Dataset with only images with Blue Light

Extracted vector with partial sums of histogram bins from LBP image and some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation

vector - partial LBP histogram sum1, partial LBP histogram sum2, partial LBP histogram sum3, partial LBP histogram sum4, contrast, homogeneity, energy, correlation

Blue Light Images	**Trained**	**Tested**
Live	21	18
Fake	21	9
Sum	42	27

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	26	26
Classified wrong	1	1	1
Accuracy [%]	96.29629629629629	96.29629629629629	96.29629629629629
FAR [%]	0	0	0
FRR [%]	3.703703703703703 7	3.703703703703703 7	3.703703703703703 7

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	25	25
Classified wrong	2	2	2
Accuracy [%]	92.5925925925926	92.5925925925926	92.5925925925926
FAR [%]	7.407407407407407	7.407407407407407	7.407407407407407
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	24	23
Classified wrong	3	3	4
Accuracy [%]	88.88888888888889	88.88888888888889	85.18518518518519
FAR [%]	7.407407407407407	7.407407407407407	7.407407407407407
FRR [%]	3.703703703703703 7	3.703703703703703 7	7.407407407407407

Dataset with only images with Green Light

Extracted vector with partial sums of histogram bins from LBP image and some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation

vector - partial LBP histogram sum1, partial LBP histogram sum2, partial LBP histogram sum3, partial LBP histogram sum4, contrast, homogeneity, energy, correlation

Green Light Images	**Trained**	**Tested**
Live	23	11
Fake	23	17
Sum	46	28

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	27	27	26
Classified wrong	1	1	2
Accuracy [%]	96.42857142857143	96.42857142857143	92.85714285714286
FAR [%]	3.571428571428571 6	3.571428571428571 6	3.571428571428571 6
FRR [%]	0	0	3.571428571428571 6

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	16	20
Classified wrong	5	12	8
Accuracy [%]	82.14285714285714	57.142857142857146	71.42857142857143
FAR [%]	17.857142857142858	42.857142857142854	17.857142857142858
FRR [%]	0	0	10.714285714285714

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	20	24
Classified wrong	2	8	4
Accuracy [%]	92.85714285714286	71.42857142857143	85.71428571428571
FAR [%]	7.142857142857143	10.714285714285714	3.5714285714285716
FRR [%]	0	17.857142857142858	10.714285714285714

Dataset with only images with Red Light

Extracted vector with partial sums of histogram bins from LBP image and some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation

vector - partial LBP histogram sum1, partial LBP histogram sum2, partial LBP histogram sum3, partial LBP histogram sum4, contrast, homogeneity, energy, correlation

Red Light Images	Trained	Tested
Live	23	12
Fake	23	15
Sum	46	27

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	27	26
Classified wrong	2	0	1
Accuracy [%]	92.5925925925926	100	96.29629629629629
FAR [%]	3.703703703703703 7	0	3.703703703703703 7
FRR [%]	3.703703703703703 7	0	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	22	27	27
Classified wrong	5	0	0
Accuracy [%]	81.48148148148148	100	100
FAR [%]	18.51851851851852	0	0
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	27	27
Classified wrong	2	0	0

Accuracy [%]	92.5925925925926	100	100
FAR [%]	3.703703703703703 7	0	0
FRR [%]	3.703703703703703 7	0	0

Dataset with mix of images with all lights

Extracted vector with partial sums of histogram bins from LBP image and some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation

vector - partial LBP histogram sum1, partial LBP histogram sum2, partial LBP histogram sum3, partial LBP histogram sum4, contrast, homogeneity, energy, correlation

	Trained	**Tested**
Live (Blue Images)		
Fake (Blue Images)		
Live (Green Images)		
Fake (Green Images)		
Live (Red Images)		
Fake (Red Images)		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	75	74	74
Classified wrong	3	4	4
Accuracy [%]	96.15384615384616	94.87179487179488	94.87179487179488
FAR [%]	2.564102564102564 3	3.846153846153846 3	5.128205128205129
FRR [%]	1.282051282051282 2	1.282051282051282 2	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	69	65	63
Classified wrong	9	13	15
Accuracy [%]	88.46153846153847	83.33333333333333	80.76923076923077
FAR [%]	11.538461538461538	3.8461538461538463	3.8461538461538463
FRR [%]	0	12.820512820512821	15.384615384615385

