

Woody Plant Encroachment in a Seasonal Tropical Savanna: Lessons About Classifiers and Accuracy From UAV Images

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S1. Confusion matrix and results of each class of land cover: *Trembleya parviflora* ([1]); *Baccharis retusa* – wood ([2]); *Baccharis retusa* – green canopy ([3]), Shadow ([4]) and Others ([5]) for two seasons (wet and dry) from three machine learning classifiers. RGB refers to red, green, and blue bands; IDXRGB refers to the green leaf index and green-red difference index; CHM refers canopy height model; Mult refers to Multispectral bands; Text refers to texture metric; Stru refers to structural metric; IDXMult refers to normalized difference vegetation index (NDVI) and normalized difference red edge index (NDRE) indexes; and PCA refers to the six principal components of all bands.

Wet season

Support Vector Machine

RGB + IDXRGB + CHM

[1] [2] [3] [4] [5]

[1] 21 0 1 1 1

[2] 0 25 5 1 0

[3] 3 1 22 0 6

[4] 0 0 0 35 0

[5] 3 1 2 0 22

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.777778

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.875

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.823529

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.925926

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.806452

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.862069

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.733333

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.6875

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.709677

2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.945946
2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 1
2022-08-12 20:43:13 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.972222
2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.758621
2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.785714
2022-08-12 20:43:13 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.7719
2022-08-12 20:43:13 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.791063

RGB + IDXRGB + CHM + Text

[1] [2] [3] [4] [5]

[1] 29 0 1 1 1

[2] 0 28 4 0 4

[3] 2 3 19 0 6

[4] 2 0 0 18 3

[5] 1 3 5 1 17

2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.852941
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.90625
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.878788
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.823529
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.777778
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.8
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.655172
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.633333
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.644068
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.9
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.782609
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.837209
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.548387
2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.62963

2022-08-12 20:49:10 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.586207

2022-08-12 20:49:10 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.685739

RGB + IDXRGB + CHM + Stru

[1] [2] [3] [4] [5]

[1] 24 0 2 1 2

[2] 1 15 6 0 7

[3] 1 2 13 0 8

[4] 0 0 0 33 1

[5] 1 0 6 1 25

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.888889

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.827586

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.857143

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.882353

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.517241

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.652174

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.481481

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.541667

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.509804

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.942857

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.970588

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.956522

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.581395

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.757576

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.657895

2022-08-12 20:54:11 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.6711

Mult + IDXMult + CHM + Text

[1] [2] [3] [4] [5]

[1] 29 0 1 1 4

[2] 1 17 2 0 10

[3] 0 3 19 2 10

[4] 0 1 1 20 3

[5] 3 1 4 2 15

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.878788

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.828571

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.852941

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.772727

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.566667

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.653846

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.703704

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.558824

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.622951

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.8

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.8

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.8

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.357143

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.6

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.447761

2022-08-12 20:59:00 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.58967

Mult + IDXMult + CHM + Stru

[1] [2] [3] [4] [5]

[1] 23 0 1 0 8

[2] 0 18 5 3 4

[3] 0 2 17 5 5

[4] 0 3 3 15 7

[5] 4 2 4 0 20

2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.851852

2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.71875

2022-08-12 21:03:03 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.779661
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.72
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.6
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.654545
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.566667
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.586207
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.576271
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.652174
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.535714
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.588235
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.454545
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.666667
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.540541
2022-08-12 21:03:03 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.529995

Mult + Text + Stru

[1] [2] [3] [4] [5]

[1] 26 0 1 2 4

[2] 1 27 4 0 2

[3] 6 0 15 1 5

[4] 2 0 0 24 2

[5] 5 2 2 3 15

2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.65
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.787879
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.712329
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.931034
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.794118
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.857143
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.681818
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.555556
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.612245

2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.8
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.857143
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.827586
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.535714
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.555556
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.545455
2022-08-12 21:06:51 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.646541

PCA

[1] [2] [3] [4] [5]

[1] 32 0 1 2 1

[2] 1 17 6 0 4

[3] 0 3 18 1 3

[4] 1 0 2 27 0

[5] 2 2 4 1 22

2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.888889
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.888889
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.888889
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.772727
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.607143
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.68
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.580645
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.72
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.642857
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.870968
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.9
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.885246
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.733333
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.709677
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.721311
2022-08-12 21:11:19 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.715925

Decision Tree

RGB + IDXRGB + CHM

[1] [2] [3] [4] [5]

[1] 23 0 0 0 1

[2] 0 27 3 1 0

[3] 2 3 26 0 1

[4] 0 0 0 34 1

[5] 3 4 1 0 20

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.821429

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.958333

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.884615

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.794118

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.870968

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.830769

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.866667

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.8125

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.83871

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.971429

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.971429

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.971429

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.869565

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.714286

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.784314

2022-08-17 10:52:44 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.832823

RGB + IDXRGB + CHM + Text

[1] [2] [3] [4] [5]

