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Plant species identification: can botanists and eXplainable AI agree?



Towards automatic plant morphological trait identification

Objective

To set up the construction of a large and comprehensive dataset of morphological plant traits to make image-based automatic plant species identification more akin to human botanists.

Method

We have set up a method to parse species descriptions from online sources in a fully automatic way. To evaluate the results, we asked three botanists to provide systematic morphological descriptions for a varying number of plant species. We organized a workshop in Wageningen with botanists and computer scientists to share and discuss the results and future steps.

Results

We have set up a method to parse species descriptions from online sources in a fully automatic way. This was done by training a natural language AI model to distinguish between species description versus other types of text, followed by a filtering using botanical and zoological glossaries. To evaluate the results, such as those shown in Figure 1, we asked three botanists to provide systematic morphological descriptions for a varying number of plant species. We organized a workshop in Wageningen with 16 botanists and computer scientists to share and discuss the results and future steps.

Impact

This work allowed to connect botanists and computer scientists to discuss the challenges and opportunities for this synergy. Our preliminary results were very well received by the botanists and other experts, including the PI@ntNet team, that assisted to the workshop. It has triggered an initiative to write a paper in collaboration with them on the topic and put further developments in the pipeline. Different organizations outside of WUR also

	black	brown	red	orange	yellow	white	green	blue	purple
black	41	1	1	0	0	0	1	0	0
brown	0	12	1	4	4	1	0	0	0
red	0	0	29	0	0	0	0	0	0
orange	1	1	1	14	10	0	0	0	0
yellow	0	1	2	0	11	1	0	0	0
white	1	0	0	0	0	1	0	0	0
green	1	0	1	6	0	1	11	0	0
blue	0	0	0	0	0	0	0	1	0
purple	0	1	1	0	3	0	0	0	6

Figure1 Comparison of fruit colors and shapes for multiple species of palms annotated by experts (Actual) and automatically extracted with our method (Predicted).

showed interest on the results, providing the option for future collaborations.

Future plans

In collaboration with several of the workshop attendees we plan to perform a more systematic evaluation of the current results for a publication and to continue the development of the method.

Further information

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