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	73	68	69
Classified wrong	5	10	9
Accuracy [%]	93.58974358974359	87.17948717948718	88.46153846153847
FAR [%]	1.2820512820512822	5.128205128205129	6.410256410256411
FRR [%]	5.128205128205129	7.692307692307695	5.128205128205129

Dataset with only images with Blue Light

Extracted vector with some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for image enhanced with Sobel on x-axis, Sobel on y-axis and Laplacian

vector - contrast for image enhanced with laplacian, homogeneity for image enhanced with laplacian, energy for image enhanced with laplacian, correlation for image enhanced with laplacian, contrast for image enhanced with sobel on x-axis, homogeneity for image enhanced with sobel on x-axis, energy for image enhanced with sobel on x-axis, correlation for image enhanced with sobel on x-axis, contrast for image enhanced with sobel on y-axis, homogeneity for image enhanced with sobel on y-axis, energy for image enhanced with sobel on y-axis, correlation for image enhanced with sobel on y-axis

	Trained	Tested
Live	21	
Fake	21	
Sum	42	27

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26		
Classified wrong	1		
Accuracy [%]	96.29629629629629		
FAR [%]	0		
FRR [%]	3.703703703703703 7		

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25		
Classified wrong	2		
Accuracy [%]	92.5925925925926		
FAR [%]	0		
FRR [%]	7.407407407407407		

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	22		
Classified wrong	5		
Accuracy [%]	81.48148148148148		

FAR [%]	7.407407407407407		
FRR [%]	11.11111111111111		

Dataset with only images with Green Light

Extracted vector with some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for image enhanced with Sobel on x-axis, Sobel on y-axis and Laplacian

vector - contrast for image enhanced with laplacian, homogeneity for image enhanced with laplacian, energy for image enhanced with laplacian, correlation for image enhanced with laplacian, contrast for image enhanced with sobel on x-axis, homogeneity for image enhanced with sobel on x-axis, energy for image enhanced with sobel on x-axis, correlation for image enhanced with sobel on x-axis, contrast for image enhanced with sobel on y-axis, homogeneity for image enhanced with sobel on y-axis, energy for image enhanced with sobel on y-axis, correlation for image enhanced with sobel on y-axis

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26		
Classified wrong	2		
Accuracy [%]	92.85714285714286		
FAR [%]	3.571428571428571 6		
FRR [%]	3.571428571428571 6		

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation

Classified right	22		
Classified wrong	6		
Accuracy [%]	78.57142857142857		
FAR [%]	14.285714285714286		
FRR [%]	7.142857142857143		

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	27		
Classified wrong	1		
Accuracy [%]	96.42857142857143		
FAR [%]	3.5714285714285716		
FRR [%]	0		

Dataset with only images with Red Light

Extracted vector with some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for image enhanced with Sobel on x-axis, Sobel on y-axis and Laplacian

vector - contrast for image enhanced with laplacian, homogeneity for image enhanced with laplacian, energy for image enhanced with laplacian, correlation for image enhanced with laplacian, contrast for image enhanced with sobel on x-axis, homogeneity for image enhanced with sobel on x-axis, energy for image enhanced with sobel on x-axis, correlation for image enhanced with sobel on x-axis, contrast for image enhanced with sobel on y-axis, homogeneity for image enhanced with sobel on y-axis, energy for image enhanced with sobel on y-axis, correlation for image enhanced with sobel on y-axis

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26		
Classified wrong	1		
Accuracy [%]	96.29629629629629		
FAR [%]	3.703703703703703 7		
FRR [%]	0		

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23		
Classified wrong	4		
Accuracy [%]	85.18518518518519		
FAR [%]	11.11111111111111		
FRR [%]	3.703703703703703 7		

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24		
Classified wrong	3		
Accuracy [%]	88.88888888888889		
FAR [%]	7.407407407407407		
FRR [%]	3.703703703703703 7		

