

AI는 식물 종을 인식할 때 어디를 보는가?

Where Does AI Look to Recognize Plant Species?



Goal / 목표

Understand how
AI recognizes
plant species

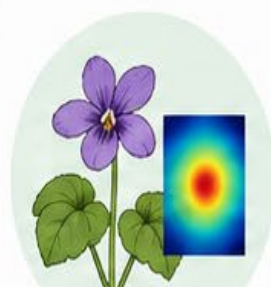
AI가 식물 종을
어떻게 인식하는지
이해



1

Classifier built
분류기 구축

93.6%
accuracy



2

Expert vs AI
전문가와 AI 비교

Similar focus
regions



3

Occlusion test
오클루전 분석

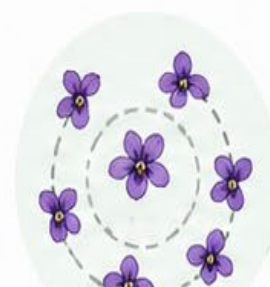
Important
regions
confirmed



4

Individual
removal
개체 제거 분석

Some units
matter more



5

Training
neighbors
학습 표본近傍解析

Same species
stays stable



Current progress /
현재까지의 이해

AI mainly uses
biologically
meaningful
regions

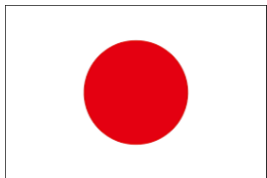
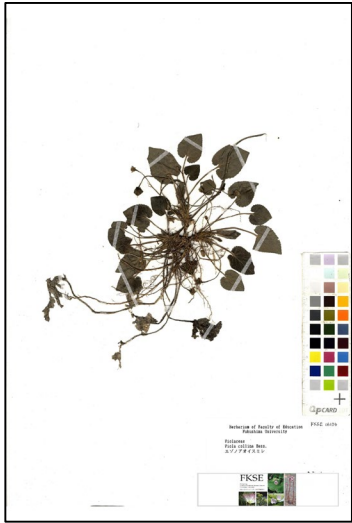
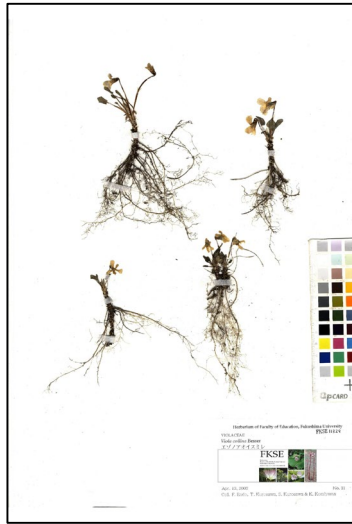
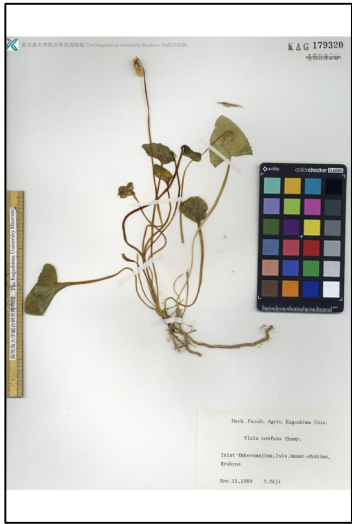
생물학적으로
의미 있는 형질을
주로 사용

Development of an Integrated Japan–Korea Herbarium Specimen Identification System: Using Violaceae, Lamiaceae, and Ferns as Case Studies

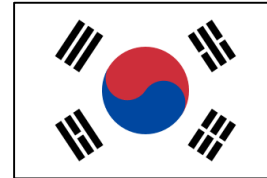
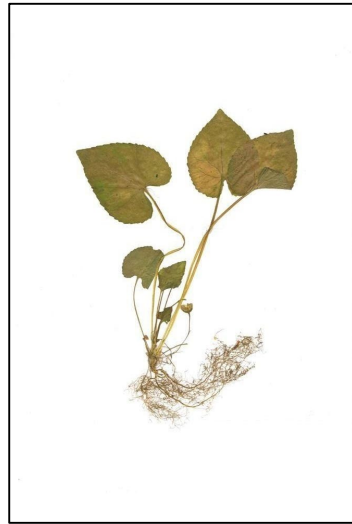
JSPS–NRF Bilateral Joint Research Project (Japan–Korea)

