SAGIVTECH

IMVC 2024

Can AI Train AI?

Spoiler: yes!

Ofer Lavi, CEO
dataspan.ai

“Obtaining the right data for training computer vision models is super easy.”

No one, ever.

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Challenges in data acquisition hinder CV potential

Data volume:

Large-scale requirements for robust models

Acquisition hurdles:

Time-consuming and resource-intensive

Annotation complexities:

Additional challenge in labeling data

80% of the time in a typical AI project spent on data

Bottom line: Traditional methods for data acquisition are insufficient to meet the needs of AI applications.

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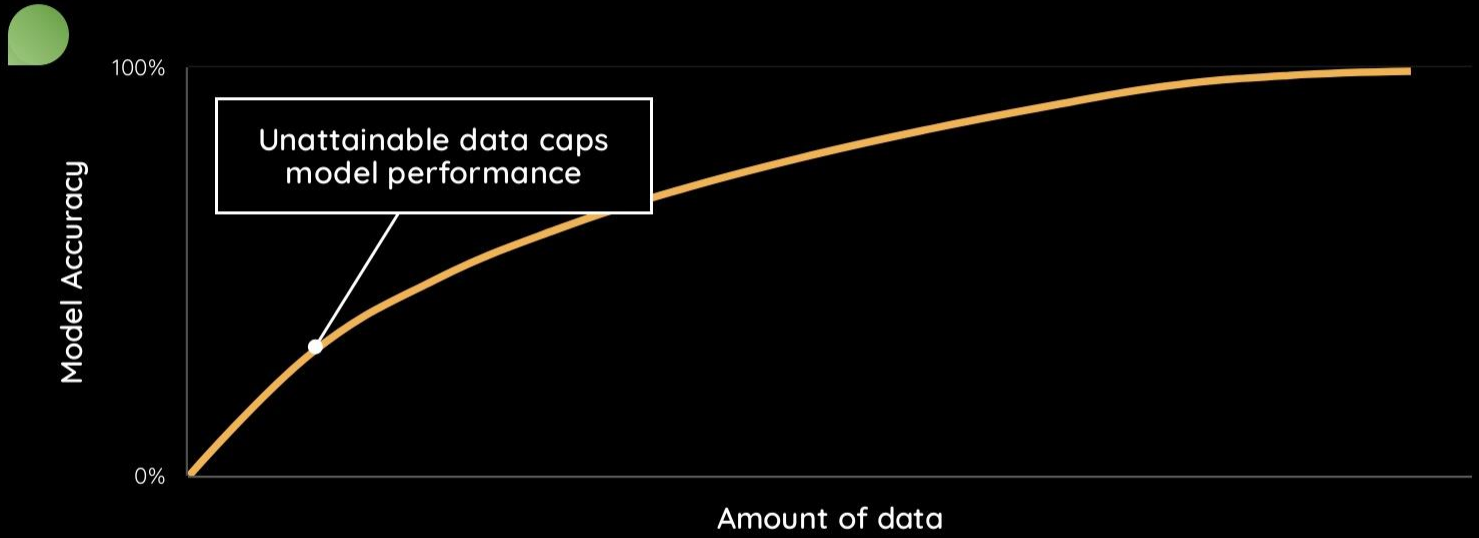
The *"death valley"* of unattainable data



Model performance is held back by unattainable data

Implications might be disastrous

IMVC 2024

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GenAI to the rescue!