[1] 29 0 1 2 0

[2] 0 27 6 0 3

[3] 0 3 26 0 1

[4] 2 1 1 19 0

[5] 1 2 4 0 20

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.90625

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.90625

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.90625

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.818182

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.75

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.782609

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.684211

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.866667

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.764706

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.904762

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.826087

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.863636

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.833333

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.740741

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.784314

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.770622

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: mapOfIndicesValid[0] = 1

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: mapOfIndicesValid[1] = 2

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: mapOfIndicesValid[2] = 3

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: mapOfIndicesValid[3] = 4

2022-08-17 10:58:07 (INFO) TrainVectorClassifier: mapOfIndicesValid[4] = 5

RGB + IDXRGB + CHM + Stru

[1] [2] [3] [4] [5]

[1] 26 0 1 0 2

[2] 1 23 5 0 0

[3] 0 4 19 0 1

[4] 0 0 0 34 0

[5] 2 2 1 0 28

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.896552

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.896552

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.896552

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.793103

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.793103

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.793103

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.730769

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.791667

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.76

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 1

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 1

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 1

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.903226

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.848485

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.875

2022-08-17 11:00:30 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.840201

Mult + IDXMult + CHM + Text

[1] [2] [3] [4] [5]

[1] 26 0 2 1 6

[2] 0 23 2 0 5

[3] 4 2 21 0 7

[4] 0 0 0 23 2

[5] 2 4 2 0 17

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.8125

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.742857

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.776119

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.793103

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.766667

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.779661

2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.777778
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.617647
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.688525
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.958333
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.92
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.938776
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.459459
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.68
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.548387
2022-08-17 11:03:00 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.672951

Mult + IDXMult + CHM + Stru

[1] [2] [3] [4] [5]

[1] 22 1 2 4 3

[2] 2 22 3 2 1

[3] 2 8 17 2 0

[4] 0 5 1 17 5

[5] 6 1 1 0 22

2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.6875
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.6875
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.6875
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.594595
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.733333
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.656716
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.708333
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.586207
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.641509
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.68
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.607143
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.641509
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.709677

2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.733333
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.721311
2022-08-17 11:05:38 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.588467

Mult + Text + Stru

[1] [2] [3] [4] [5]

[1] 25 0 3 0 5

[2] 0 31 2 0 1

[3] 3 0 18 0 6

[4] 5 0 0 22 1

[5] 9 0 3 0 15

2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.595238
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.757576
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.666667
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 1
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.911765
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.953846
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.692308
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.666667
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.679245
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 1
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.785714
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.88
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.535714
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.555556
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.545455
2022-08-17 11:08:00 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.679878

PCA

[1] [2] [3] [4] [5]

[1] 34 0 0 1 1

[2] 0 20 3 1 4

[3] 0 4 18 1 2

[4] 1 0 1 28 0

[5] 1 3 6 0 21

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.944444

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.944444

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.944444

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.740741

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.714286

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.727273

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.642857

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.72

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.679245

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.903226

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.933333

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.918033

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.75

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.677419

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.711864

2022-08-17 11:10:15 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.75766

Random Forest

RGB + IDXRGB + CHM

[1] [2] [3] [4] [5]

[1] 24 0 0 0 0

[2] 0 30 0 1 0

[3] 3 3 26 0 0

[4] 0 0 0 35 0

[5] 3 1 0 0 24

2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.8

2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 1
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.888889
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.882353
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.967742
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.923077
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 1
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.8125
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.896552
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.972222
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 1
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.985915
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 1
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.857143
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.923077
2022-08-12 20:40:56 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.908139

RGB + IDXRGB + CHM + Text

[1] [2] [3] [4] [5]

[1] 32 0 0 0 0

[2] 0 36 0 0 0

[3] 0 2 28 0 0

[4] 3 0 0 20 0

[5] 0 4 2 0 21

2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.914286
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 1
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.955224
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.857143
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 1
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.923077
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.933333
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.933333
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.933333

2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 1
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.869565
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.930233
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 1
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.777778
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.875
2022-08-12 20:46:23 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.90614

RGB + IDXRGB + CHM + Stru

[1] [2] [3] [4] [5]

[1] 29 0 0 0 0

[2] 0 25 3 1 0

[3] 2 1 20 0 1

[4] 0 0 0 34 0

[5] 1 2 3 0 27

2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.90625
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 1
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.95082
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.892857
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.862069
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.877193
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.769231
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.833333
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.8
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.971429
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 1
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.985507
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.964286
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.818182
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.885246
2022-08-12 20:52:45 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.8823

Mult + IDXMult + CHM + Text

[1] [2] [3] [4] [5]

[1] 31 0 1 0 3

[2] 0 30 0 0 0

[3] 1 4 27 0 2

[4] 0 0 0 23 2

[5] 1 3 1 1 19

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.939394

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.885714

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.911765

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.810811

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 1

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.895522

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.931034

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.794118

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.857143

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.958333

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.92

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.938776

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.730769

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.76

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.745098

2022-08-12 20:57:47 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.840056

Mult + IDXMult + CHM + Stru

[1] [2] [3] [4] [5]