Dataset with images with All Lights

Extracted vector with some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for image enhanced with Sobel on x-axis, Sobel on y-axis and Laplacian

vector - contrast for image enhanced with laplacian, homogeneity for image enhanced with laplacian, energy for image enhanced with laplacian, correlation for image enhanced with laplacian, contrast for image enhanced with sobel on x-axis, homogeneity for image enhanced with sobel on x-axis, energy for image enhanced with sobel on x-axis, correlation for image enhanced with sobel on x-axis, contrast for image enhanced with sobel on y-axis, homogeneity for image enhanced with sobel on y-axis, energy for image enhanced with sobel on y-axis, correlation for image enhanced with sobel on y-axis

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	74		
Classified wrong	4		
Accuracy [%]	94.87179487179488		
FAR [%]	2.564102564102564 3		
FRR [%]	2.564102564102564 3		

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	66		
Classified wrong	12		

Accuracy [%]	84.61538461538461		
FAR [%]	3.8461538461538463		
FRR [%]	11.538461538461538		

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	75		
Classified wrong	3		
Accuracy [%]	96.15384615384616		
FAR [%]	0		
FRR [%]	3.8461538461538463		

Dataset with only images with Blue Light

Process image with wavelet transformation (bior1.3) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live	21	
Fake	21	
Sum	42	27

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	23	23
Classified wrong	1	4	4
Accuracy [%]	96.29629629629629	85.18518518518519	85.18518518518519
FAR [%]	0	0	7.407407407407407
FRR [%]	3.703703703703703 7	14.81481481481481 5	7.407407407407407

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	23	24
Classified wrong	1	4	3
Accuracy [%]	96.29629629629629	85.18518518518519	88.88888888888889
FAR [%]	3.703703703703703 7	14.81481481481481 5	11.11111111111111
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	23	21
Classified wrong	2	4	6
Accuracy [%]	92.5925925925926	85.18518518518519	77.77777777777777
FAR [%]	0	7.407407407407407	7.407407407407407
FRR [%]	7.407407407407407	7.407407407407407	14.81481481481481 5

Dataset with only images with Green Light

Process image with wavelet transformation (bior1.3) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live	23	
Fake	23	
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	28	25	18
Classified wrong	0	3	10
Accuracy [%]	100	89.28571428571429	64.28571428571429
FAR [%]	0	3.5714285714285716	21.428571428571427
FRR [%]	0	7.142857142857143	14.285714285714286

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	20	20
Classified wrong	4	8	8
Accuracy [%]	85.71428571428571	71.42857142857143	71.42857142857143

FAR [%]	14.285714285714286	21.428571428571427	10.714285714285714
FRR [%]	0	7.142857142857143	17.857142857142858

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	21	22	21
Classified wrong	7	6	7
Accuracy [%]	75	78.57142857142857	75
FAR [%]	10.714285714285714	17.857142857142858	10.714285714285714
FRR [%]	14.285714285714286	3.5714285714285716	14.285714285714286

Dataset with only images with Red Light

Process image with wavelet transformation (bior1.3) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live	23	
Fake	23	
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	24	26
Classified wrong	4	3	1
Accuracy [%]	85.18518518518519	88.88888888888889	96.29629629629629
FAR [%]	7.407407407407407	11.11111111111111	3.703703703703703 7
FRR [%]	7.407407407407407	0	

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	22	25	24
Classified wrong	5	2	3
Accuracy [%]	81.48148148148148	92.5925925925926	88.88888888888889
FAR [%]	18.51851851851852	7.407407407407407	11.11111111111111
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	20	26
Classified wrong	3	7	1
Accuracy [%]	88.88888888888889	74.07407407407408	96.29629629629629
FAR [%]	7.407407407407407	18.51851851851852	0
FRR [%]	3.703703703703703 7	7.407407407407407	3.703703703703703 7

Dataset with only images with All Lights

Process image with wavelet transformation (bior1.3) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	70	69	69
Classified wrong	8	9	9
Accuracy [%]	89.74358974358974	88.46153846153847	88.46153846153847
FAR [%]	1.2820512820512822	7.6923076923076925	7.6923076923076925
FRR [%]	8.974358974358974	3.8461538461538463	3.8461538461538463

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	70	69	63
Classified wrong	8	9	15
Accuracy [%]	89.74358974358974	88.46153846153847	80.76923076923077
FAR [%]	8.974358974358974	10.256410256410257	11.538461538461538

