AI Summer School

September 8-12, 2025

VLM-Inspector

Early detection, smarter decisions on rare events that matter

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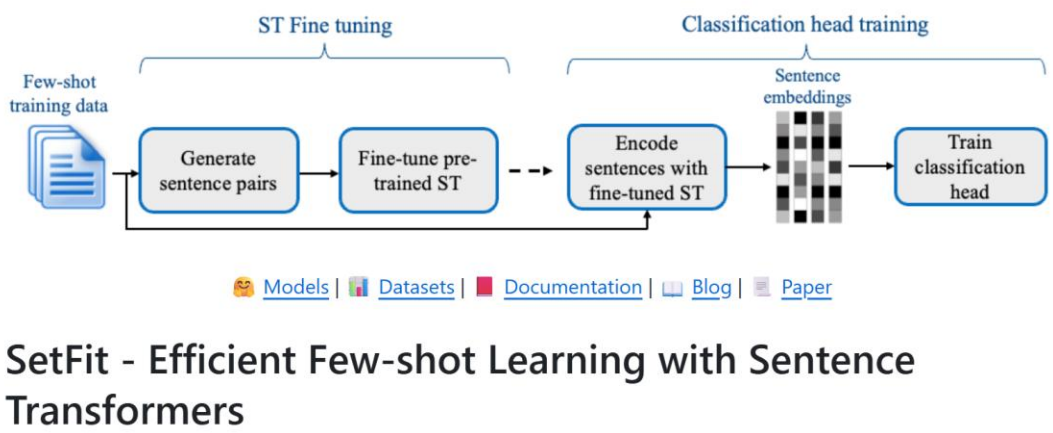
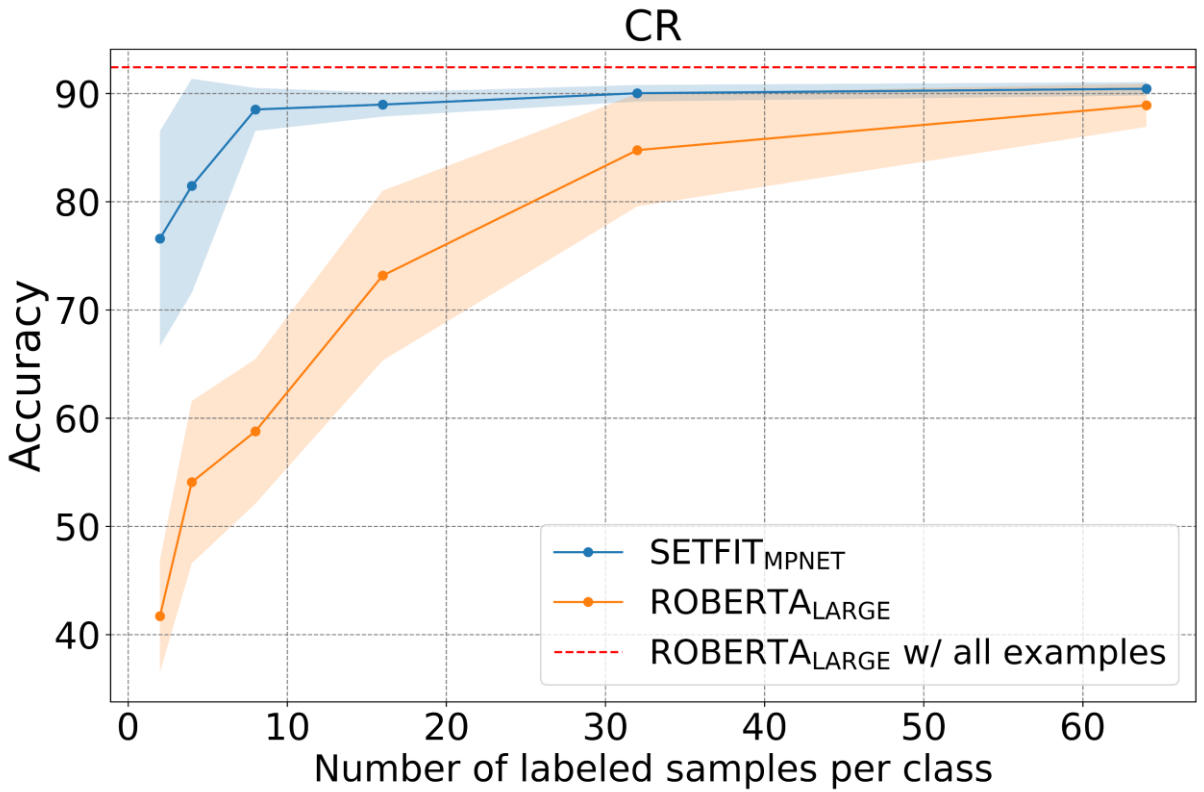
Rare events challenge