[1] 31 0 0 0 1

[2] 1 22 4 3 0

[3] 1 3 20 4 1

[4] 1 2 2 20 3

[5] 5 3 2 0 20

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.794872

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.96875

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.873239

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.733333

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.733333

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.733333

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.714286

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.689655

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.701754

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.740741

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.714286

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.727273

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.8

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.666667

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.727273

2022-08-12 21:01:33 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.697547

Mult + Text + Stru

[1] [2] [3] [4] [5]

[1] 31 0 1 0 1

[2] 0 34 0 0 0

[3] 2 1 23 0 1

[4] 3 0 0 25 0

[5] 4 1 6 1 15

2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.775

2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.939394

2022-08-12 21:05:43 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.849315

2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.944444

2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 1

2022-08-12 21:05:43 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.971429
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.766667
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.851852
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.807018
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.961538
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.892857
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.925926
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.882353
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.555556
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.681818
2022-08-12 21:05:43 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.82282

PCA

[1] [2] [3] [4] [5]

[1] 35 0 0 1 0

[2] 0 23 3 0 2

[3] 0 3 20 0 2

[4] 2 0 0 28 0

[5] 1 4 6 0 20

2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.921053
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.972222
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.945946
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.766667
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.821429
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.793103
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.689655
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.8
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.740741
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.965517
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.933333
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.949153

2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.833333
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.645161
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.727273
2022-08-12 21:10:11 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.799476

Dry Season

Support Vector Machine

RGB + IDXRGB + CHM

1] [2] [3] [4] [5]

[1] 14 0 2 2 7

[2] 0 23 5 1 2

[3] 3 3 19 1 11

[4] 1 2 0 26 1

[5] 4 2 3 1 15

2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.636364
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.56
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.595745
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.766667
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.741935
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.754098
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.655172
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.513514
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.575758
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.83871
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.866667
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.852459
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.416667
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.6
2022-08-23 10:53:51 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.491803

2022-08-23 10:53:51 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.569203

RGB + IDXRGB + CHM + Text

[1] [2] [3] [4] [5]

[1] 22 0 4 3 7

[2] 0 20 4 0 3

[3] 1 3 19 2 10

[4] 0 0 2 21 2

[5] 4 2 1 1 17

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.814815

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.611111

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.698413

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.8

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.740741

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.769231

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.633333

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.542857

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.584615

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.777778

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.84

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.807692

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.435897

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.68

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.53125

2022-08-23 10:50:48 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.586945

RGB + IDXRGB + CHM + Stru

[1] [2] [3] [4] [5]

[1] 25 0 3 0 3

[2] 0 15 8 5 3

[3] 2 2 16 0 8

[4] 2 1 1 25 2

[5] 2 1 3 3 18

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.806452

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.806452

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.806452

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.789474

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.483871

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.6

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.516129

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.571429

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.542373

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.757576

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.806452

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.78125

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.529412

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.666667

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.590164

2022-08-23 11:15:50 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.586663

Mult + IDXMult + CHM + Text

[1] [2] [3] [4] [5]

[1] 18 2 2 4 2

[2] 0 19 5 2 6

[3] 2 3 17 5 5

[4] 4 0 0 26 2

[5] 3 1 3 1 17

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.666667

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.642857

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.654545

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.76

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.59375

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.666667

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.62963

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.53125

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.576271

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.684211

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.8125

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.742857

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.53125

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.68

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.596491

2022-08-23 19:55:02 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.563862

Mult + IDXMult + CHM + Stru

[1] [2] [3] [4] [5]

[1] 21 0 1 8 5

[2] 0 16 4 0 1

[3] 1 6 16 2 6

[4] 4 0 3 20 6

[5] 1 2 3 3 18

2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.777778

2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.6

2022-08-23 20:10:03 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.677419

2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.666667
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.761905
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.711111
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.592593
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.516129
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.551724
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.606061
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.606061
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.606061
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.5
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.666667
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.571429
2022-08-23 20:10:03 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.523114

Mult + Text + Stru

[1] [2] [3] [4] [5]

[1] 21 1 2 0 3

[2] 0 25 9 2 3

[3] 2 3 20 0 4

[4] 2 0 0 26 0

[5] 2 2 2 0 20

2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.777778
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.777778
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.777778
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.806452
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.641026
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.714286
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.606061

2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.689655
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.645161
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.928571
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.928571
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.928571
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.666667
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.769231
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.714286
2022-08-23 20:46:22 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.689268

PCA

[1] [2] [3] [4] [5]

[1] 22 0 2 7 0

[2] 0 15 2 4 2

[3] 1 3 20 1 9

[4] 3 0 1 28 0

[5] 4 1 0 3 21

2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.733333
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.709677
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.721311
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.789474
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.652174
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.714286
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.8
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.588235
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.677966
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.651163
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.875

2022-08-23 21:26:26 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.746667
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.65625
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.724138
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.688525
2022-08-23 21:26:26 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.637613