FRR [%]	1.2820512820512822	1.2820512820512822	7.692307692307695

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	67	64	66
Classified wrong	11	14	12
Accuracy [%]	85.8974358974359	82.05128205128206	84.61538461538461
FAR [%]	5.128205128205129	8.974358974358974	8.974358974358974
FRR [%]	8.974358974358974	8.974358974358974	6.410256410256411

Dataset with only images with Blue Light

Process image with wavelet transformation (db2) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	20	20
Classified wrong	2	7	7

Accuracy [%]	92.5925925926	74.07407407407408	74.07407407407408
FAR [%]	0	7.407407407407407	14.814814814814815
FRR [%]	7.407407407407407	18.51851851851852	11.11111111111111

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	23	25
Classified wrong	3	4	2
Accuracy [%]	88.88888888888889	85.18518518518519	92.5925925925926
FAR [%]	11.11111111111111	14.814814814814815	7.407407407407407
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	21	17	20
Classified wrong	6	10	7
Accuracy [%]	77.77777777777777	62.96296296296296	74.07407407407408
FAR [%]	3.7037037037037037	7.407407407407407	3.7037037037037037
FRR [%]	18.51851851851852	29.62962962962963	22.22222222222222

Dataset with only images with Green Light

Process image with wavelet transformation (db2) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical

detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	24	20
Classified wrong	3	4	8
Accuracy [%]	89.28571428571429	85.71428571428571	71.42857142857143
FAR [%]	7.142857142857143	7.142857142857143	14.285714285714286
FRR [%]	3.5714285714285716	7.142857142857143	14.285714285714286

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	25	22
Classified wrong	4	3	6
Accuracy [%]	85.71428571428571	89.28571428571429	78.57142857142857
FAR [%]	14.285714285714286	10.714285714285714	17.857142857142858
FRR [%]	0	0	3.5714285714285716

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	22	23
Classified wrong	5	6	5
Accuracy [%]	82.14285714285714	78.57142857142857	82.14285714285714
FAR [%]	10.714285714285714	14.285714285714286	3.5714285714285716
FRR [%]	7.142857142857143	7.142857142857143	14.285714285714286

Dataset with only images with Red Light

Process image with wavelet transformation (db2) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	26	25
Classified wrong	1	1	2

Accuracy [%]	96.29629629629629	96.29629629629629	92.5925925925926
FAR [%]	0	0	7.407407407407407
FRR [%]	3.703703703703703 7	3.703703703703703 7	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	22	22
Classified wrong	4	5	5
Accuracy [%]	85.18518518518519	81.48148148148148	81.48148148148148
FAR [%]	14.81481481481481 5	18.51851851851852	18.51851851851852
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	22	20	22
Classified wrong	5	7	5
Accuracy [%]	81.48148148148148	74.07407407407408	81.48148148148148
FAR [%]	14.81481481481481 5	7.407407407407407	14.81481481481481 5
FRR [%]	3.703703703703703 7	18.51851851851852	3.703703703703703 7

Dataset with only images with All Lights

Process image with wavelet transformation (db2) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail,

homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	70	62	65
Classified wrong	8	16	13
Accuracy [%]	89.74358974358974	79.48717948717949	83.33333333333333
FAR [%]	2.5641025641025643	7.692307692307695	6.410256410256411
FRR [%]	7.692307692307695	12.820512820512821	10.256410256410257

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	69	59	65
Classified wrong	9	19	13
Accuracy [%]	88.46153846153847	75.64102564102564	83.33333333333333
FAR [%]	10.256410256410257	15.384615384615385	11.538461538461538
FRR [%]	1.2820512820512822	8.974358974358974	5.128205128205129

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	65	58	60
Classified wrong	13	20	18
Accuracy [%]	83.33333333333333	74.35897435897436	76.92307692307692
FAR [%]	6.410256410256411	7.692307692307692 5	11.53846153846153 8
FRR [%]	10.25641025641025 7	17.94871794871795	11.53846153846153 8

Dataset with only images with Blue Light

Process image with wavelet transformation (rbio3.1) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	26	25