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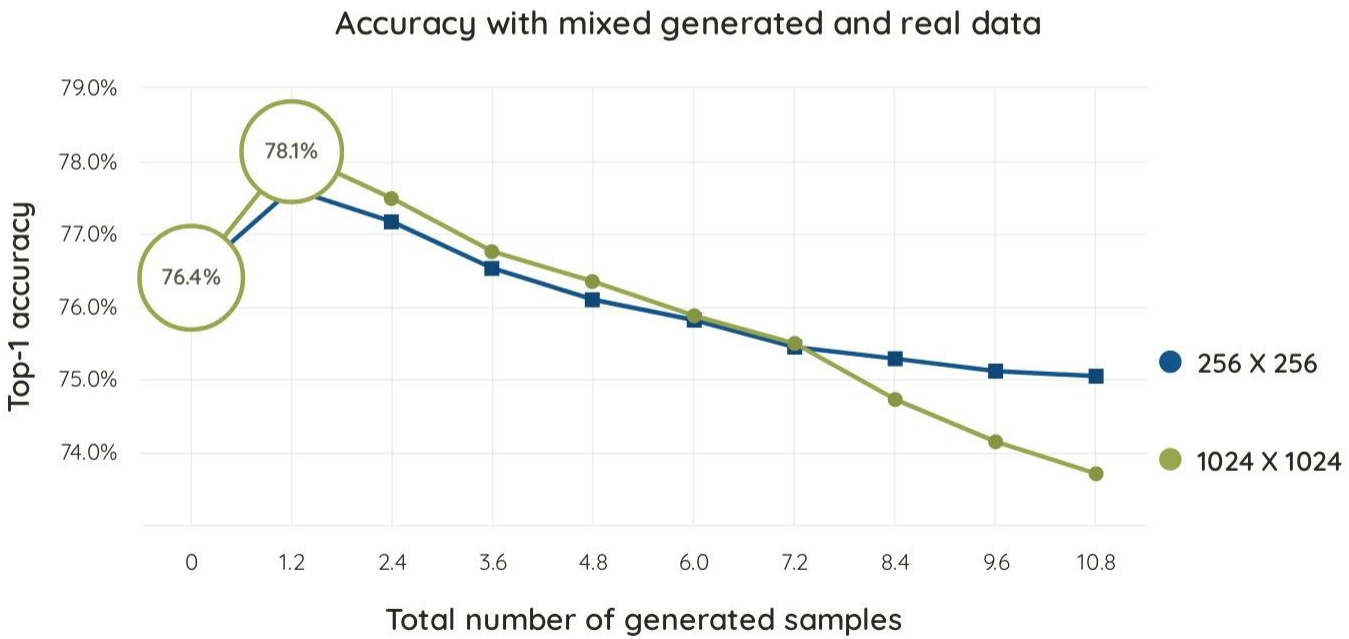
Diffusion models can improve ImageNet (Google Research, 2023)

+1.73%

HIGHEST ACCURACY IMPROVMENT

1:1

RATIO OF REAL:GENERATED DATA AT BEST ACCURACY



Azizi, Shekoofeh, et al. "Synthetic data from diffusion models improves imagenet classification." arXiv preprint arXiv:2304.08466 (2023).

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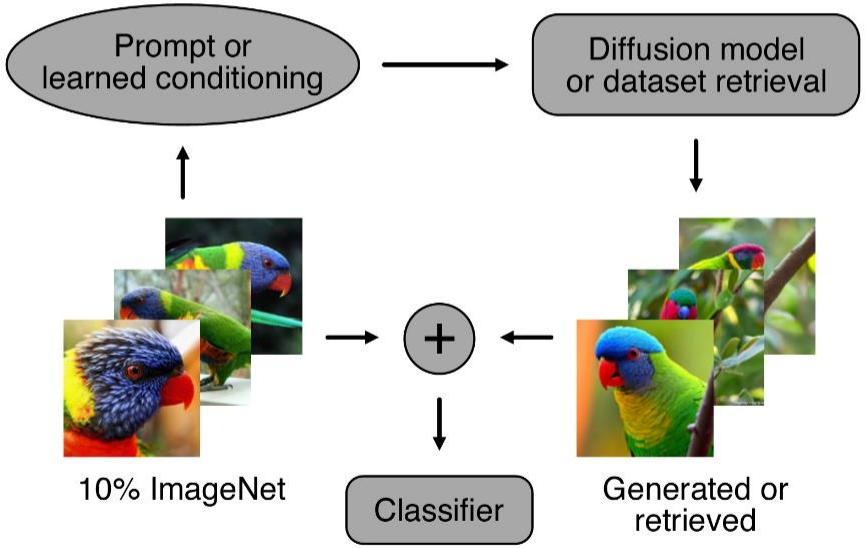
Image retrieval outperforms diffusion models on data augmentation



Burg, Max F. et al. "Image retrieval outperforms diffusion models on data augmentation." (2023).

