Active Segmentation plugin for tissue and cell structures segmentation

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Motivation

Some cell types have complex shapes that are difficult to segment using conventional approaches because of inhomogeneities of the tissue texture and dispersion of light.

Thresholding is Tricky

Conventional approaches, such as thresholding, handle well only cells with small contrast variation

Thresholding can not be standardized.

Our Solution

Generic framework for Image classification, segmentation and object detection.

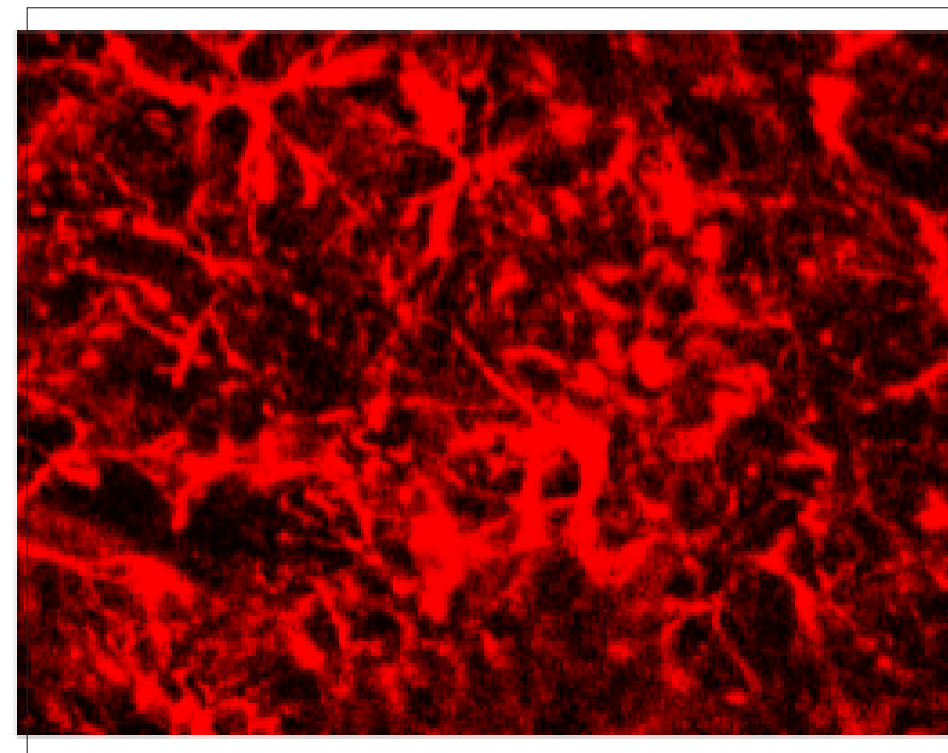Geometry could exhibit distinct fingerprints for different cell types.
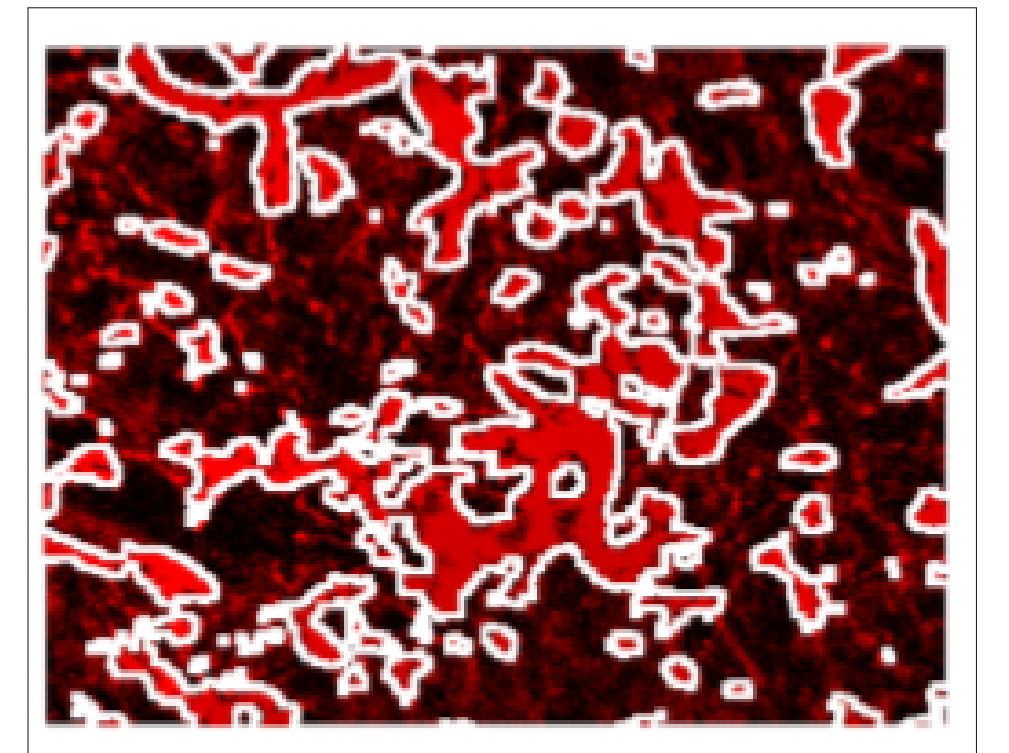
Work-flow