Classified wrong	1	1	2
Accuracy [%]	96.29629629629629	96.29629629629629	92.5925925925926
FAR [%]	0	3.703703703703703 7	0
FRR [%]	3.703703703703703 7	0	7.407407407407407

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	22	23
Classified wrong	2	5	4
Accuracy [%]	92.5925925925926	81.48148148148148	85.18518518518519
FAR [%]	7.407407407407407	18.51851851851852	14.81481481481481 5
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	18	21
Classified wrong	2	9	6
Accuracy [%]	92.5925925925926	66.66666666666667	77.77777777777777
FAR [%]	0	18.51851851851852	0
FRR [%]	7.407407407407407	14.81481481481481 5	22.22222222222222

Dataset with only images with Green Light

Process image with wavelet transformation (rbio3.1) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	20	21
Classified wrong	2	8	7
Accuracy [%]	92.85714285714286	71.42857142857143	75
FAR [%]	0	14.285714285714286	7.142857142857143
FRR [%]	7.142857142857143	14.285714285714286	17.857142857142858

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	22	21
Classified wrong	5	6	7
Accuracy [%]	82.1428571428571	78.57142857142857	75
FAR [%]	17.857142857142858	17.857142857142858	14.285714285714286
FRR [%]	0	3.571428571428571	10.71428571428571

		6	4

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	26	17
Classified wrong	4	2	11
Accuracy [%]	85.71428571428571	92.85714285714286	60.714285714285715
FAR [%]	0	3.5714285714285716	14.285714285714286
FRR [%]	14.285714285714286	3.5714285714285716	25

Dataset with only images with Red Light

Process image with wavelet transformation (rbio3.1) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian	Adaptive Mean

		Segmentation	Segmentation
Classified right	26	25	26
Classified wrong	1	2	1
Accuracy [%]	96.29629629629629	92.5925925925926	96.29629629629629
FAR [%]	0	7.407407407407407	3.703703703703703 7
FRR [%]	3.703703703703703 7	0	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	24	26
Classified wrong	4	3	1
Accuracy [%]	85.18518518518519	88.88888888888889	96.29629629629629
FAR [%]	14.81481481481481 5	11.11111111111111	3.703703703703703 7
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	25	26
Classified wrong	3	2	1
Accuracy [%]	88.88888888888889	92.5925925925926	96.29629629629629
FAR [%]	0	7.407407407407407	3.703703703703703 7
FRR [%]	11.11111111111111	0	0

Dataset with only images with All Lights

Process image with wavelet transformation (rbio3.1) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence

Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	69	68	70
Classified wrong	9	10	8
Accuracy [%]	88.46153846153847	87.17948717948718	89.74358974358974
FAR [%]	3.8461538461538463	6.410256410256411	7.6923076923076925
FRR [%]	7.6923076923076925	6.410256410256411	2.5641025641025643

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	67	67	67
Classified wrong	11	11	11
Accuracy [%]	85.8974358974359	85.8974358974359	85.8974358974359
FAR [%]	14.102564102564108	11.538461538461538	10.256410256410257

FRR [%]	0	2.564102564102564 3	3.846153846153846 3

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	68	67	67
Classified wrong	10	11	11
Accuracy [%]	87.17948717948718	85.8974358974359	85.8974358974359
FAR [%]	6.410256410256411	5.128205128205129	7.692307692307692 5
FRR [%]	6.410256410256411	8.974358974358974	6.410256410256411

Dataset with only images with Blue Light

Process image with wavelet transformation (bior2.4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian	Adaptive Mean

		Segmentation	Segmentation
Classified right	25	25	25
Classified wrong	2	2	2
Accuracy [%]	92.5925925925926	92.5925925925926	92.5925925925926
FAR [%]	0	7.407407407407407	0
FRR [%]	7.407407407407407	0	7.407407407407407

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	22	25
Classified wrong	3	5	2
Accuracy [%]	88.88888888888889	81.48148148148148	92.5925925925926
FAR [%]	11.11111111111111	11.11111111111111	7.407407407407407
FRR [%]	0	7.407407407407407	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	20	22	24
Classified wrong	7	5	3
Accuracy [%]	74.07407407407408	81.48148148148148	88.88888888888889
FAR [%]	0	7.407407407407407	3.703703703703703 7
FRR [%]	25.92592592592592 7	11.11111111111111	7.407407407407407

