



Nachet: Advancing the next generation of weed seed analysis using Artificial Intelligence

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Background:

- Seeds and grains can act as pathways that introduce invasive weeds into new regions over long distances. These risks are further intensified by the effects of global warming. As a result, identifying weed seeds has become an important requirement for phytosanitary certification.
- CFIA's Saskatoon Laboratory leads weed seed analysis work to support phytosanitary certificate issuance, with a primary goal of ensuring that Canadian agricultural commodities are free of prohibited weed seeds.

Current challenges:

- As Canada prioritizes diversification of trading partners, workload for weed seed analysis to ensure that Canadian exports are free of prohibited weed seeds is increasing.
- Analysts are highly specialized – 1500 hours of training is usually required for an analyst to be able to identify 300 species of seeds.

How we are innovating using Artificial Intelligence:

- CFIA has developed artificial intelligence (AI), called "Nachet", to identify quarantine weed seeds.
- The tool is an online web application which pairs with a digital microscope. Images are taken with

the digital microscope, uploaded to the web application, and seed species are flagged by the tool using computer vision.

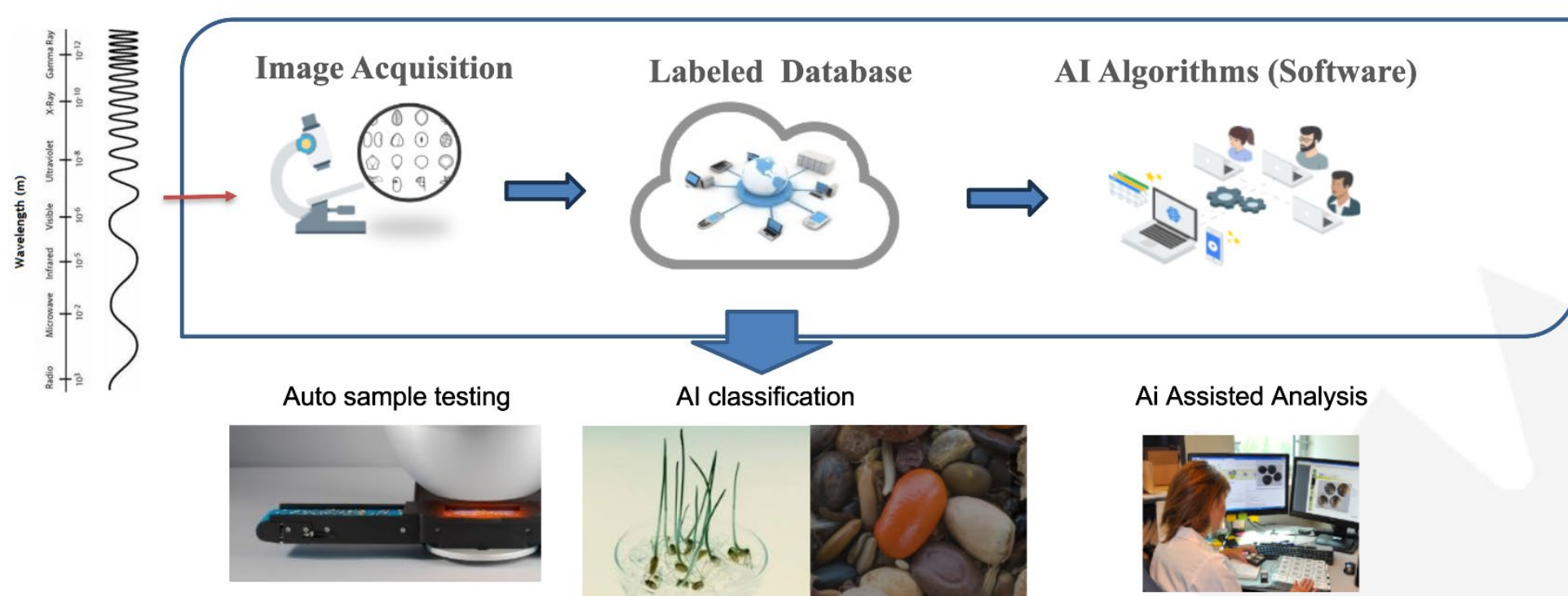
- This tool, once completed, will increase efficiency of weed seed analysis, support CFIA diagnostic tests, training of new analysts, and increase CFIA's capacity to support market access and market diversification for grains, pulses and oilseeds.
- Currently, it is expected that the tool will be able to identify close to 60 different species by March 31, 2026, with early analysis demonstrating 85-97% accuracy rates.

Public-private partnership:

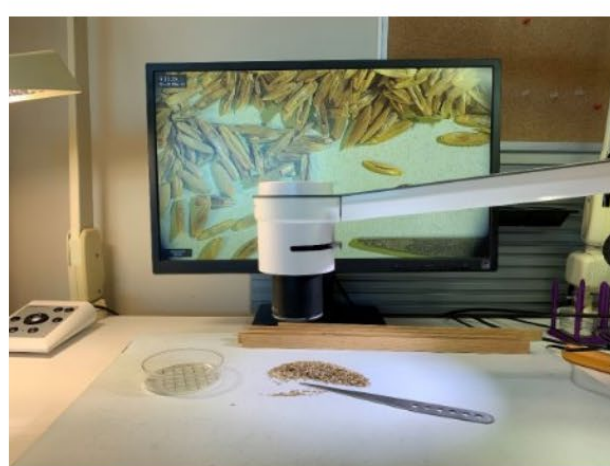
- CFIA has formed strong partnerships with accredited labs. The accredited labs share seed images with CFIA which will accelerate the number of weed species that the A.I tool can identify. Private labs have expressed strong support and enthusiasm.

Next steps:

- CFIA plans to continue private-public collaboration to increase the tools species recognition, accuracy and ease of use
- This year's goal is to reach ID ability for 50-60 species by end of fiscal year 2025-2026
- If you'd like a demo of the tool, or have questions, feel free to send an email to: Ruoqing.Wang@inspection.gc.ca



Micro-imaging with a digital microscope



Tagarno® Trend used

Interface developed by CFIA AI-lab

