AI Summer School

September 8-12, 2025

VLM-Inspector

Early detection, smarter decisions on rare events that matter

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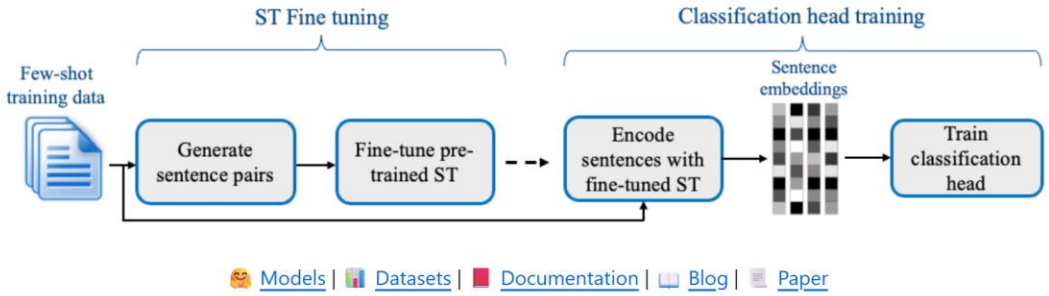
Rare events challenge

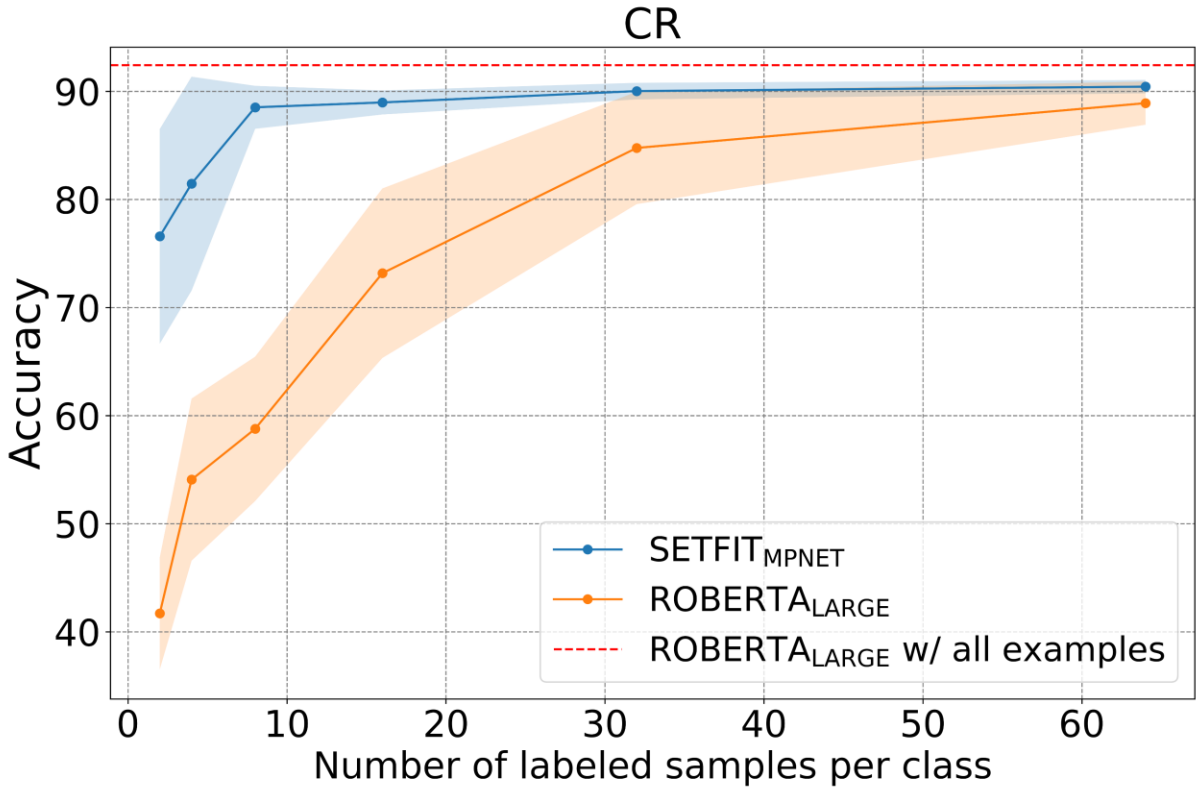
Critical rare events face the challenge of *data scarcity*, which in the context of AI makes it difficult to train accurate models

