

Overview:

The ROI-Class software application is an add-on module that extends the manual capabilities of the ROI-Manage browser-based application by generating automatic classifications of images that were collected by the CPICS family of instruments. The manually classified Region Of Interest (ROI) Training Sets created in the ROI-Manage application are used by ROI-Class to build classifiers based on state-of-the-art machine learning algorithms such as Support Vector Machines, Random Forests, or Deep Neural Nets. The user can also select from several types of machine vision feature extractors to form descriptors that can represent the image in various ways for the training and execution of the classifiers.

Features:

- Selection of features to be extracted from the ROIs such as texture, shape, color, and morphology
- Selection of the training sets to be analyzed
- Selection of the classifier to run over the ROI features (e.g., Support Vector Machine, Random Forest, CDNN)
- Extraction and storage in the data base of features separately from classification (e.g., batch extraction of features from a large ROI set)
- Validation of classifier models against a separate manually annotated test set of ROIs using K-fold Validation
- Creation of Confusion Matrices, canonical analyses, ROC curves, and other characterization statistics of the classifier model
- Classify novel (unclassified) ROIs from the stored image data base or from an image stream in real-time

Accessible from anywhere:

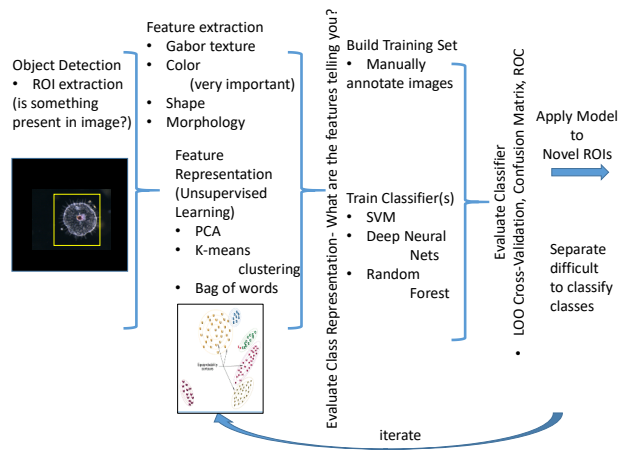
Because of its thin-client architecture, users can access ROI-Class from any web-enabled device anywhere in the world where there is an Internet connection.

Manual Class	Classification Confusion Matrix															Num Images	Percent Correct
	Buranga	Meseri	Noctiba	Noctiba	Thymos	Thymos	Thymos	Thymos	Thymos	Thymos	Thymos	Thymos	Thymos	Thymos	Thymos		
Buranga	337	4	0	1	0	1	0	0	0	0	0	0	0	0	0	359	93.87
Meseri	2	252	0	0	3	1	0	0	0	0	0	0	1	0	0	260	96.92
Noctiba	2	7	303	5	7	6	0	8	14	0	1	7	0	0	3	429	85.08
Noctiba_yellow	4	9	0	264	3	2	1	0	1	0	0	0	0	0	0	284	92.96
Thymos	1	2	0	0	209	1	0	1	0	0	0	1	0	0	1	276	97.46
Thymos_mimic	0	0	0	0	0	83	0	0	0	0	0	0	0	0	0	83	100.00
Thymos_mimic_linear	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	50	100.00
Thymos	0	9	0	0	0	1	0	280	7	0	0	3	0	4	0	304	92.11
Thymos	2	3	1	0	0	1	0	0	233	0	0	2	0	1	0	243	95.88
Thymos	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	100.00
Thymos	0	0	0	0	0	0	0	0	0	0	0	46	0	0	0	46	100.00
Thymos	2	3	0	0	1	1	0	0	0	0	0	152	0	0	0	159	95.60
Thymos	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	100.00
Thymos	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	31	100.00
Thymos	6	0	2	0	0	1	0	0	7	0	1	2	0	347	1	367	94.55
Thymos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	56	100.00

Confusion matrix for random forest classifier results on 16 classes

Available IT support:

The ROI-Class software may either operate on a local server or on a cloud-based server at the location of CoastalOceanVision Inc., reducing local system maintenance needs. The main advantages of this service are the automatic updates of the software as feature extraction and classification code improves, and the elimination of the need to maintain a local server and image databases.



Flow chart showing various stages of analysis

Product specifications subject to change without notice.

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