

SIBGRAPI '16


UCDB Universidade Católica Dom Bosco
Instituição Salesiana de Educação Superior

Using Color for Fish Species Classification

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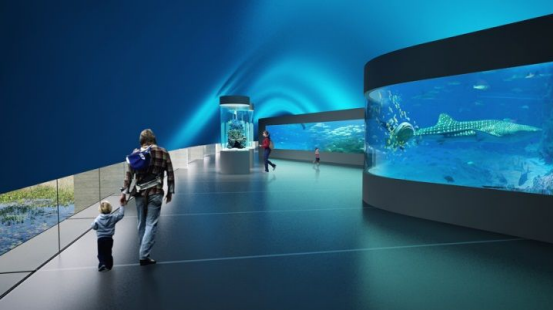
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Marcelo Rafael Borth - IFPR

Hemerson Pistori - UCDB

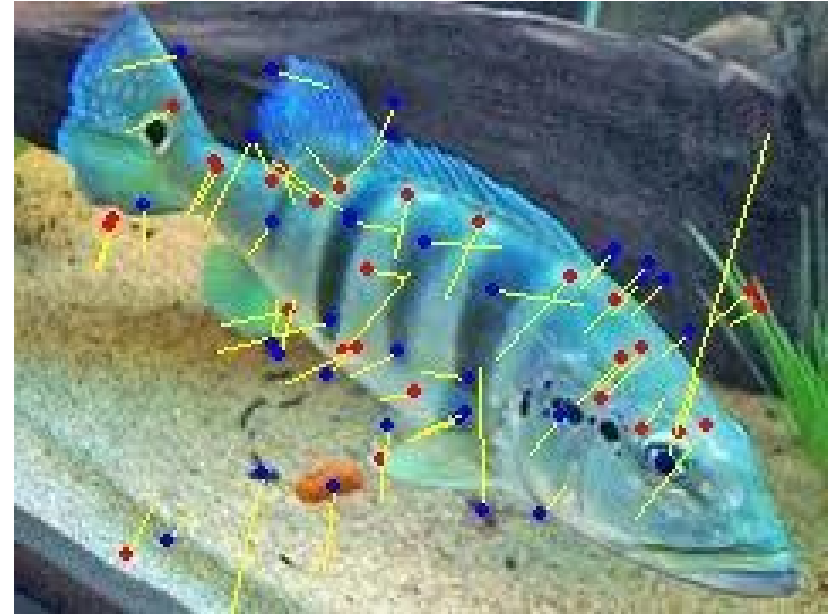
Center for Research and Ichthyofauna Rehabilitation – CEPRIC



- Campo Grande, Mato Grosso do Sul, Brazil
- 17.000 square meters
- 16 large aquariums
- 4.275.000 liters of water
- 263 species of aquatic fauna