Decision Tree

RGB + IDXRGB + CHM

[1] [2] [3] [4] [5]

[1] 15 0 1 2 7

[2] 1 28 2 0 0

[3] 2 4 26 0 5

[4] 1 0 0 28 1

[5] 5 1 3 0 16

2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.625
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.6
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.612245
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.848485
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.903226
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.875
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.8125
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.702703
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.753623
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.933333
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.933333
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.933333
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.551724
2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.64

2022-08-23 10:54:59 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.592593

2022-08-23 10:54:59 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.703526

RGB + IDXRGB + CHM + Text

[1] [2] [3] [4] [5]

[1] 23 0 8 3 2

[2] 0 22 2 1 2

[3] 1 4 25 1 4

[4] 0 0 4 20 1

[5] 2 3 1 1 18

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.884615

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.638889

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.741935

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.758621

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.814815

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.785714

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.625

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.714286

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.666667

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.769231

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.8

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.784314

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.666667

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.72

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.692308

2022-08-23 10:52:18 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.660939

RGB + IDXRGB + CHM + Stru

[1] [2] [3] [4] [5]

[1] 29 0 1 0 1

[2] 1 22 3 4 1

[3] 2 4 17 1 4

[4] 3 1 2 24 1

[5] 7 4 2 1 13

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.690476

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.935484

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.794521

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.709677

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.709677

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.709677

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.68

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.607143

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.641509

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.8

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.774194

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.786885

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.65

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.481481

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.553191

2022-08-23 11:17:34 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.635739

Mult + IDXMult + CHM + Text

[1] [2] [3] [4] [5]

[1] 22 0 2 1 3

[2] 2 21 7 1 1

[3] 6 5 18 2 1

[4] 3 0 1 27 1

[5] 3 1 3 2 16

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.611111

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.785714

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.6875

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.777778

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.65625

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.711864

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.580645

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.5625

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.571429

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.818182

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.84375

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.830769

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.727273

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.64

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.680851

2022-08-23 19:56:12 (INFO) TrainVectorClassifier: Global performance, Kappa index:
0.621849

Mult + IDXMult + CHM + Stru

[1] [2] [3] [4] [5]

[1] 25 3 1 4 2

[2] 1 14 4 0 2

[3] 2 7 16 5 1

[4] 4 2 8 13 6

[5] 2 2 1 6 16

2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.735294

2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.714286

2022-08-23 20:11:04 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.724638
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.5
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.666667
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.571429
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.533333
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.516129
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.52459
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.464286
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.393939
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.42623
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.592593
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.592593
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.592593
2022-08-23 20:11:04 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.463068

Mult + Text + Stru

[1] [2] [3] [4] [5]

[1] 20 0 5 0 2

[2] 0 30 7 0 2

[3] 4 11 12 0 2

[4] 1 0 0 27 0

[5] 2 1 0 0 23

2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.740741
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.740741
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.740741
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.714286
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.769231
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.740741

2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.5
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.413793
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.45283
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 1
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.964286
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.981818
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.793103
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.884615
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.836364
2022-08-23 20:45:09 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.687259

PCA

[1] [2] [3] [4] [5]

[1] 23 0 3 3 2

[2] 0 17 5 0 1

[3] 3 1 28 0 2

[4] 3 0 2 26 1

[5] 4 2 0 3 20

2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.69697
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.741935
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.71875
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.85
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.73913
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.790698
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.736842
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.823529
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.777778
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.8125

2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.8125
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.8125
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.769231
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.689655
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.727273
2022-08-23 21:27:07 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.704499

Random Forest

RGB + IDXRGB + CHM

[1] [2] [3] [4] [5]

[1] 18 0 1 2 4

[2] 0 29 2 0 0

[3] 4 2 29 0 2

[4] 1 0 0 29 0

[5] 1 3 2 0 19

2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.75
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.72
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.734694
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.852941
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.935484
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.892308
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.852941
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.783784
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.816901
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.935484
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.966667
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.95082
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.76

2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.76
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.76
2022-08-23 10:20:52 (INFO) TrainVectorClassifier: Global performance, Kappa index:
0.796295

RGB + IDXRGB + CHM + Text

[1] [2] [3] [4] [5]

[1] 29 0 4 1 2

[2] 0 25 2 0 0

[3] 2 4 29 0 0

[4] 2 0 3 20 0

[5] 2 4 2 0 17

2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.828571
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.805556
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.816901
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.757576
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.925926
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.833333
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.725
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.828571
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.773333
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.952381
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.8
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.869565
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.894737
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.68
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.772727
2022-08-23 10:49:05 (INFO) TrainVectorClassifier: Global performance, Kappa index:
0.761194

RGB + IDXRGB + CHM + Stru

[1] [2] [3] [4] [5]

[1] 27 0 4 0 0

[2] 0 25 5 1 0

[3] 0 2 25 0 1

[4] 1 0 3 27 0

[5] 4 2 5 0 16

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.84375

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.870968

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.857143

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.862069

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.806452

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.833333

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.595238

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.892857

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.714286

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.964286

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.870968

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.915254

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.941176

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.592593

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.727273

2022-08-23 11:16:57 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.763335

Mult + IDXMult + CHM + Text

[1] [2] [3] [4] [5]