57.2%

ImageNet accuracy on 10% of the data

60.9%

Accuracy augmenting with CLIP prompts **generation**

61.2%

Accuracy combining two state of the art **generation** methods

62.6%

Accuracy on **retrieved** data from diffusion model training set

NO GENERATION HERE!

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dataspan.ai
The low-data computer vision rapid development platform

dataspan.ai provides an intuitive visual platform with powerful API capabilities that leverage cutting-edge generative AI to automatically process data and train computer vision models.

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Case study - predictive maintenance

Derailments per year

1000

Cost of a massive derailement occured in 2023

$803M

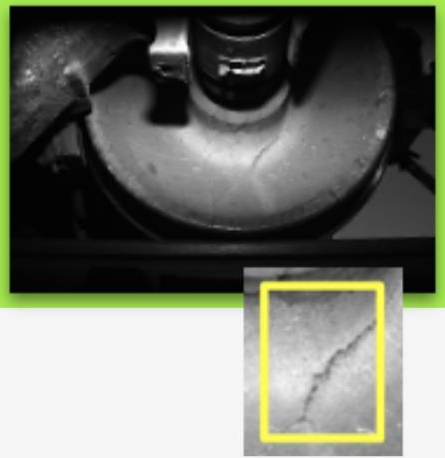
Cost of a small derailment

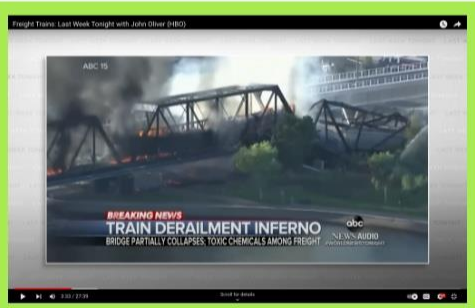
$400,000

Images of damaged wheels in dataset

60

Collected in **6(!)** years





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Clear wheel

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"a photo of a train wheel, taken from the level of the rail, where the wheel has a big crack that can cause a derailment"

Dall-E 2

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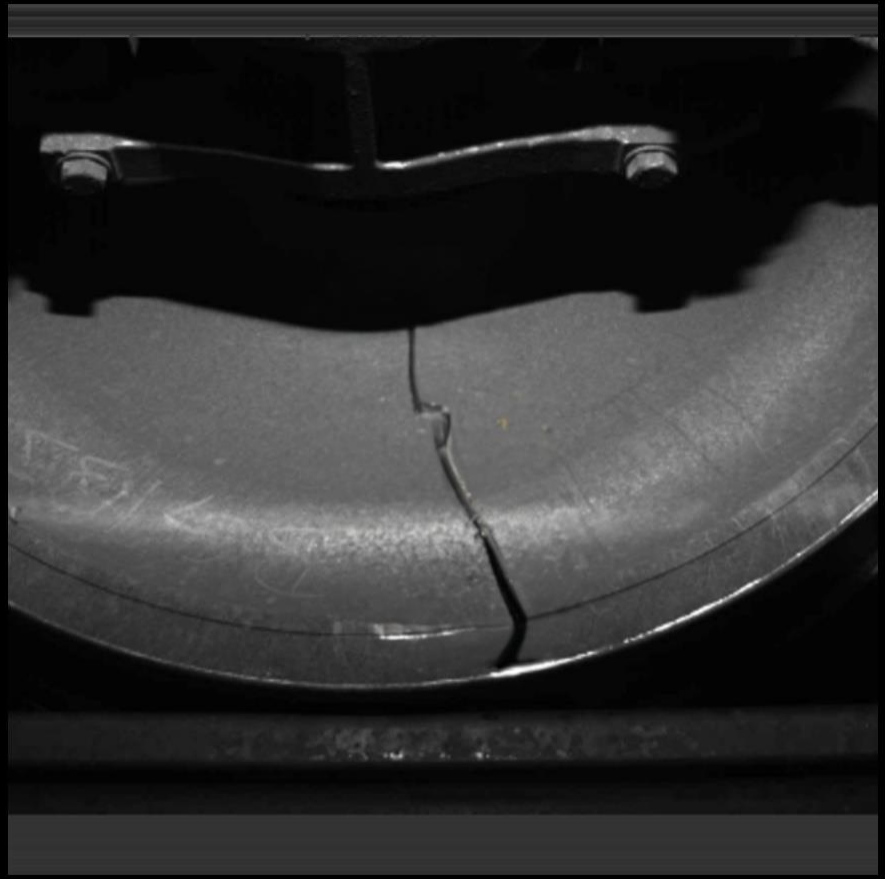

Inpainting + prompt

"a train wheel with a big crack"

Dall-E 2

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No free lunch!