Learning By Example
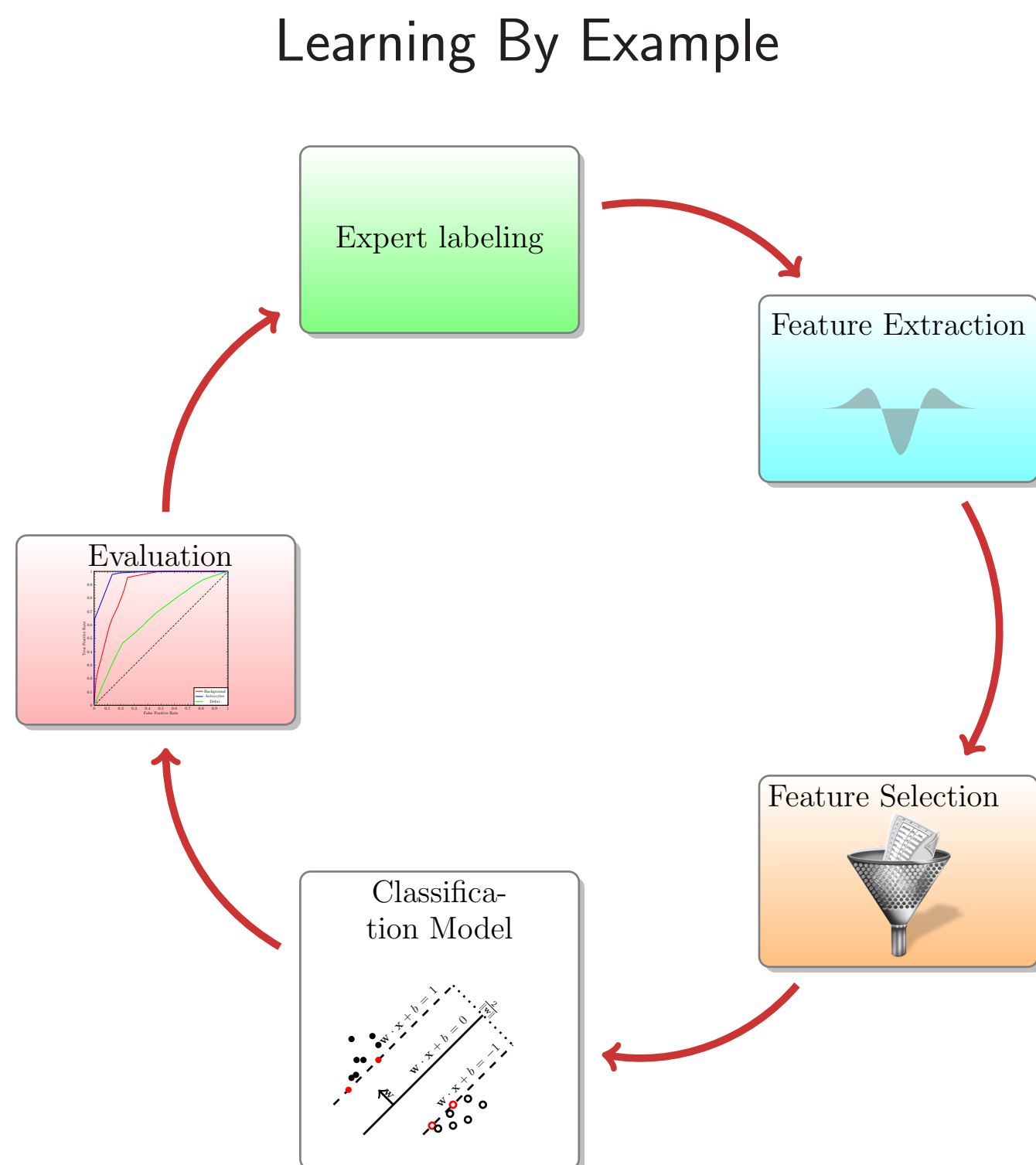
Results

Examples are given by two data sets: confocal microscopic images of astrocytes and microglial cells. The accuracy of segmentation is 75 % and 90 % for astrocytes and microglia dataset, respectively.