2025-2027





8,798



12,499

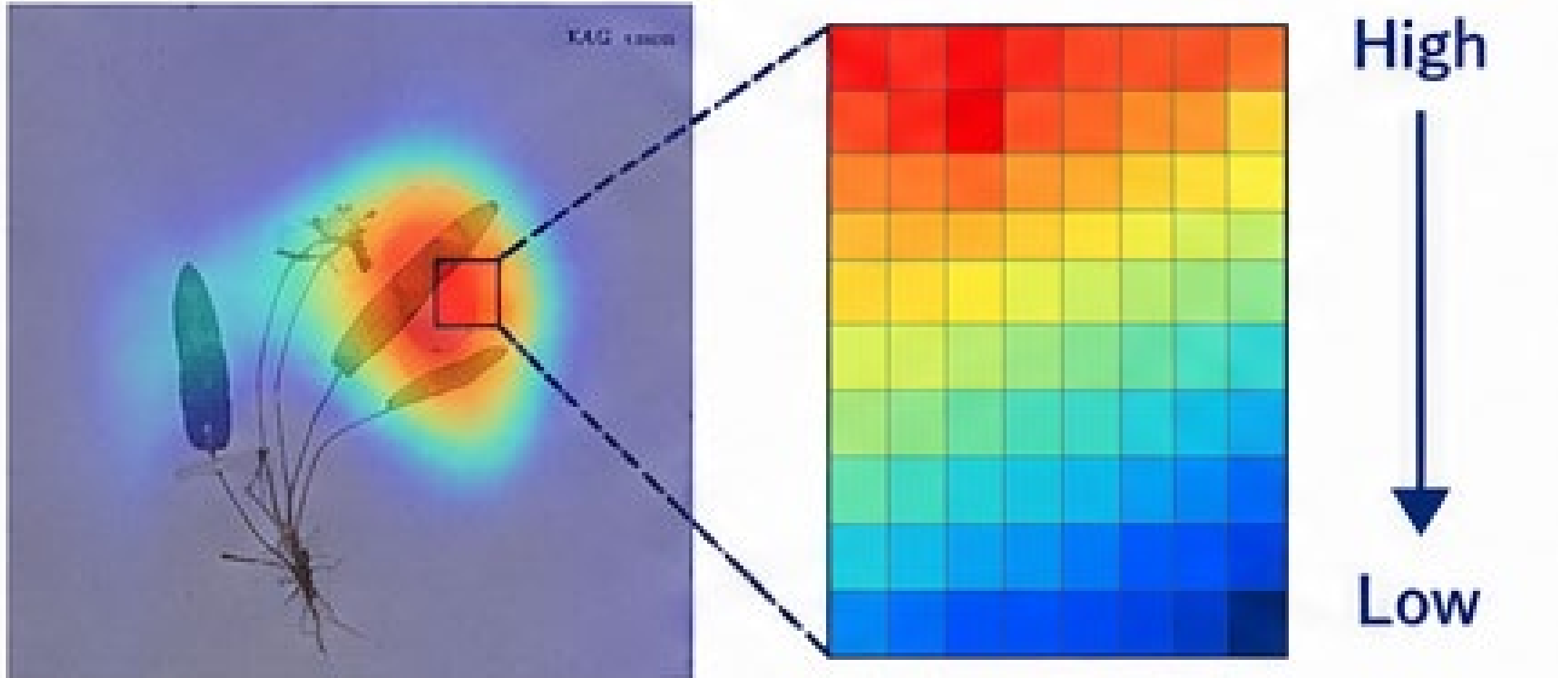
72 taxa