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

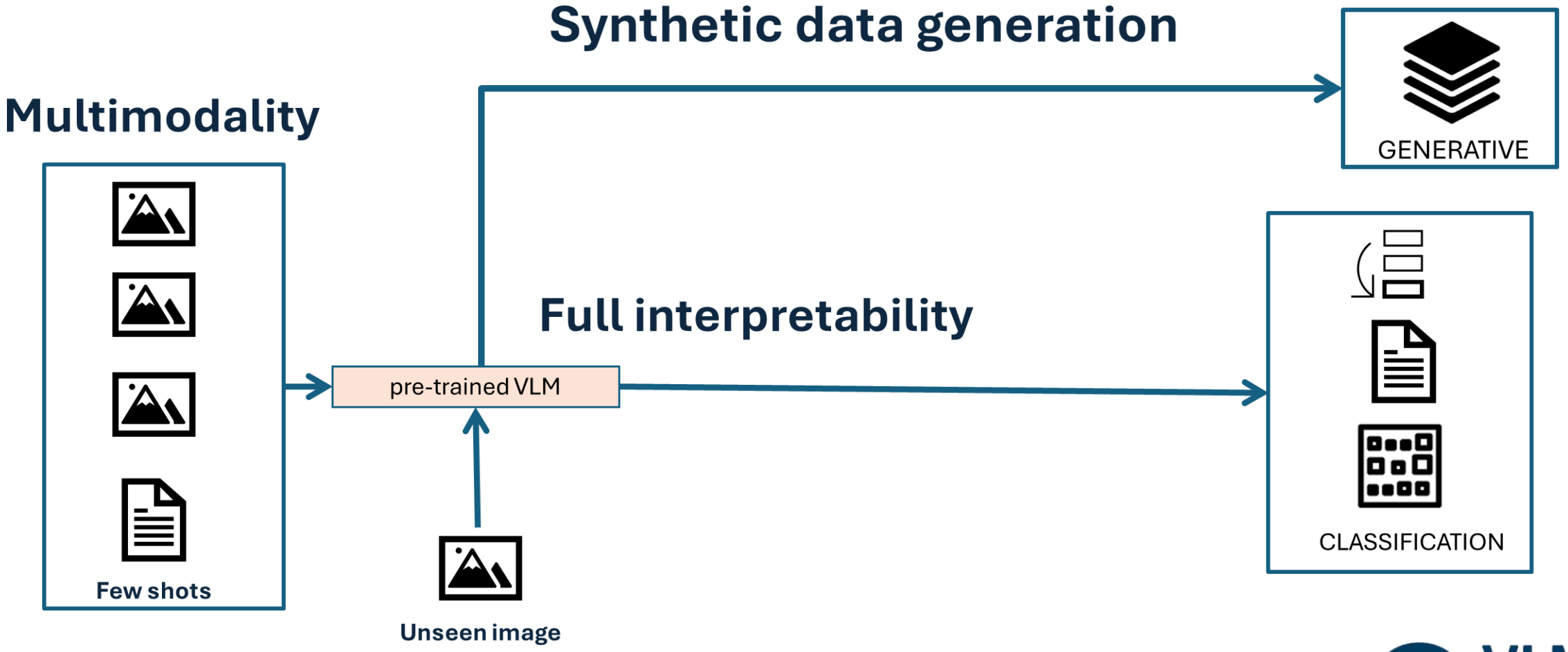
Few-shot learning with pretrained language models has emerged as a promising solution to every data scientist's nightmare: dealing with data that has few to no labels 😱