Keep original distribution

Add missing aspects

Make them as real as possible

Improve downstream model

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How dataspan.ai works

Analysis of existing data

Generate new data

Human feedback

User interacts with the platform to refine data

Efficient training

Improved model

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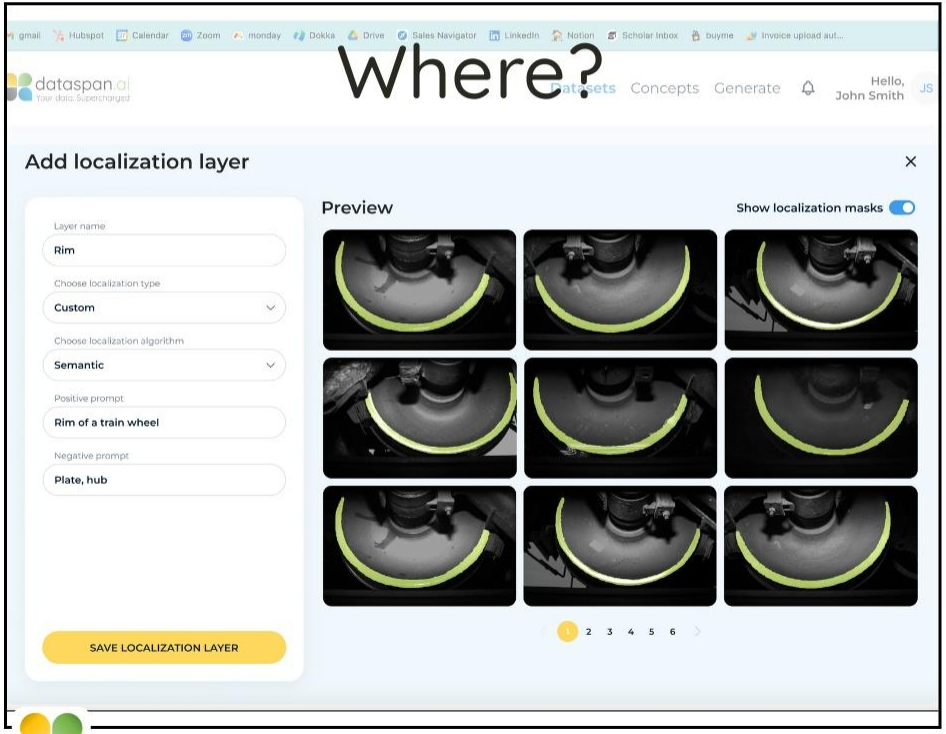
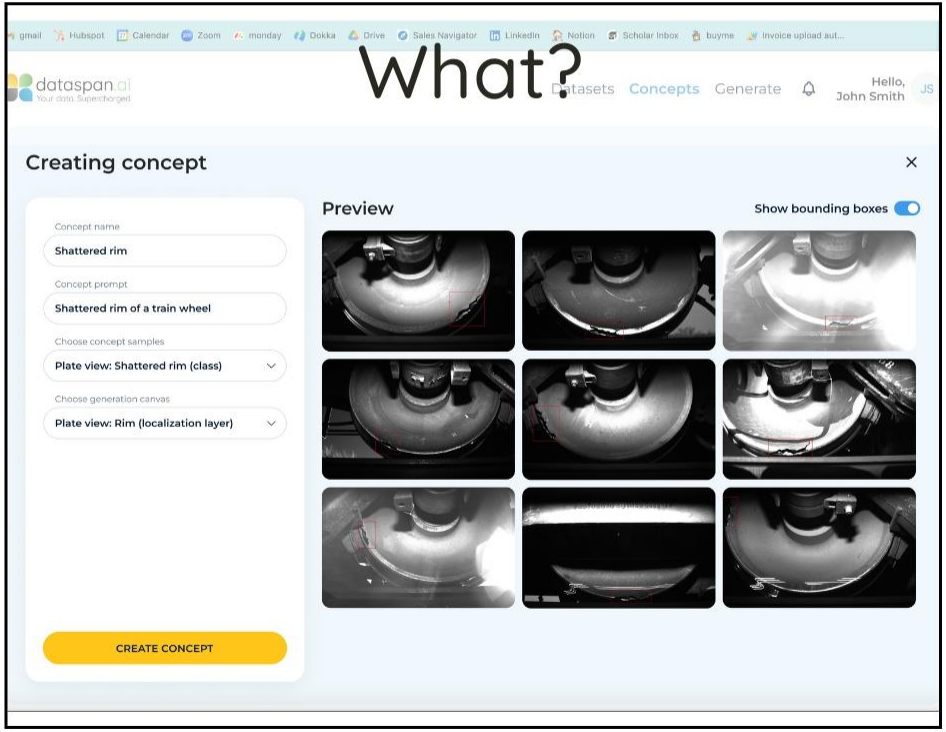
The two questions to answer