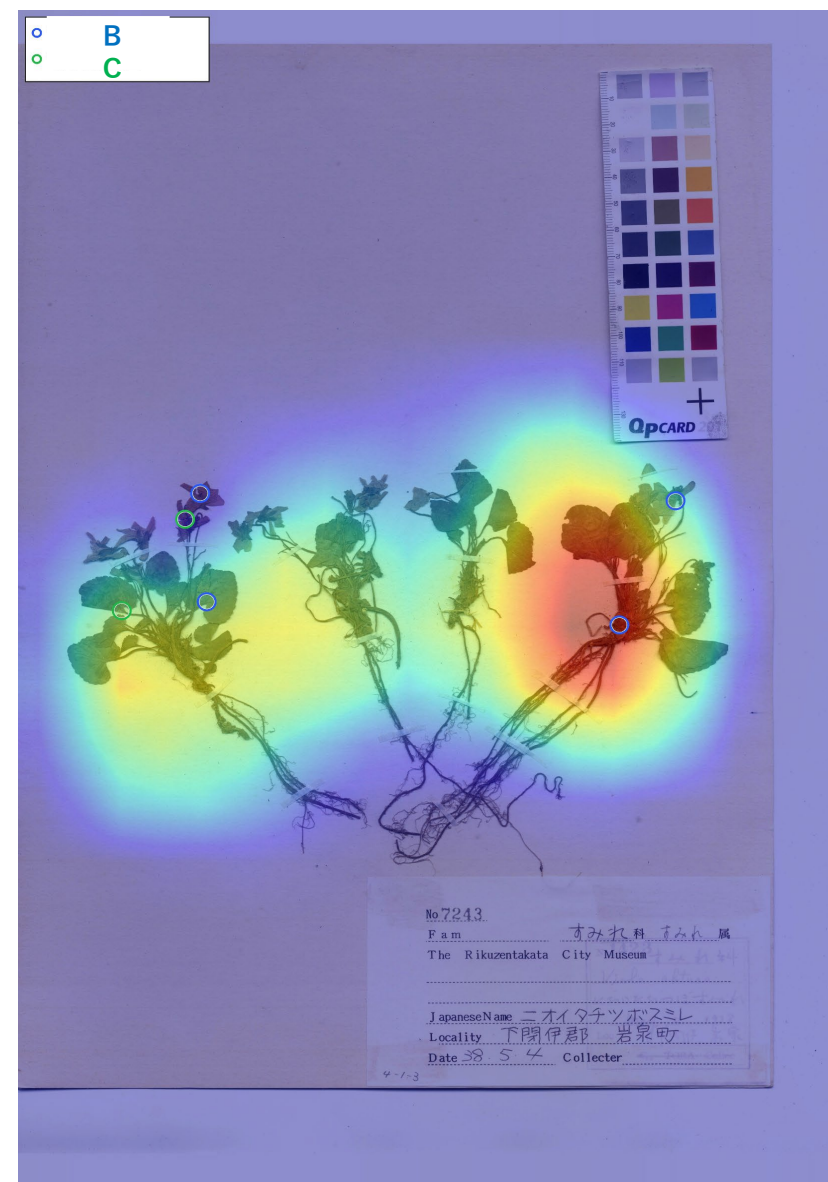
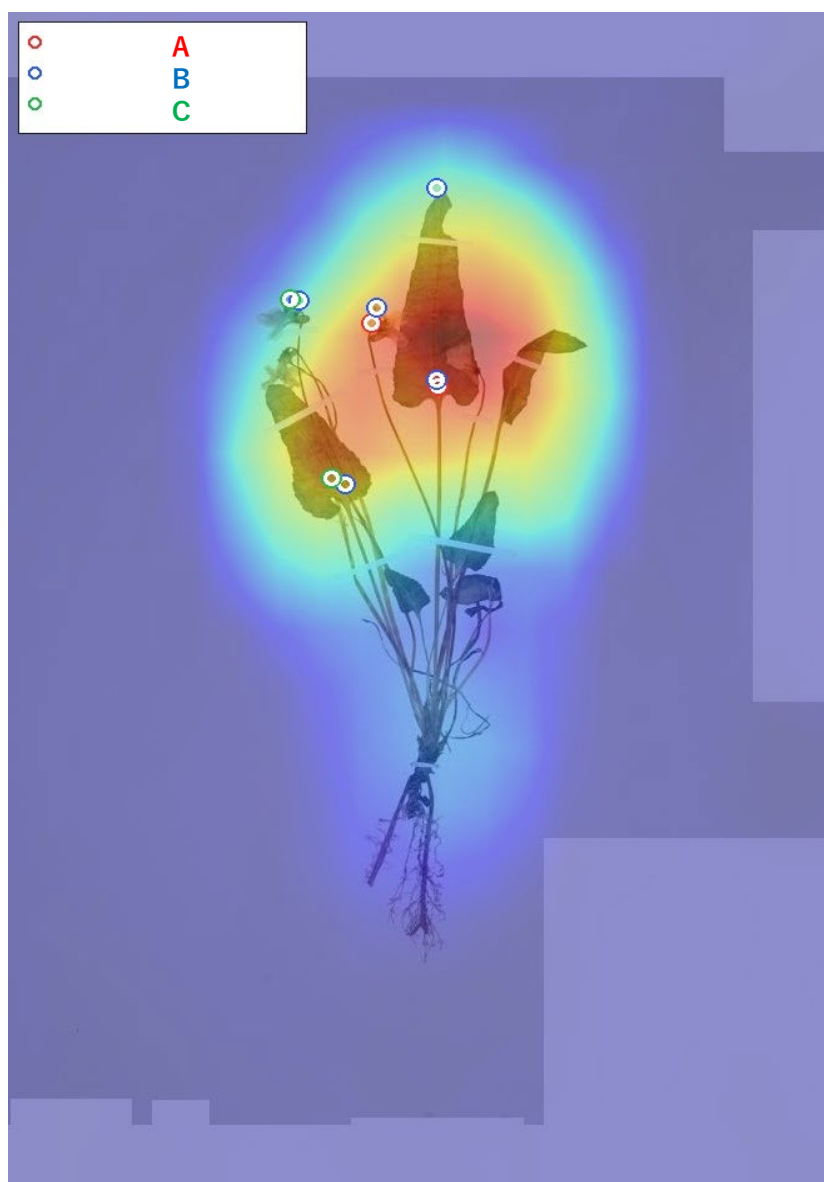
Total 21,297 specimens