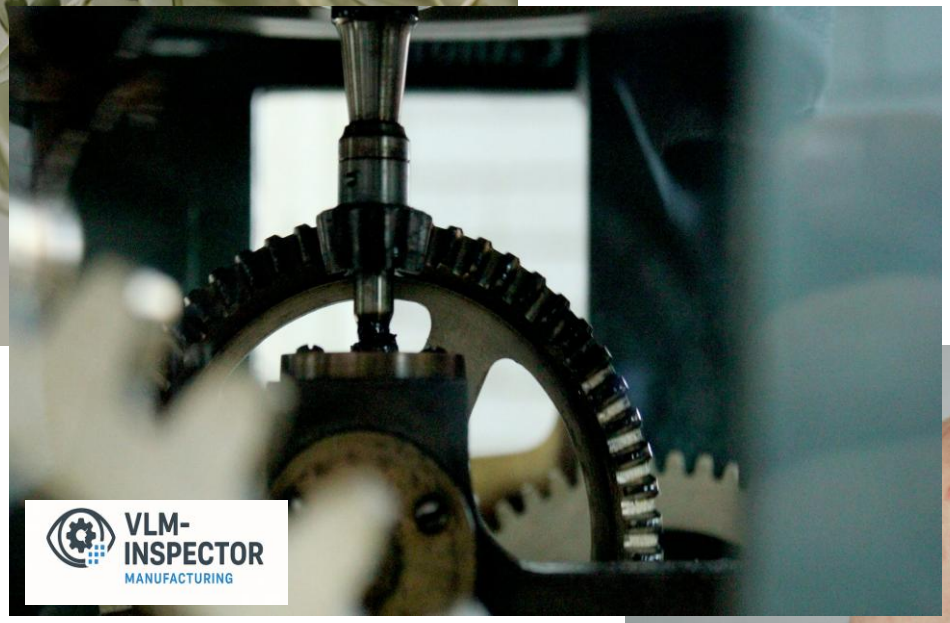
https://doi.org/10.48550/arXiv.2209.11055