Dataset with only images with Green Light

Process image with wavelet transformation (bior2.4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	19	21
Classified wrong	3	9	7
Accuracy [%]	89.28571428571429	67.85714285714286	75
FAR [%]	0	21.428571428571427	3.5714285714285716
FRR [%]	10.714285714285714	10.714285714285714	21.428571428571427

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	17	22
Classified wrong	4	11	6
Accuracy [%]	85.71428571428571	60.714285714285715	78.57142857142857
FAR [%]	14.285714285714286	25.0	17.857142857142858

FRR [%]	0	14.285714285714286	3.5714285714285716

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	20	19	17
Classified wrong	8	9	11
Accuracy [%]	71.42857142857143	67.85714285714286	60.714285714285715
FAR [%]	10.714285714285714	10.714285714285714	17.857142857142858
FRR [%]	17.857142857142858	21.428571428571427	21.428571428571427

Dataset with only images with Red Light

Process image with wavelet transformation (bior2.4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	26	26
Classified wrong	2	1	1
Accuracy [%]	92.5925925925926	96.29629629629629	96.29629629629629
FAR [%]	3.703703703703703 7		3.703703703703703 7
FRR [%]	3.703703703703703 7	3.703703703703703 7	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	23	25
Classified wrong	3	4	2
Accuracy [%]	88.88888888888889	85.18518518518519	92.5925925925926
FAR [%]	11.11111111111111	14.814814814814815	7.407407407407407
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	20	27	26
Classified wrong	7	0	1
Accuracy [%]	74.07407407407408	100	96.29629629629629
FAR [%]	11.11111111111111	0	0
FRR [%]	14.814814814814815	0	3.703703703703703 7

Dataset with only images with All Lights

Process image with wavelet transformation (bior2.4) and get horizontal, vertical and

diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	73	67	70
Classified wrong	5	11	8
Accuracy [%]	93.58974358974359	85.8974358974359	89.74358974358974
FAR [%]	2.5641025641025643	5.128205128205129	3.8461538461538463
FRR [%]	3.8461538461538463	8.974358974358974	6.410256410256411

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	69	63	69
Classified wrong	9	15	9
Accuracy [%]	88.46153846153847	80.76923076923077	88.46153846153847

FAR [%]	8.974358974358974	11.538461538461538	10.256410256410257
FRR [%]	2.5641025641025643	7.692307692307695	1.2820512820512822

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	65	60	63
Classified wrong	13	18	15
Accuracy [%]	83.33333333333333	76.92307692307692	80.76923076923077
FAR [%]	8.974358974358974	10.256410256410257	6.410256410256411
FRR [%]	7.692307692307695	12.820512820512821	12.820512820512821

Dataset with only images with Blue Light

Process image with wavelet transformation (bior1.5) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	24	22
Classified wrong	2	3	5
Accuracy [%]	92.5925925925926	88.88888888888889	81.48148148148148
FAR [%]	0	7.407407407407407	3.703703703703703 7
FRR [%]	7.407407407407407	3.703703703703703 7	14.81481481481481 5

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	23	23
Classified wrong	1	4	4
Accuracy [%]	96.29629629629629	85.18518518518519	85.18518518518519
FAR [%]	3.703703703703703 7	14.81481481481481 5	14.81481481481481 5
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	23	21	24
Classified wrong	4	6	3
Accuracy [%]	85.18518518518519	77.77777777777777	88.88888888888889
FAR [%]	3.703703703703703 7	7.407407407407407	0
FRR [%]	11.11111111111111	14.81481481481481 5	11.11111111111111

Dataset with only images with Green Light

Process image with wavelet transformation (bior1.5) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	27	22	19
Classified wrong	1	6	9
Accuracy [%]	96.42857142857143	78.57142857142857	67.85714285714286
FAR [%]	3.571428571428571 6	10.71428571428571 4	21.42857142857142 7
FRR [%]	0	10.71428571428571 4	10.71428571428571 4

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	20	21
Classified wrong	3	8	7

Accuracy [%]	89.28571428571429	71.42857142857143	75
FAR [%]	10.714285714285714	17.857142857142858	7.142857142857143
FRR [%]	0	10.714285714285714	17.857142857142858