[1] 27 0 0 0 1

[2] 3 25 3 0 1

[3] 3 5 16 0 8

[4] 1 0 0 31 0

[5] 2 0 0 0 23

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.75

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.964286

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.84375

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.833333

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.78125

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.806452

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.842105

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.5

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.627451

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 1

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.96875

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.984127

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.69697

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.92

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.793103

2022-08-23 19:53:18 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.77409

Mult + IDXMult + CHM + Stru

[1] [2] [3] [4] [5]

[1] 27 0 0 5 3

[2] 0 15 6 0 0

[3] 1 5 19 4 2

[4] 1 0 6 21 5

[5] 3 3 1 2 18

2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.84375

2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.771429
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.80597
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.652174
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.714286
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.681818
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.59375
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.612903
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.603175
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.65625
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.636364
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.646154
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.642857
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.666667
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.654545
2022-08-23 20:08:50 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.598361

Mult + Text + Stru

[1] [2] [3] [4] [5]

[1] 23 0 2 1 1

[2] 1 26 9 0 3

[3] 4 5 19 0 1

[4] 0 0 0 28 0

[5] 0 3 2 0 21

2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.821429
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.851852
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.836364
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.764706
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.666667

2022-08-23 20:44:11 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.712329
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.59375
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.655172
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.622951
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.965517
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 1
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.982456
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.807692
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.807692
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.807692
2022-08-23 20:44:11 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.730667

PCA

[1] [2] [3] [4] [5]

[1] 27 0 2 2 0

[2] 0 19 4 0 0

[3] 2 2 29 0 1

[4] 2 0 3 27 0

[5] 3 3 0 0 23

2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Precision of class [1] vs all: 0.794118
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Recall of class [1] vs all: 0.870968
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: F-score of class [1] vs all: 0.830769
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Precision of class [2] vs all: 0.791667
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Recall of class [2] vs all: 0.826087
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: F-score of class [2] vs all: 0.808511
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Precision of class [3] vs all: 0.763158
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Recall of class [3] vs all: 0.852941
2022-08-23 21:25:36 (INFO) TrainVectorClassifier: F-score of class [3] vs all: 0.805556

2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Precision of class [4] vs all: 0.931034
 2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Recall of class [4] vs all: 0.84375
 2022-08-23 21:25:36 (INFO) TrainVectorClassifier: F-score of class [4] vs all: 0.885246
 2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Precision of class [5] vs all: 0.958333
 2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Recall of class [5] vs all: 0.793103
 2022-08-23 21:25:36 (INFO) TrainVectorClassifier: F-score of class [5] vs all: 0.867925
 2022-08-23 21:25:36 (INFO) TrainVectorClassifier: Global performance, Kappa index: 0.797726

***In situ* validation - phytophysionomies**

S2. Confusion matrix and results of each class of land cover: *Trembleya parviflora* (Tremb.); *Baccharis retusa* – wood (Bac.S); *Baccharis retusa* – green canopy (Bac.V), and Others (Outros.). RGB refers to red, green, and blue bands; IDXRGB refers to the green leaf index and green-red difference index; CHM refers canopy height model; Mult refers to Multispectral bands; Text refers to Texture metric; Stru refers to structural metric; and PCA refers to the six principal components of all bands.

Campo úmido

Support Vector Machine

RGB + IDXRGB + CHM

SVM							
RGB	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	2	0	0	1	3	0.33333333	66.66666667
Bac.V	1	2	0	0	3	0.33333333	66.7
Bac.S	0	0	1	0	1	0	100
Outros.	1	0	0	1	2	0.5	50.0
Total	4	2	1	2	9		

Omission	0.5	0	0	0.5			
Producer's accuracy	50	100	100	50			
OA	66.66666667						
Kappa	0.534482759						

Mult + Text + Stru

SVM							
Mult	Tremb.	Bac.V	Bac.S	Outros	Total	Commission	User's accuracy
Tremb.	2	0	0	0	2	0	100
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	3	0	3	0	100
Outros.	1	0	0	1	2	0.5	50
Total	3	1	3	1	8		
Omission	0.333333333	0	0	0			
Producer's accuracy	66.66666667	100	100	100			
OA	87.5						
Kappa	0.826086957						

PCA

SVM							
PCA	Tremb.	Bac.V	Bac.S	Outros	Total	Commission	User's accuracy
Tremb.	3	0	0	1	4	0.25	75
Bac.V	0	1	0	1	2	0.5	50
Bac.S	0	0	1	1	2	0.5	50
Outros.	0	0	0	2	2	0	100
Total	3	1	1	5	10		
Omission	0	0	0	0.6			
Producer's accuracy	100	100	100	40			
OA	70						
Kappa	0.594594595						

