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FLORES: identifying flowers by image content

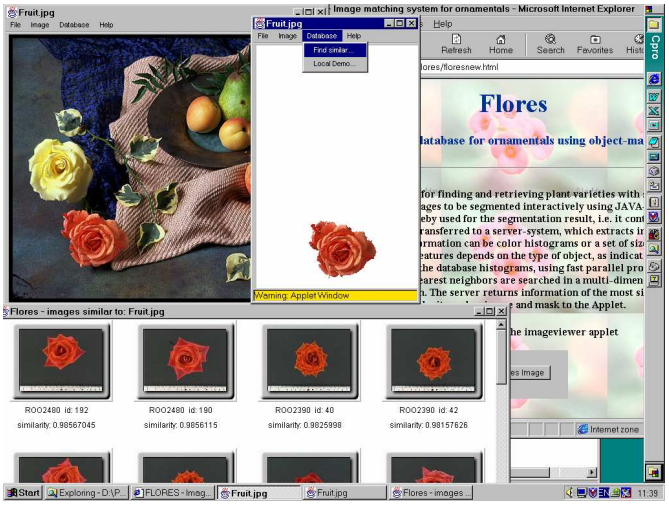
Introduction

For auctions and plant variety testing, flowers need to be identified and compared. This is typically done by an expert. We try to develop a system to automatically compare an image of a flower with stored images of known varieties and retrieve the most similar ones.

Image database FLORES

The image database prototype consists of a collection of color images of rose varieties. The user can compare a local image with the images in the database. After the image is loaded in the web browser, the user can indicate the object of interest, using several semi-interactive segmentation and selection tools.

Two approaches are available for feature extraction and object matching. The first approach uses size, shape and color features and assumes standardized recording. The second approach uses only features that are invariant to size and light intensity, so unstandardized pictures can be used.

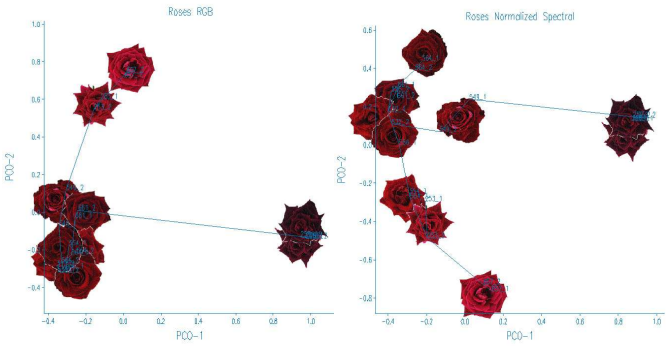


A screendump of FLORES: in a web browser, the user can load any image and interactively select the flower. Images containing the most similar flowers are returned by the database.

Spectral imaging

Color is one of the most prominent features for ornamentals. The observed color is not only dependent on the object, but also on light source and camera (optics, filters, sensor). For an internationally exchangeable reference collection of ornamentals, images need to be calibrated. Recording of the visible part of the photonic spectrum in narrow bands (spectral imaging) allows such a calibrated color description.

Spectral imaging increases the amount of data considerably. Using straightforward feature dimension reduction (PCA) and histogram cross correlation, an increased number of clusters can be discerned compared to RGB-images, as is shown in the Principal Coordinates plots below.



In a two-dimensional representation of distances between images, RGB images (left) show less discernable clusters than spectral images (right).

Conclusions

Spectral imaging allows calibration, making flower color invariant of recording equipment.
Using simple similarity measures, spectral images of flowers proved to be superior to RGB images.
The aim is to develop feature descriptors and similarity measures that will further increase the precision and recall of FLORES.

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