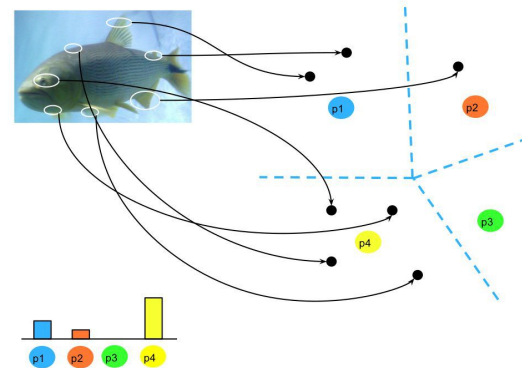
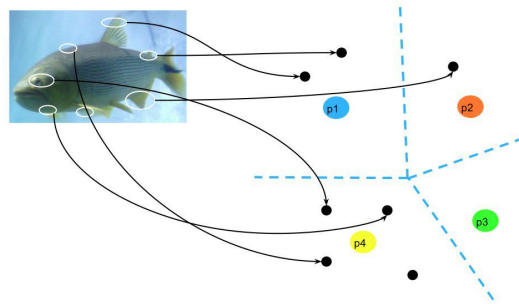
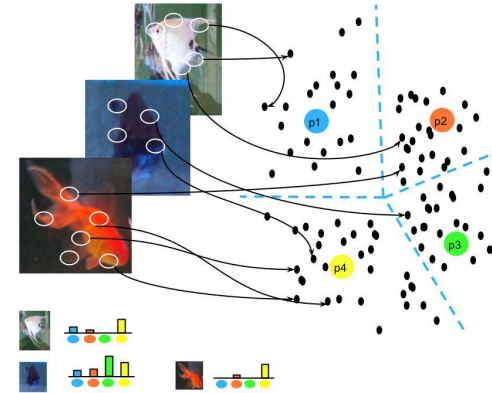
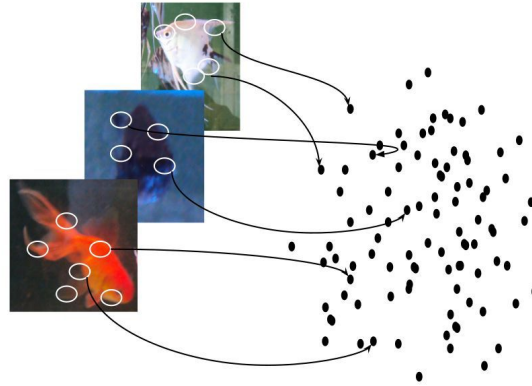
Keypoints Extraction Using SURF

Key points found in the image of a fish using SURF

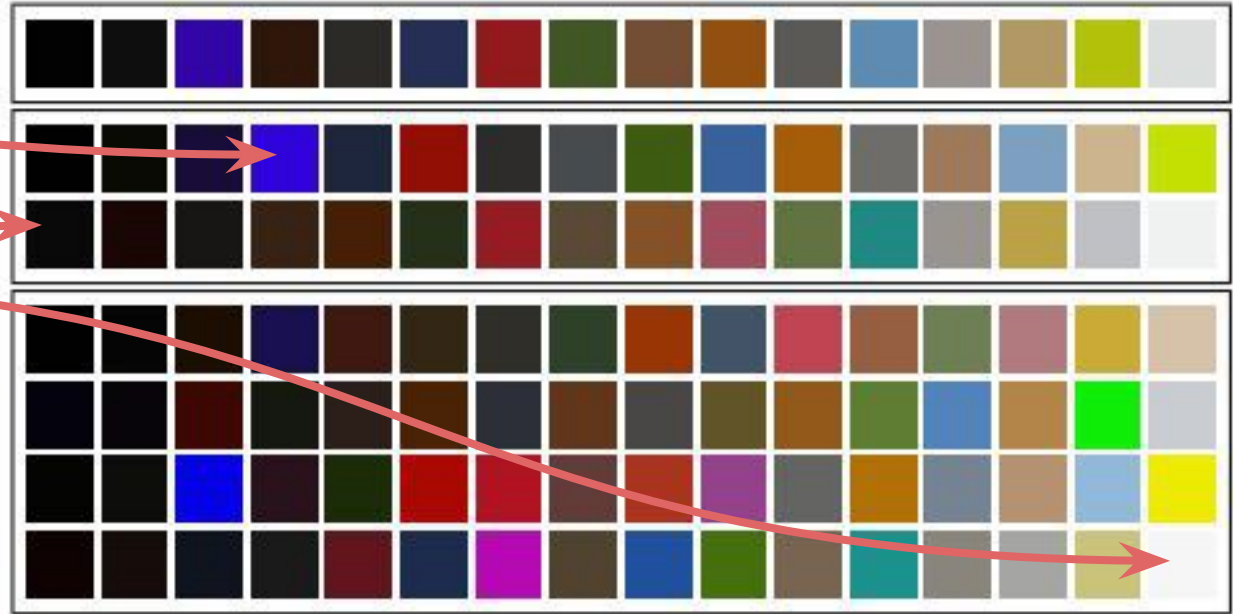
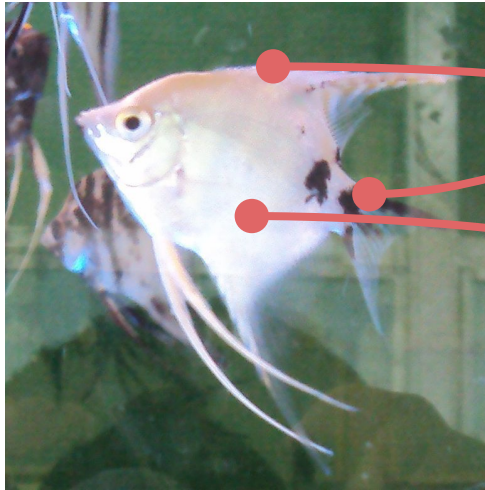