Where?



What?



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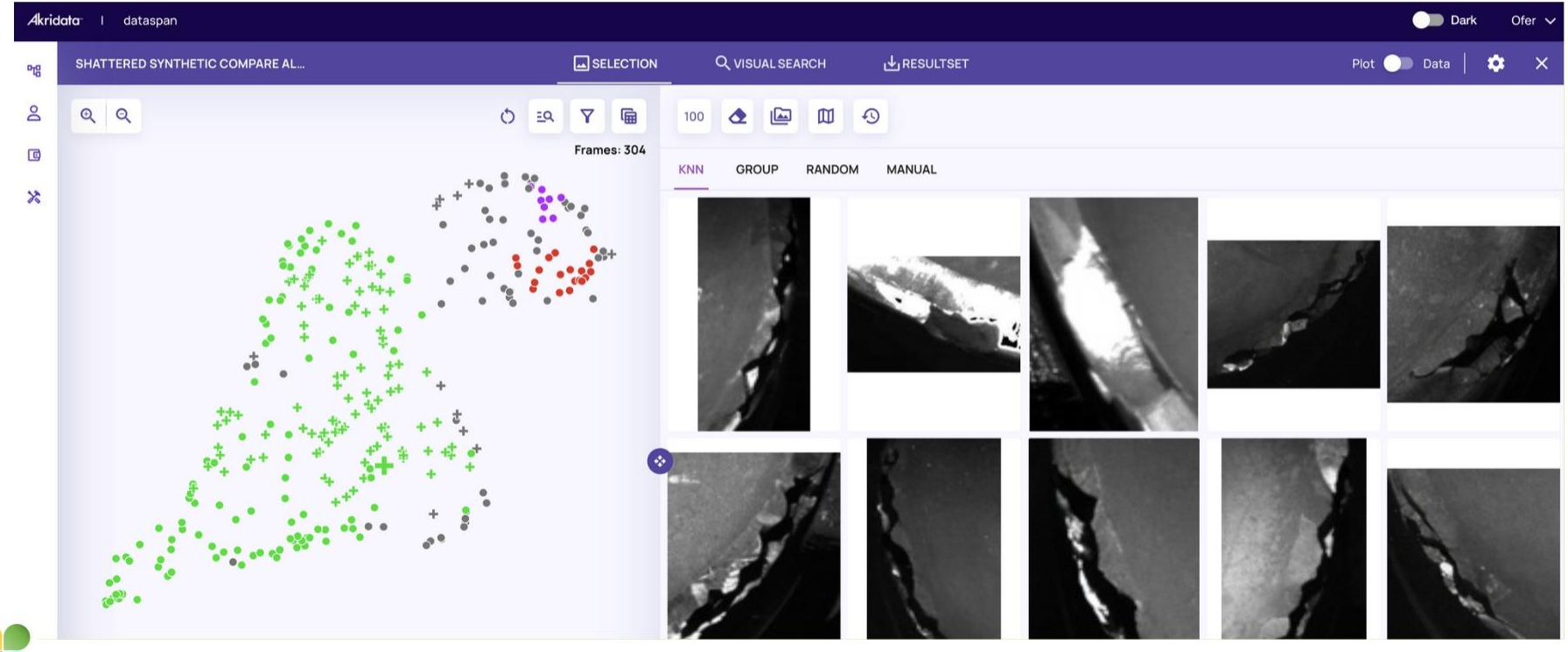
Generated data is similar to real data