Decision Tree

RGB + IDXRGB + CHM

DT							
RGB	Tremb.	Bac. V	Bac. S	Outros.	Total	Commissio n	User's accuracy
Tremb.	3	0	0	0	3	0	100
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	1	2	3	0.666666667	33.33333333
Outros.	0	0	0	2	2	0	100
Total	3	2	1	4	10		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	80						
Kappa	0.736842105						

Mult + Text + Stru

DT							
Mult	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	1	0	1	0	100
Outros.	1	0	0	2	3	0.333333333	66.66666667
Total	2	2	1	3	8		
Omission	0.5	0	0	0.333333333			
Producer's accuracy	50	100	100	66.66666667			
OA	75						
Kappa	0.652173913						

PCA

DT							
PCA	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	6	0	0	0	6	0	100
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	1	0	1	0	100
Outros.	0	1	0	1	2	0.5	50
Total	6	2	1	1	10		-1
Omission	0	0.5	0	0			

Producer's accuracy	100	50	100	100			
OA	90						
Kappa	0.830508475						

Random Forest

RGB + IDXRGB + CHM

RF							
RGB	Tremb.	Bac. V	Bac. S	Outros.	Total	Commission	User's accuracy
Tremb.	2	0	0	0	2	0	100
Bac.V	0	1	0	1	2	0.5	50
Bac.S	0	0	2	0	2	0	100
Outros.	1	0	0	2	3	0.333333333	66.66666667
Total	3	1	2	3	9		
Omission	0.333333333	0	0	0.333333333			
Producer's accuracy	66.66666667	100	100	66.66666667			
OA	77.77777778						
Kappa	0.7						

Mult + Text + Stru

RF							
Mult	Tremb.	Bac.V	Bac.S	Outros	Total	Commission	User's accuracy
Tremb.	5	0	0	2	7	0.285714286	71.42857143
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	1	1	2	0.5	50
Outros.	0	0	0	1	1	0	100
Total	5	1	1	4	11		
Omission	0	0	0	0.75			
Producer's accuracy	100	100	100	25			
OA	72.72727273						
Kappa	0.582278481						

PCA

RF							
PCA	Tremb.	Bac. V	Bac. S	Outros .	Total	Commissio n	User's accuracy
Tremb.	5	0	0	0	5	0	100
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	1	0	1	0	100
Outros.	1	0	0	1	2	0.5	50
Total	6	2	1	1	10		
Omission	0.16666666 7	0	0	0			
Producer's accuracy	83.3333333 3	100	100	100			
OA	90						
Kappa	0.84126984 1						

Campo sujo

Support Vector Machine

RGB + IDXRGB + CHM

SVM							
RGB	Tremb.	Bac.V	Bac.S	Outros .	Total	Commissio n	User's accuracy
Tremb.	1	0	0	2	3	0.66666666 7	33.3333333 3
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	2	0	2	0	100
Outros.	0	0	0	2	2	0	100
Total	1	1	2	4	8		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	75						
Kappa	0.66666666 7						

Mult + Text + Stru

SVM							
Mult	Tremb.	Bac. V	Bac. S	Outros .	Tota l	Commission	User's accuracy
Tremb.	1	0	0	2	3	0.666666667	33.33333333

Bac.V	0	1	0	1	2	0.5	50
Bac.S	0	0	4	0	4	0	100
Outros.	0	0	0	2	2	0	100
Total	1	1	4	5	11		-1
Omission	0	0	0	0.6			
Producer's accuracy	100	100	100	40			
OA	72.72727273						
Kappa	0.633333333						

PCA

SVM							
PCA	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	0	1	0	100
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	5	1	6	0.166666667	83.33333333
Outros.	0	0	0	1	1	0	100
Total	1	1	5	2	9		-3
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	88.88888889						
Kappa	0.808510638						

Decision Tree

RGB + IDXRGB + CHM

DT							
RGB	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	5	0	5	0	100
Outros.	0	0	1	2	3	0.333333333	66.66666667
Total	1	2	6	3	12		1

Omission	0	0	0.16666667	0.33333333			
Producer's accuracy	100	100	83.33333333	66.66666667			
OA	83.33333333						
Kappa	0.757575758						

Mult + Text + Stru

DT		campo sujo					
Mult	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	4	5	0.8	20
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	4	0	4	0	100
Outros.	0	0	0	2	2	0	100
Total	1	1	4	6	12		
Omission	0	0	0	0.66666667			
Producer's accuracy	100	100	100	33.33333333			
OA	66.66666667						
Kappa	0.563636364						

PCA

DT							
PCA	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	4	0	4	0	100
Outros.	0	0	0	2	2	0	100
Total	1	2	4	3	10		
Omission	0	0	0	0.333333333			
Producer's accuracy	100	100	100	66.66666667			

OA	90						
Kappa	0.8611111111						

Random Forest

RGB + IDXRGB + CHM

RF							
RGB	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	2	3	0.666666667	33.33333333
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	3	0	3	0	100
Outros.	0	0	0	1	1	0	100
Total	1	2	3	3	9		-2
Omission	0	0	0	0.666666667			
Producer's accuracy	100	100	100	33.33333333			
OA	77.77777778						
Kappa	0.709677419						

