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Interactive Dimension Reduction with Explainable Deep Learning for Image Sorting

Problem
Dimension reductions (DR’s) provide 2D organizations of images based on visual features. However, the DR layout may not match the given task.

Images of Soybeans:
- Initial Layout
- Interaction
- Updated Layout
- Diseased Pod
- Ready-to-Harvest Pod
- Late-to-Harvest Pod

Images of Animals:
- Initial Layout
- Interaction
- Updated Layout
- Visual Explanations Before and After Interaction

We use RESNET-18 to extract high dimensional features from images and adapt Bojarski et al.’s visual backpropagation method to create visual explanations of features of importance under the current DR.

The images of soybeans fall into three categories: ready-to-harvest, late-to-harvest, and diseased. The user interaction aims to teach the projection how to differentiate between the three categories.

The data contains 5 types of animals, some with humans in the picture. The interaction aims to teach the projection how to differentiate between images with and without humans.

References