► Segmentation not limited to specific cell type.
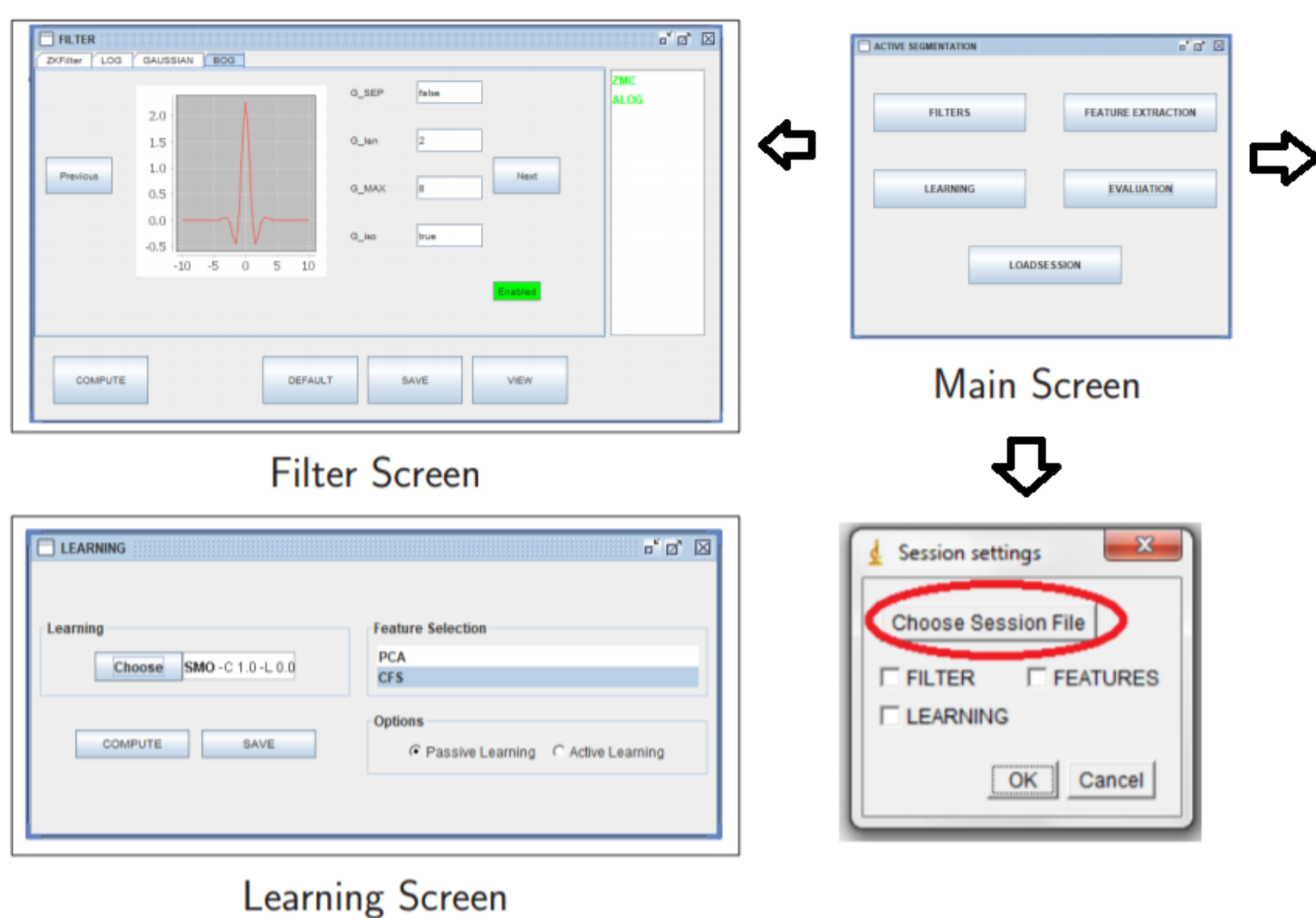