Mult + Text + Stru

RF							
Mult	Tremb.	Bac.V	Bac.S	Outros.	Total	Commission	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	4	1	5	0.2	80
Outros.	0	0	1	2	3	0.333333333	66.66666667
Total	1	2	5	4	12		
Omission	0	0	0.2	0.5			
Producer's accuracy	100	100	80	50			
OA	75						
Kappa	0.643564356						

PCA

RF							
PCA	Tremb.	Bac.V	Bac.S	Outros	Total	Commissio n	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	2	0	1	3	0.33333333 3	66.6666666 7
Bac.S	0	0	3	1	4	0.25	75
Outros.	0	0	0	2	2	0	100
Total	1	2	3	5	11		
Omission	0	0	0	0.6			
Producer's accuracy	100	100	100	40			
OA	72.7272727 3						
Kappa	0.63736263 7						

Cerrado ralo

Support Vector Machine

RGB + IDXRGB + CHM

SVM							
RGB	Tremb.	Bac.V	Bac.S	Outro s.	Total	Comission	User's accuracy
Tremb.	1	0	0	2	3	0.6666666 67	33.333333 33
Bac.V	0	1	0	0	1	0	100
Bac.S	0	0	4	1	5	0.2	80
Outros.	0	0	0	3	3	0	100
Total	1	1	4	6	12		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	75						
Kappa	0.6470588 24						

Mult + Text + Stru

SVM							
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Mult	Tremb.	Bac.V	Bac.S	Outros	Total	Comissio n	User's accuracy
Tremb.	1	0	0	3	4	0.75	25
Bac.V	0	4	0	0	4	0	100
Bac.S	0	0	2	0	2	0	100
Outros.	0	1	0	1	2	0.5	50
Total	1	5	2	4	12		
Omission	0	0.2	0	0.75			
Producer's accuracy	100	80	100	25			
OA	66.6666666 7						
Kappa	0.55555555 6						

PCA

SVM							
PCA	Tremb.	Bac.V	Bac.S	Outros.	Total	Comissio n	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	4	0	0	4	0	100
Bac.S	0	0	1	1	2	0.5	50
Outros.	0	0	0	4	4	0	100
Total	1	4	1	6	12		
Omission	0	0	0	0.33333333 3			
Producer's accuracy	100	100	100	66.6666666 7			
OA	83.3333333 3						
Kappa	0.76						

Decision Tree

RGB + IDXRGB + CHM

DT							
RGB	Tremb.	Bac.V	Bac.S	Outros.	Total	Comission	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	5	0	1	6	0.16666666 7	83.3333333 3
Bac.S	0	0	2	0	2	0	100
Outros.	0	0	0	2	2	0	100

Total	1	5	2	4	12		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	83.33333333						
Kappa	0.76						

Mult + Text + Stru

DT		cerrado ralo					
Mult	Tremb.	Bac.V	Bac.S	Outros.	Total	Comissio n	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	5	0	0	5	0	100
Bac.S	0	0	1	1	2	0.5	50
Outros.	0	0	0	1	1	0	100
Total	1	5	1	3	10		
Omission	0	0	0	0.666666667			
Producer's accuracy	100	100	100	33.33333333			
OA	80						
Kappa	0.705882353						

PCA

DT							
PCA	Tremb.	Bac. V	Bac.S	Outros.	Total	Comissio n	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	2	0	1	3	0.3333333333	66.66666667
Bac.S	0	0	2	1	3	0.3333333333	66.66666667
Outros.	0	0	0	4	4	0	100
Total	1	2	2	7	12		
Omission	0	0	0	0.428571429			
Producer's accuracy	100	100	100	57.14285714			
OA	75						
Kappa	0.647058824						

Random Forest

RGB + IDXRGB + CHM

RF							
RGB	Tremb.	Bac.V	Bac.S	Outros	Total	Comission	User's accuracy
Tremb.	1	0	0	2	3	0.666666667	33.33333333
Bac.V	0	2	0	1	3	0.333333333	66.66666667
Bac.S	0	0	1	0	1	0	100
Outros.	0	0	0	5	5	0	100
Total	1	2	1	8	12		
Omission	0	0	0	0.375			
Producer's accuracy	100	100	100	62.5			
OA	75						
Kappa	0.617021277						

Mult + Text + Stru

RF							
Mult	Tremb.	Bac.V	Bac.S	Outros	Total	Comission	User's accuracy
Tremb.	1	0	0	2	3	0.666666667	33.33333333
Bac.V	0	3	0	0	3	0	100
Bac.S	0	0	3	0	3	0	100
Outros.	0	0	0	3	3	0	100
Total	1	3	3	5	12		
Omission	0	0	0	0.4			
Producer's accuracy	100	100	100	60			
OA	83.33333333						
Kappa	0.777777778						