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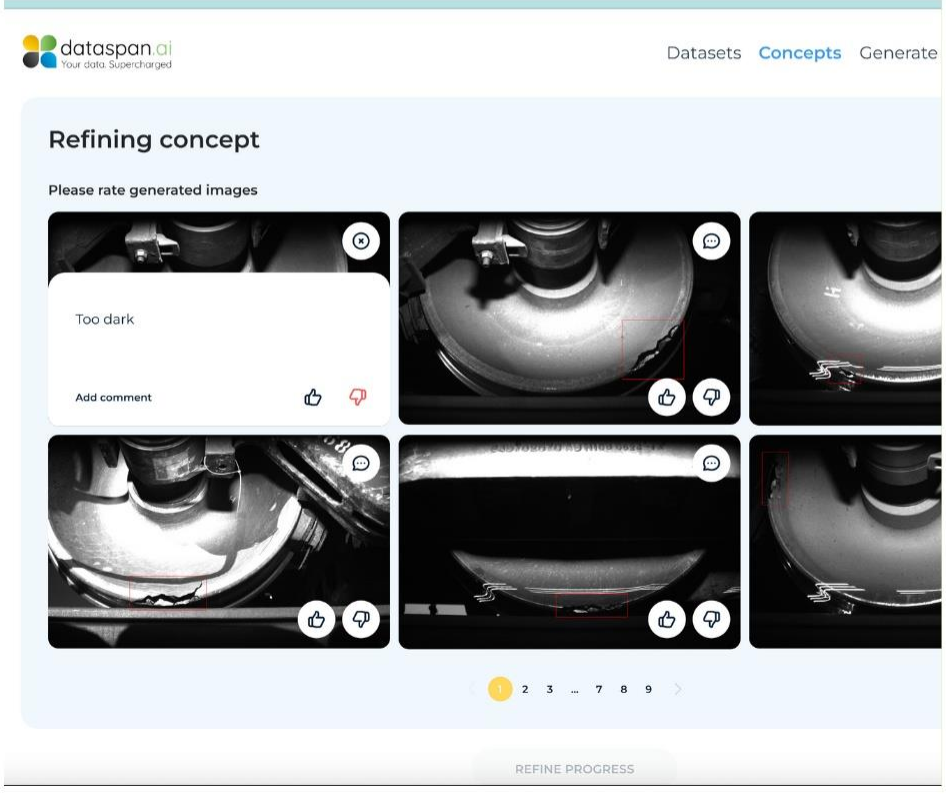
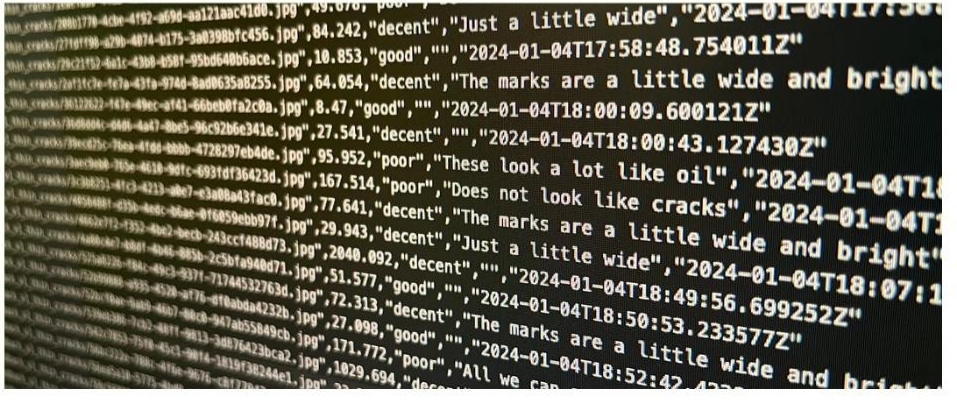
Iterative refinement



Subject matter expert provides feedback to improve the generation process

Visit our demo to learn more!