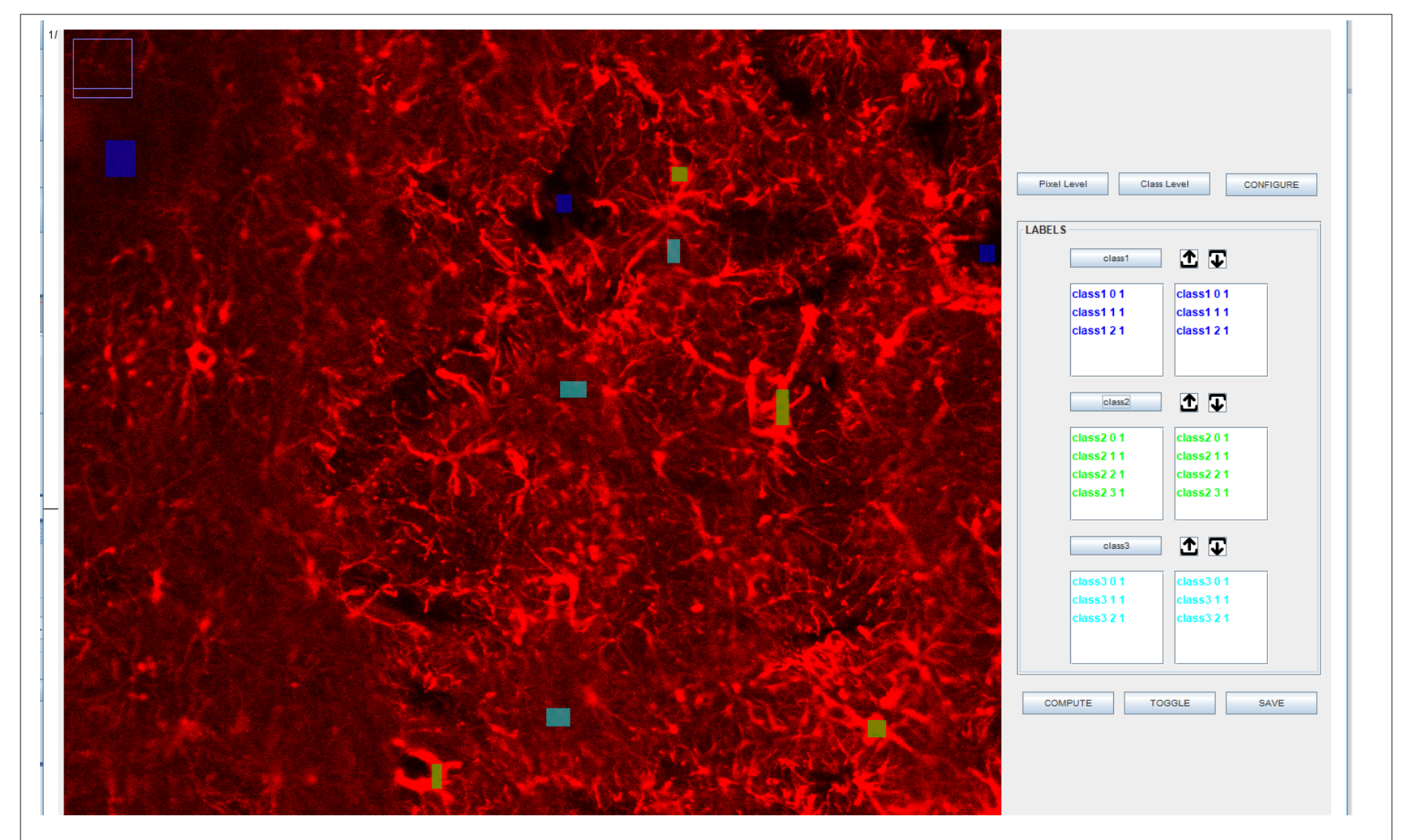► Platform supports additional Filter and Classifier types