Multimodal Foundation models and Generative AI

Few-shot learning with pretrained language models has emerged as a promising solution to every data scientist's nightmare: dealing with data that has few to no labels 😱

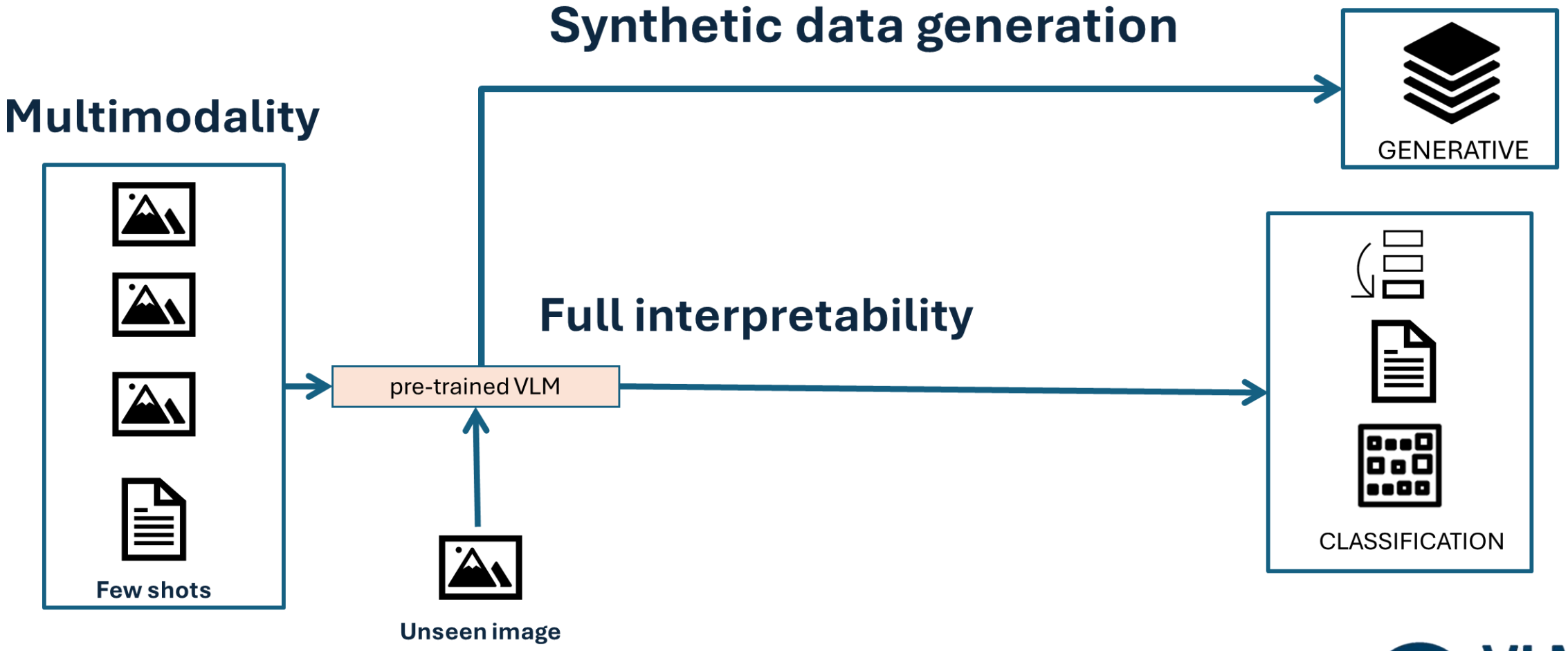