PCA

RF							
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PCA	Tremb.	Bac.V	Bac.S	Outros	Total	Comissio n	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	3	0	1	4	0.25	75
Bac.S	0	0	3	0	3	0	100
Outros.	0	0	0	3	3	0	100
Total	1	3	3	5	12		
Omission	0	0	0	0.4			
Producer's accuracy	100	100	100	60			
OA	83.3333333 3						
Kappa	0.77358490 6						

Cerrado típico

Support Vector Machine

RGB + IDXRGB + CHM

SVM							
RGB	Tremb.	Bac.V	Bac.S	Outros	Total	Comissio n	User's accuracy
Tremb.	1	0	0	1	2	0.5	50
Bac.V	0	4	0	1	5	0.2	80
Bac.S	0	0	2	0	2	0	100
Outros.	0	0	0	3	3	0	100
Total	1	4	2	5	12		
Omission	0	0	0	0.4			
Producer's accuracy	100	100	100	60			
OA	83.3333333 3						
Kappa	0.76699029 1						

Mult + Text + Stru

SVM							
Mult	Tremb.	Bac. V	Bac. S	Outros.	Total	Comission	User's accuracy
Tremb.	1	0	0	3	4	0.75	25

Bac.V	0	2	0	1	3	0.33333333	66.6666667
Bac.S	0	0	2	0	2	0	100
Outros.	0	0	0	3	3	0	100
Total	1	2	2	7	12		
Omission	0	0	0	0.57142857			
Producer's accuracy	100	100	100	42.85714286			
OA	66.6666667						
Kappa	0.559633028						

PCA

SVM							
PCA	Tremb.	Bac. V	Bac. S	Outros.	Total	Comission	User's accuracy
Tremb.	4	0	0	2	6	0.33333333	66.6666667
Bac.V	0	1	0	1	2	0.5	50
Bac.S	0	0	1	0	1	0	100
Outros.	0	0	0	2	2	0	100
Total	4	1	1	5	11		
Omission	0	0	0	0.6			
Producer's accuracy	100	100	100	40			
OA	72.72727273						
Kappa	0.607142857						

Decision Tree

RGB + IDXRGB + CHM

DT							
RGB	Tremb.	Bac.V	Bac.S	Outros.	Total	Comission	User's accuracy
Tremb.	1	0	0	5	6	0.83333333	16.6666667
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	2	0	2	0	100

Outros.	0	0	0	2	2	0	100
Total	1	2	2	7	12		
Omission	0	0	0	0.714285714			
Producer's accuracy	100	100	100	28.57142857			
OA	58.33333333						
Kappa	0.482758621						

Mult + Text + Stru

DT		cerrado tipico					
Mult	Tremb.	Bac.V	Bac.S	Outros.	Total	Comission	User's accuracy
Tremb.	1	0	0	4	5	0.8	20
Bac.V	0	2	0	0	2	0	100
Bac.S	0	0	1	0	1	0	100
Outros.	0	0	0	4	4	0	100
Total	1	2	1	8	12		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	66.66666667						
Kappa	0.529411765						

PCA

DT							
PCA	Tremb.	Bac.V	Bac.S	Outros	Total	Comission	User's accuracy
Tremb.	2	0	0	1	3	0.3333333333	66.66666667
Bac.V	0	4	0	0	4	0	100
Bac.S	0	0	1	0	1	0	100
Outros.	0	0	0	1	1	0	100
Total	2	4	1	2	9		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			

OA	88.88888889						
Kappa	0.839285714						

Random Forest

RGB + IDXRGB + CHM

RF							
RGB	Tremb.	Bac.V	Bac.S	Outros.	Total	Comissio n	User's accuracy
Tremb.	2	0	0	3	5	0.6	40
Bac.V	0	2	0	1	3	0.33333333	66.66666667
Bac.S	0	0	1	0	1	0	100
Outros.	0	0	0	3	3	0	100
Total	2	2	1	7	12		
Omission	0	0	0	0.571428571			
Producer's accuracy	100	100	100	42.85714286			
OA	66.66666667						
Kappa	0.547169811						

Mult + Text + Stru

RF							
Mult	Tremb.	Bac.V	Bac.S	Outros.	Total	Comissio n	User's accuracy
Tremb.	1	0	0	3	4	0.75	25
Bac.V	0	3	0	1	4	0.25	75
Bac.S	0	0	1	1	2	0.5	50
Outros.	0	0	0	2	2	0	100
Total	1	3	1	7	12		
Omission	0	0	0	0.714285714			
Producer's accuracy	100	100	100	28.57142857			
OA	58.33333333						
Kappa	0.464285714						

PCA

RF							
PCA	Tremb.	Bac. V	Bac. S	Outros .	Tota l	Comission	User's accuracy
Tremb.	1	0	0	2	3	0.666666667	33.33333333 3
Bac.V	0	4	0	0	4	0	100
Bac.S	0	0	2	0	2	0	100
Outros.	0	0	0	2	2	0	100
Total	1	4	2	4	11		
Omission	0	0	0	0.5			
Producer's accuracy	100	100	100	50			
OA	81.8181818 2						
Kappa	0.75555555 6						