Clear wheel

Using a model built upon dataspan.ai's API 1.1M wheels examined weekly

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dataspan.ai

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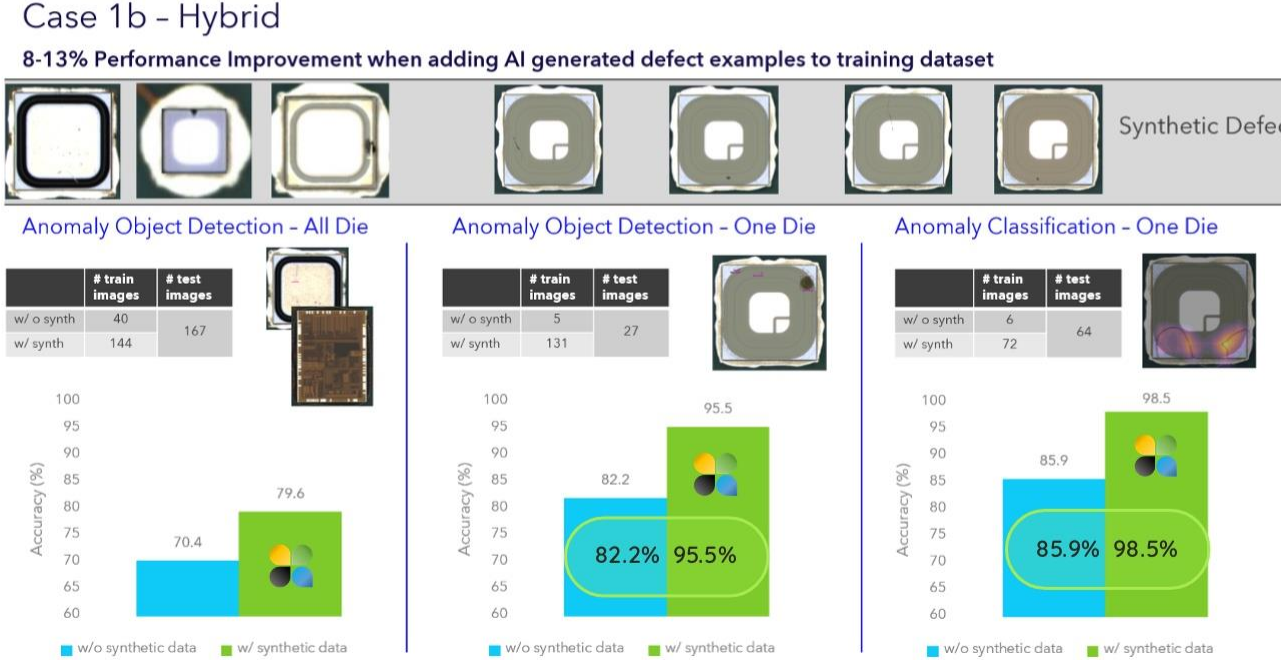
Client case study - Defect detection in manufacturing

- **Challenge**
  - Limited number of defect images in data, multiple components, multiple defect types
- **Result**
  - PoC results - Reduction of up to 90% in error rate over a **prominent competitor**