Grad-CAM analysis

A method that shows, in color, **which parts of an image the AI focused on when making its decision.**

AI가 판단할 때 이미지의 어느 부분을 주로 보았는지를 색으로 보여주는 방법입니다.





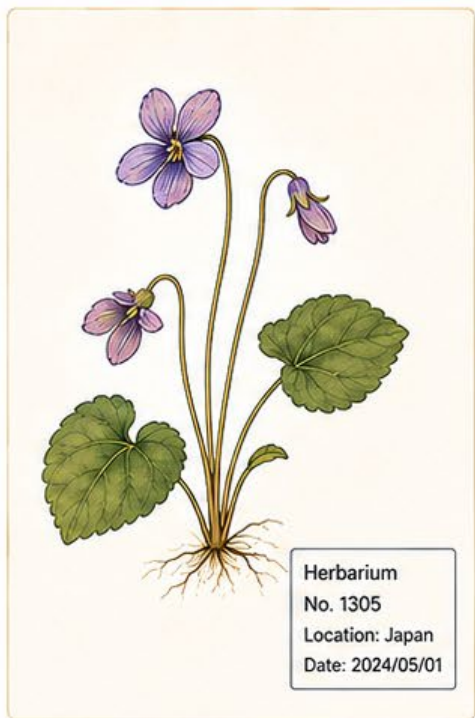
What Is Occlusion Analysis?

오클루전 분석이란?

How AI checks 'what the model is looking at'

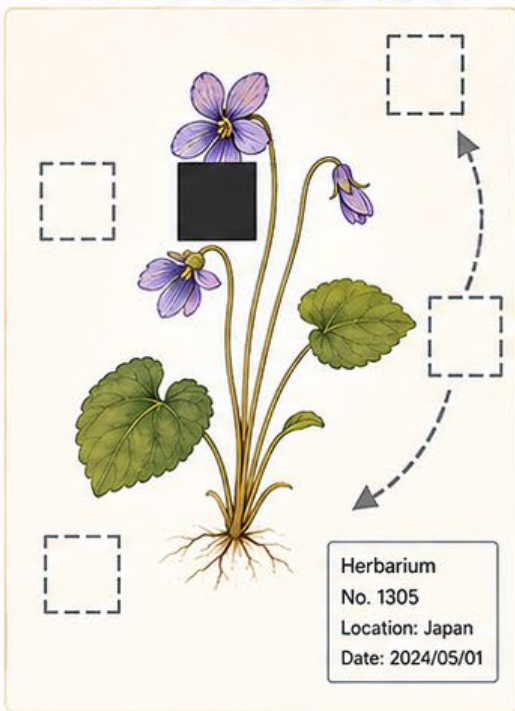
AI가 모델이 어디를 보고 있는지 확인하는 방법

1. Original image 원본 이미지



AI predicts the plant species.
AI가 식물 종을 예측합니다.

2. Hide small parts of the image 이미지의 작은 부분을 가립니다



Move the area slightly
and check each position.
가린 영역을 조금씩 옮기며
각 위치를 확인합니다.