The proposed approach

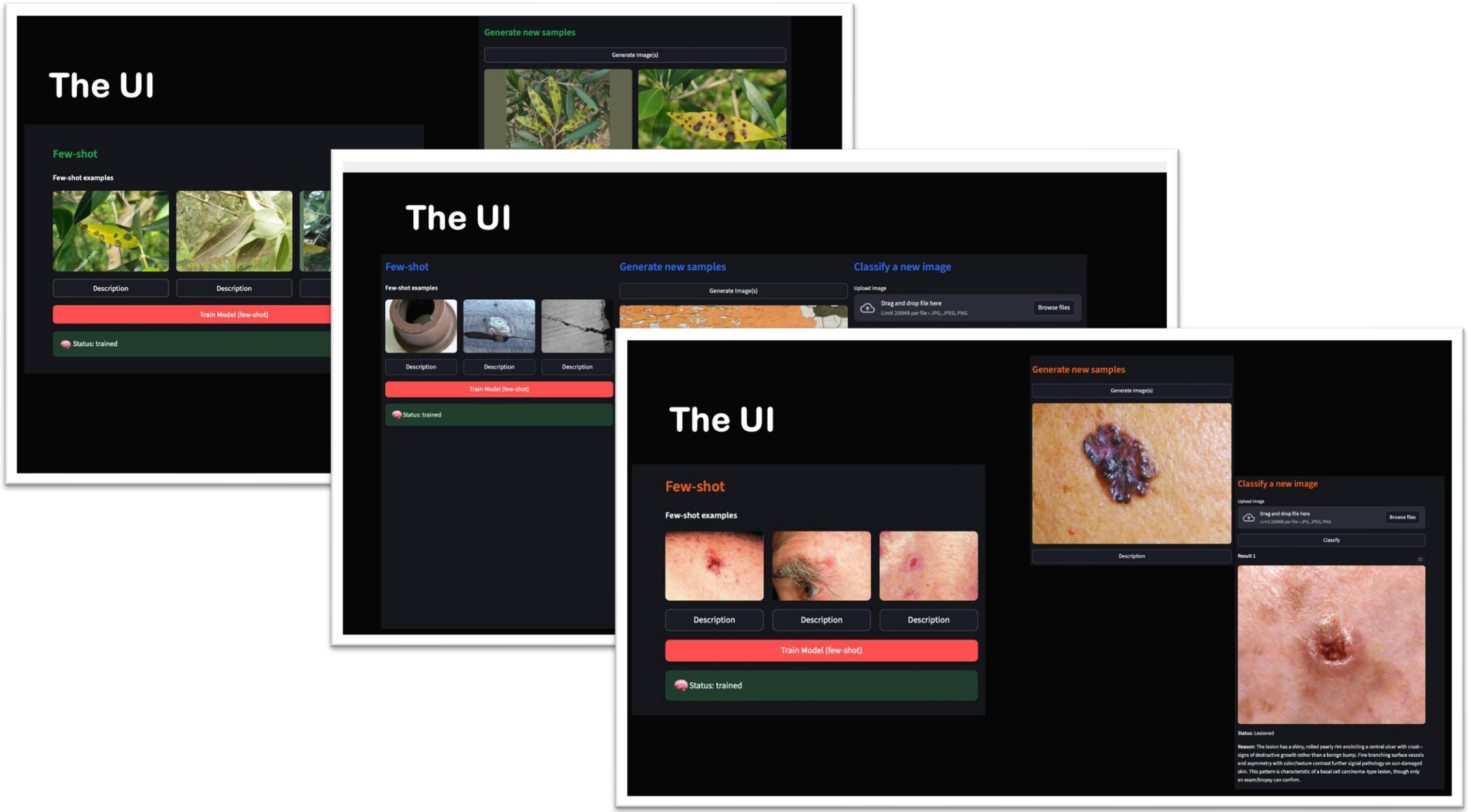


VLM-Inspector


VLM-
INSPECTOR
CROP HEALTH


VLM-
INSPECTOR
MANUFACTURING


VLM-
INSPECTOR
TROPICAL MEDICINE


The UI
Few-shot
Few-shot examples
Description
Description
Train Model (few-shot)
Status: trained
Generate new samples
Generate Image(s)
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Generate new samples
Generate Image(s)
Classify a new image
Upload image
Drag and drop file here
Limit 200MB per file • JPG, JPEG, PNG
Browse files
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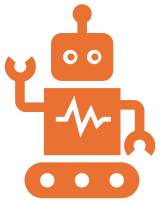
Limit 200MB per file • JPG, JPEG, PNG
Browse files
Classify
Result 1
Status: Lesioned
Reason: The lesion has a shiny, rolled pearly rim encircling a central ulcer with crust—signs of destructive growth rather than a benign bump. Fine branching surface vessels and asymmetry with color/texture contrast further signal pathology on sun-damaged skin. This pattern is characteristic of a basal cell carcinoma–type lesion, though only an exam/biopsy can confirm.

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/3MeQzZp
[2] https://bit.ly/3MkUG7n
[3] https://bit.ly/3MkXMMp

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.