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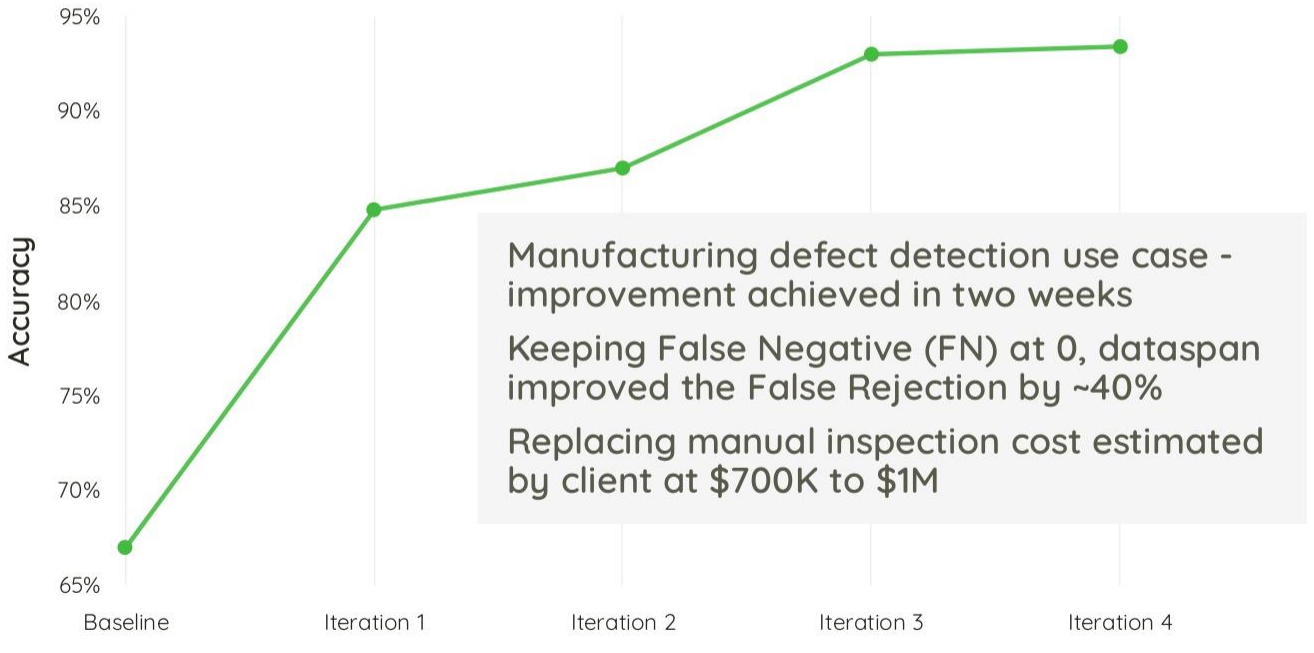
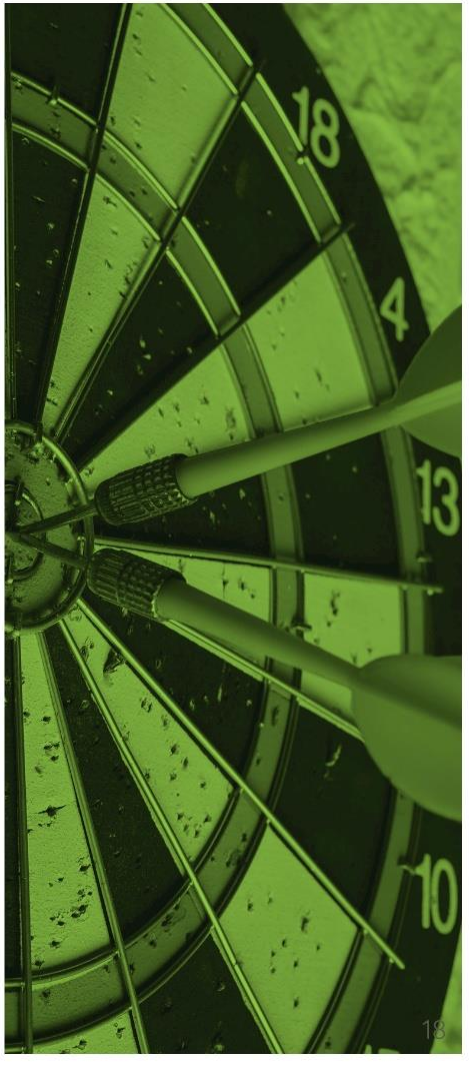
Defect detection accuracy



Manufacturing defect detection use case - improvement achieved in two weeks

Keeping False Negative (FN) at 0, dataspan improved the False Rejection by ~40%

Replacing manual inspection cost estimated by client at $700K to $1M



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Thanks!

Scan the QR code for more info!

Joint work with:

Almog Elharar

Roy Toren

Elad Shaked

Sanjay Pichala and the Akridata team

Akridata™
AI Platform for Visual Data

PLUGANDPLAY

NVIDIA INCEPTION PROGRAM

aws startup loft

FUSION

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