Astrocytes

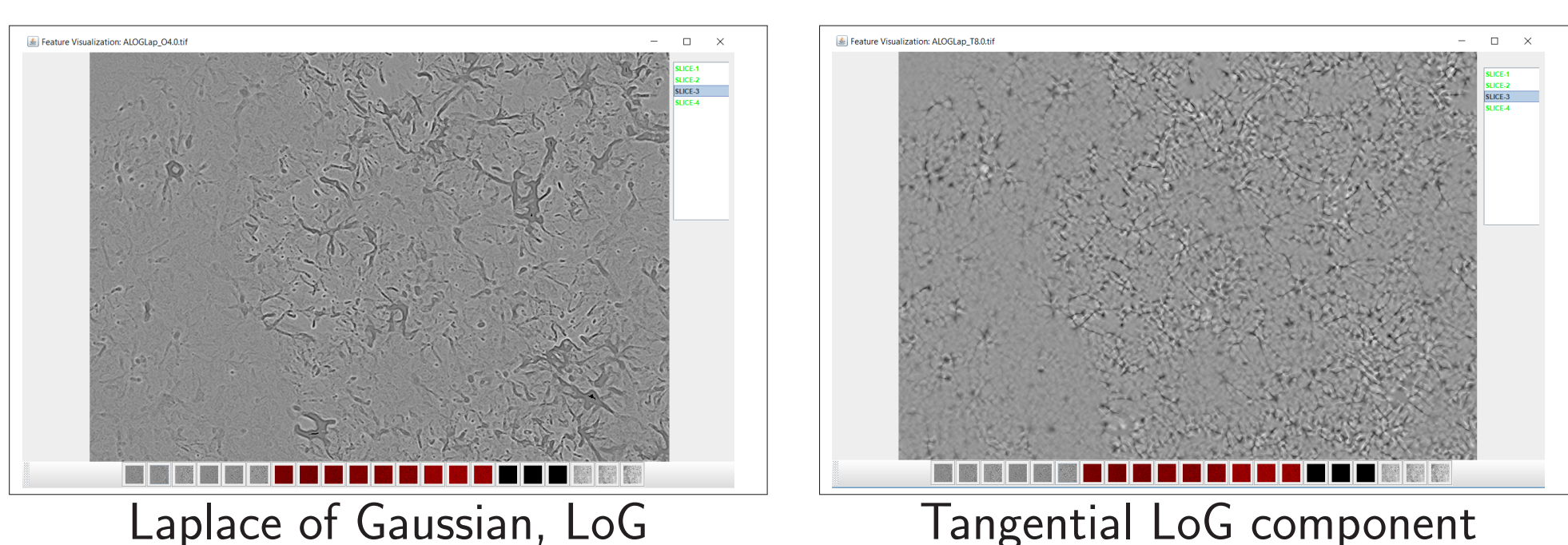Astrocytes Classification

Expert-Guided Segmentation

Filter Screen

Main Screen

Session settings — Choose Session File — ☐ FILTER ☐ FEATURES ☐ LEARNING — OK Cancel

Learning Screen

Training interface

Feature Space Visualization

The tool allows one to visualize filter output for each slice and along various scale also showing selected region of interest.

Laplace of Gaussian, LoG

Tangential LoG component

Cell Morphology and Filter Output

Features

Features	Weka Segmentation	Active Segmentation
Custom Filters	—	✓
Image Classifier	—	✓
Metadata	—	✓
RAM Usage	High	Low

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Downloads: https://sumit3203.github.io