SetFit - Efficient Few-shot Learning with Sentence Transformers

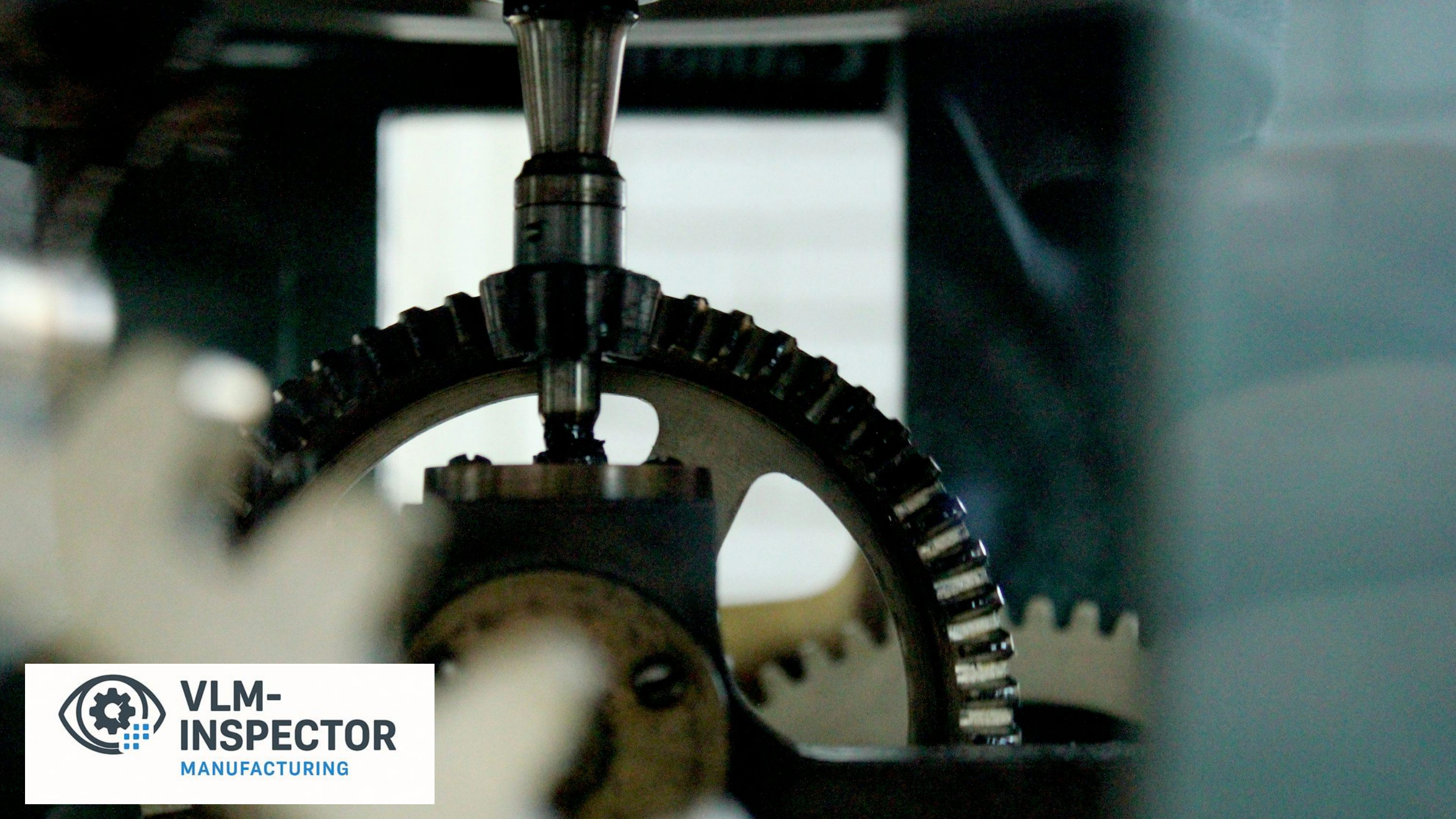


https://doi.org/10.48550/arXiv.2209.11055

The proposed approach



VLM-Inspector


VLM-
INSPECTOR
MANUFACTURING

The UI

Few-shot

Few-shot examples

Description | Description | Description

Train Model (few-shot)