3. Observe changes in the prediction 예측의 변화를 관찰합니다

Not hidden (original image)
가리지 않음 (원본 이미지)

Prediction confidence
예측 확신도 **95%**

0% 50% 100%

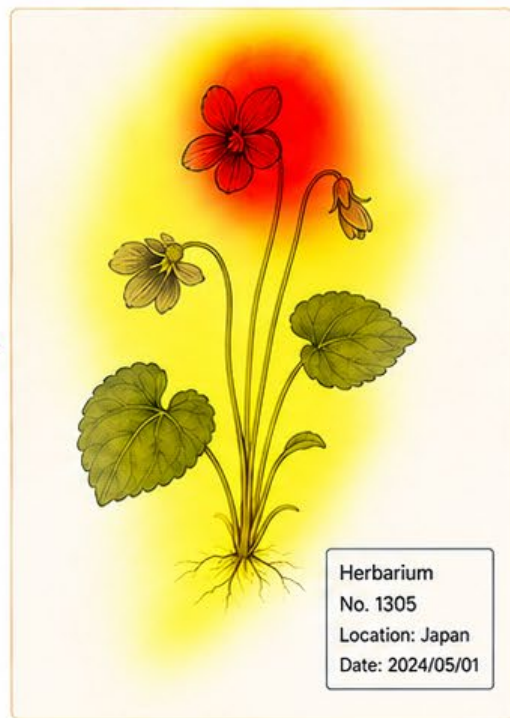
Hidden (example)
가림 (예시)

Prediction confidence
예측 확신도 **28%**

0% 50% 100%

Find areas where hiding
causes a large drop in
confidence.
가렸을 때 확신도가 크게
떨어지는 영역을 찾습니다.

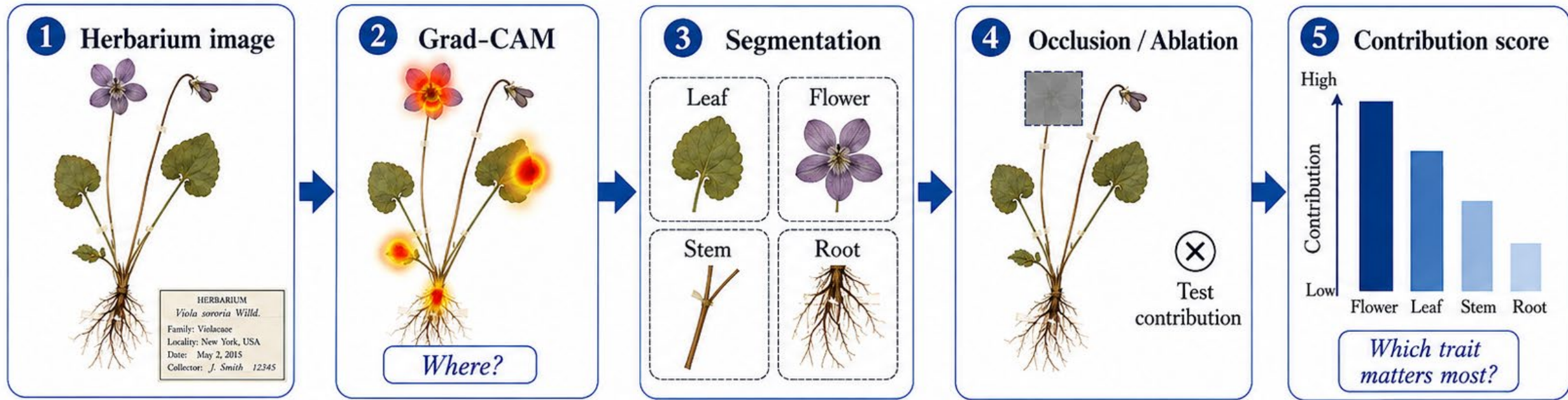
4. Visualize important areas 중요한 영역을 시각화합니다



Where confidence drops
the most = important for AI.
확신도가 가장 많이 떨어지는 곳
= AI에 중요한 영역

Next Step: From 'Where?' to 'Which Trait?'

How can we identify the biological traits actually used by AI?



What we know now

- Important regions have been narrowed down.
- Multiple plant units contribute.
- Species-level neighbors remain stable.



What comes next

- Segment biologically meaningful organs.
- Test each organ by occlusion / ablation.
- Link AI evidence to plant traits.



Major progress on the 'where' question — the next goal is to identify the exact biological traits used for species recognition.

Collaborators

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