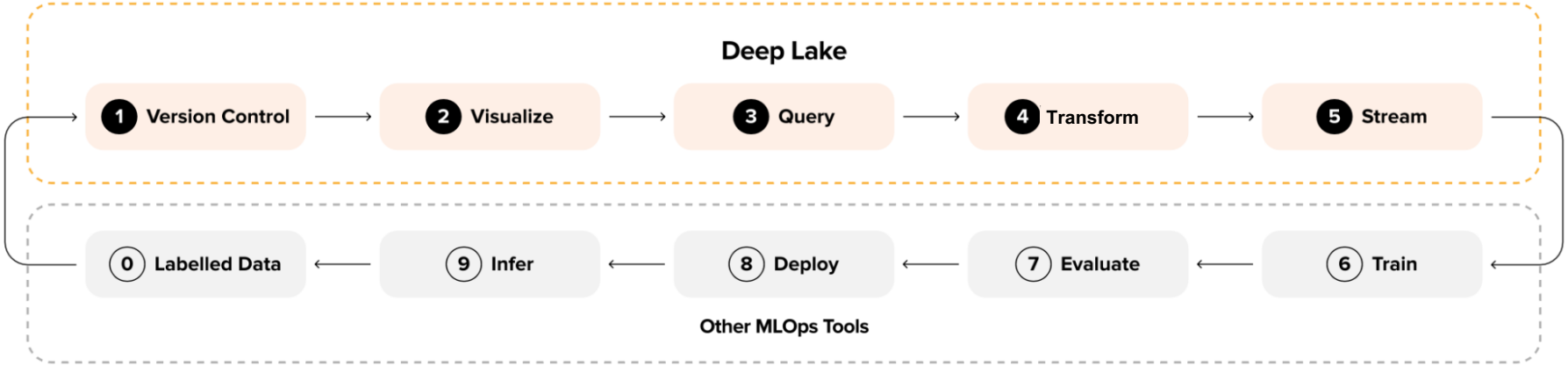
Deep Lake: Lakehouse for Deep Learning



Machine Learning Loop with Deep Lake

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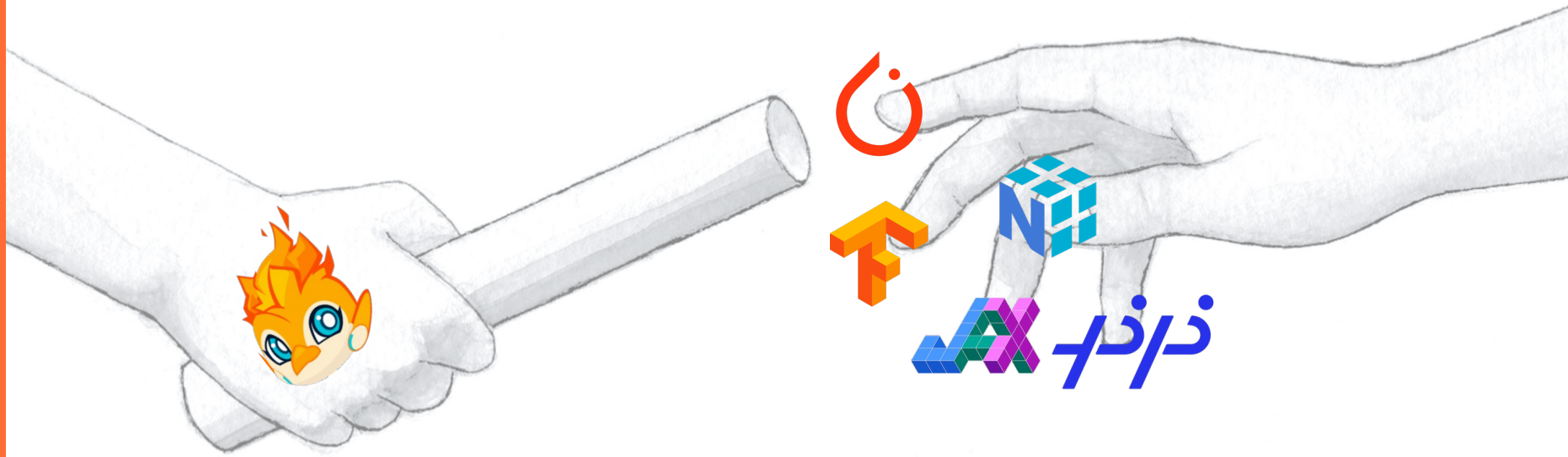
Unlock compute from data bottleneck



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Dive into Deeplake

https://github.com/activeloopai/deeplake

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