Bag of Visual Words - BoVW

Example of use of
the BoVW in
images



Bag of Color - BoC



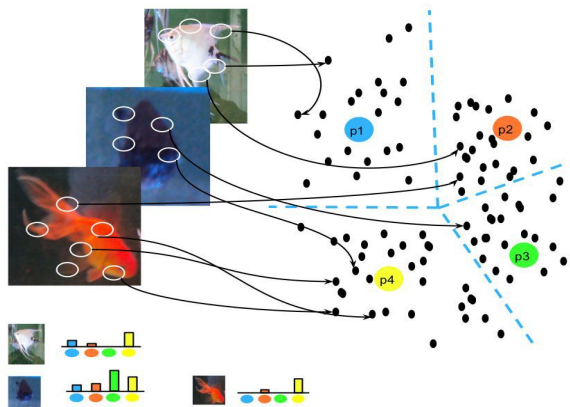
Bag of Colors palette

Color Histogram - HSV - RGB

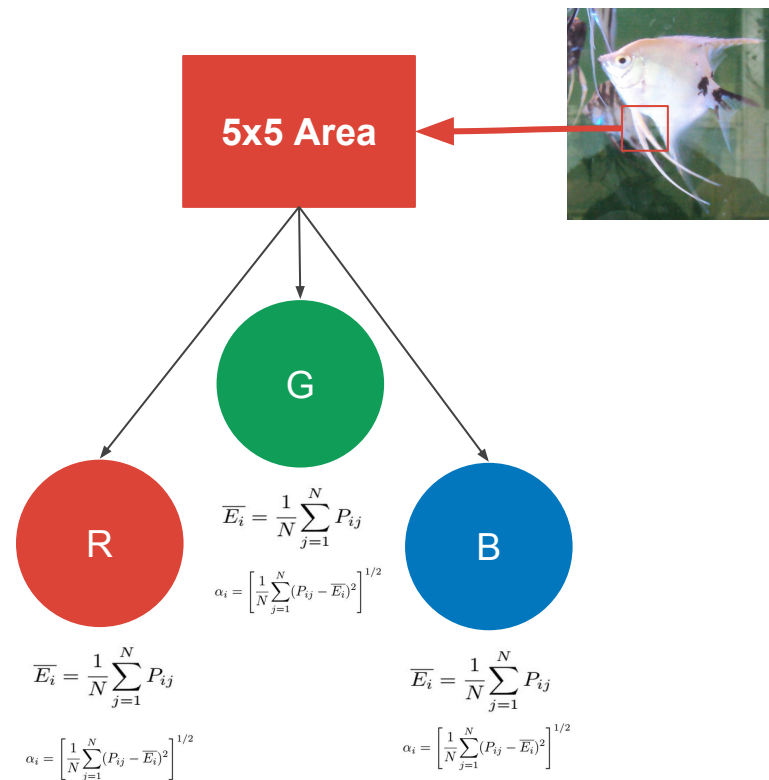


HSV and RGB Color Histogram

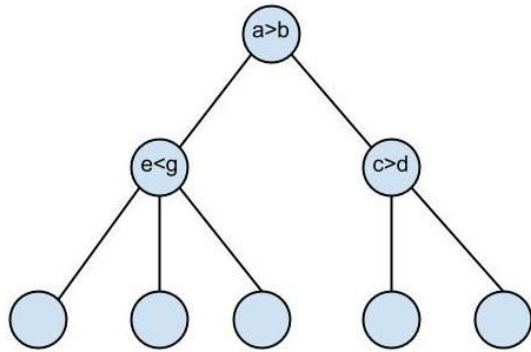
Bag of Features and Colors - BoFC



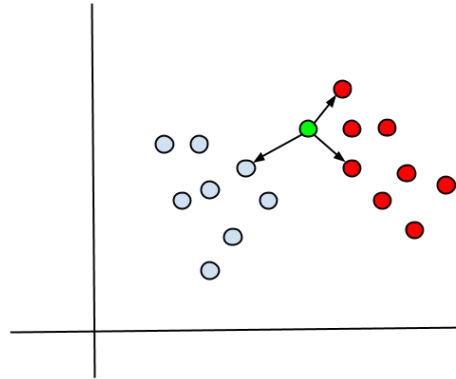
BoVW



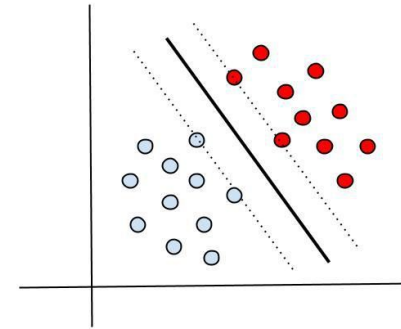
Classifiers



Tree decision
C4.5



KNN



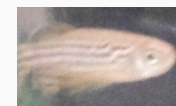
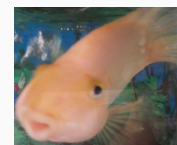
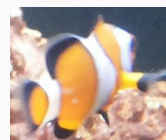
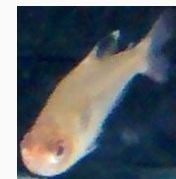
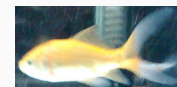
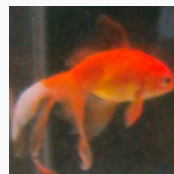
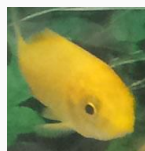
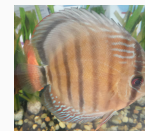
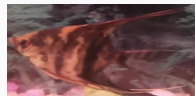
SVM

Dataset Samples

- 28 fish species

- 40 images for each fish specie

- 1120 images in total























Results

Extractor	C4.5	KNN	SMO
BoVW	0.466	0.331	0.713
BoC	0.842	0.807	0.923
BoFC	0.662	0.603	0.873
Color Histogram - HSV	0.842	0.877	0.941
Color Histogram - RGB	0.823	0.826	0.926

F-Measure comparison of each classifier

Results

										Classified as
39	0	0	0	1	0	0	0	0	0	 Acará Bandeira
3	37	0	0	0	0	0	0	0	0	 kinguio
3	0	37	0	0	0	0	0	0	0	 Molinésia Preta
0	0	0	40	0	0	0	0	0	0	 Platy Sangue
2	0	1	0	37	0	0	0	0	0	 Tricogaster
0	0	0	0	0	39	0	0	1	0	 Lambari Tambiu
0	0	0	0	0	0	39	0	0	1	 Oscar
0	0	0	0	0	3	1	35	1	0	 Pacu
0	0	0	0	0	1	0	0	35	4	 Piau Três Pintas
0	0	0	0	0	1	0	0	1	38	 Tucunaré

Confusion matrix of species using F-Measure: SVM + HSV Color Histogram.

App PantanAlbum