Status: trained

Generate new samples

Generate Image(s)

Description

Classify a new image

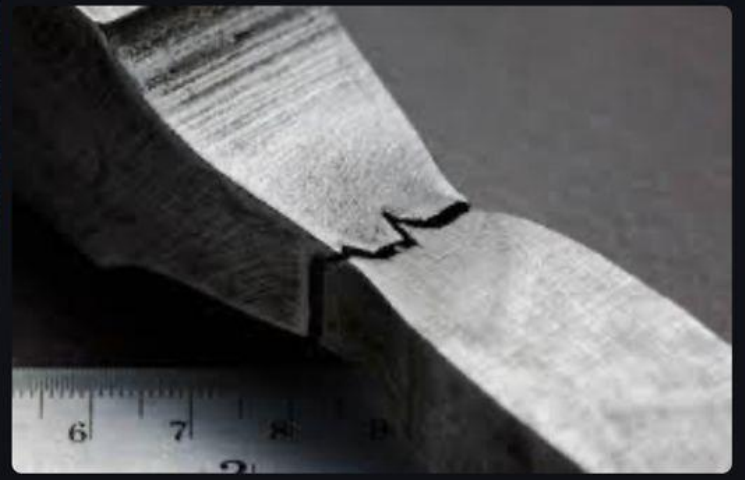
Upload image

Drag and drop file here
Limit 200MB per file • JPG, JPEG, PNG
Browse files

mu2.jpg 7.2KB

Classify

Result 1

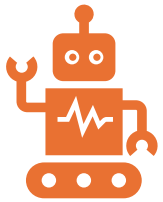


Observation: On a metal part, around a bolt hole, there is an irregular crack that begins at the rim of the hole and extends to the left.

Presence of fatigue cracks: Yes (likely)

Where: The main crack runs along the surface, originating at the edge of the hole (a stress concentration point) and spreading outward. Its rounded contour and lack of heavy plastic deformation suggest a slow fatigue process rather than a sudden

Ethics and Inclusive Design



Responsible AI

Controlled generation of synthetic images for data augmentation, ensuring privacy and licensing compliance according to Moroccan Law 09-08 on personal data protection and AI Act (eu)

Built-in explainability: output includes class, textual reasoning, and heatmap.

Bias Mitigation

Ensure **balanced** data within each domain (e.g. different skin colors).

Validate on diverse samples

Inclusive Design

Simple interface for **non-technical** domain experts.

Clear multimodal output: explanatory text, image, and defect heatmap.

Business Model

Value Proposition
Versatile AI tool for early detection of rare events in images, with natural-language explanations.

Adapts quickly to any dataset with few samples. Supports health, agriculture, and manufacturing and all rare critical events management.

Customers & Channels
Hospitals, NGOs, farmers, manufacturers. Delivered via SaaS, APIs, or partnerships.

Revenue
Subscriptions, API usage, customization services, grants for social-impact projects.

Partners
Hospitals, agritech groups, industrial firms, research labs.

Costs
Cloud computing, development, dataset curation, support & training.

Business Model

[1] https://bit.ly/4mhF8S6
[2] https://bit.ly/4nxA2SN
[3] https://bit.ly/4nrbSsS

The AI markets for precision medicine, agriculture, and industrial defect detection are all rapidly growing with strong future potential.

Precision medicine AI is valued at around **USD 3 billion** in 2025, with expected **CAGR of 25-35%** over the next decade, potentially reaching over USD 14-30 billion by early 2030s.

The AI agriculture market is projected to reach **USD 61 billion** by 2035, growing at about **25% CAGR** from 2025, driven by advanced crop and pest monitoring technologies.

The AI-powered defect detection market in manufacturing stands at **USD 2.6-3.6 billion** in 2024, with a **15-20% CAGR** expected over 5-10 years.

We can realistically target annual revenue growth of 20-35% in initial scaling phases, fueled by adoption, scaling, and strong market demand for AI-driven early detection and precision analytics.