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	20	23
Classified wrong	3	8	5
Accuracy [%]	89.28571428571429	71.42857142857143	82.14285714285714
FAR [%]	3.5714285714285716	10.714285714285714	7.142857142857143
FRR [%]	7.142857142857143	17.857142857142858	10.714285714285714

Dataset with only images with Red Light

Process image with wavelet transformation (bior1.5) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	25	26
Classified wrong	3	2	1
Accuracy [%]	88.88888888888889	92.5925925925926	96.29629629629629
FAR [%]	3.703703703703703 7	7.407407407407407	3.703703703703703 7
FRR [%]	7.407407407407407	0	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	22	25	24
Classified wrong	5	2	3
Accuracy [%]	81.48148148148148	92.5925925925926	88.88888888888889
FAR [%]	18.51851851851852	7.407407407407407	11.11111111111111
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	18	25
Classified wrong	2	9	2
Accuracy [%]	92.5925925925926	66.66666666666667	92.5925925925926
FAR [%]	0	25.92592592592592 7	3.703703703703703 7
FRR [%]	7.407407407407407	7.407407407407407	3.703703703703703 7

Dataset with only images with All Lights

Process image with wavelet transformation (bior1.5) and get horizontal, vertical and

diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	70	65	
Classified wrong	8	13	
Accuracy [%]	89.74358974358974	83.33333333333333	
FAR [%]	2.5641025641025643	8.974358974358974	
FRR [%]	7.6923076923076925	7.6923076923076925	

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	68	68	
Classified wrong	10	10	
Accuracy [%]	87.17948717948718	87.17948717948718	

FAR [%]	10.256410256410257	11.538461538461538	
FRR [%]	2.5641025641025643	1.2820512820512822	

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	67	60	
Classified wrong	11	18	
Accuracy [%]	85.8974358974359	76.92307692307692	
FAR [%]	7.6923076923076925	10.256410256410257	
FRR [%]	6.410256410256411	12.820512820512821	

Dataset with only images with Blue Light

Process image with wavelet transformation (db4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	26	19	27
Classified wrong	1	8	0
Accuracy [%]	96.29629629629629	70.37037037037037	100
FAR [%]	3.703703703703703 7	7.407407407407407	0
FRR [%]	0	22.22222222222222	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	19	24
Classified wrong	3	8	3
Accuracy [%]	88.88888888888889	70.37037037037037	88.88888888888889
FAR [%]	11.11111111111111	18.51851851851852	11.11111111111111
FRR [%]	0	11.11111111111111	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	19	26
Classified wrong	3	8	1
Accuracy [%]	88.88888888888889	70.37037037037037	96.29629629629629
FAR [%]	7.407407407407407	11.11111111111111	3.703703703703703 7
FRR [%]	3.703703703703703 7	18.51851851851852	0

Dataset with only images with Green Light

Process image with wavelet transformation (db4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence

Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	27	25	23
Classified wrong	1	3	5
Accuracy [%]	96.42857142857143	89.28571428571429	82.14285714285714
FAR [%]	3.5714285714285716	10.714285714285714	10.714285714285714
FRR [%]	0	0	7.142857142857143

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	24	20	25
Classified wrong	4	8	3
Accuracy [%]	85.71428571428571	71.42857142857143	89.28571428571429
FAR [%]	14.285714285714286	28.571428571428573	7.142857142857143

FRR [%]	0	0	3.571428571428571 6

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	22	19	22
Classified wrong	6	9	6
Accuracy [%]	78.57142857142857	67.85714285714286	78.57142857142857
FAR [%]	7.142857142857143	14.285714285714286	10.714285714285714
FRR [%]	14.285714285714286	17.857142857142858	10.714285714285714

Dataset with only images with Red Light

Process image with wavelet transformation (db4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation

Classified right	25	23	27
Classified wrong	2	4	0
Accuracy [%]	92.5925925925926	85.18518518518519	100
FAR [%]	3.703703703703703 7	7.407407407407407	0
FRR [%]	3.703703703703703 7	7.407407407407407	0

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	20	23	20
Classified wrong	7	4	7
Accuracy [%]	74.07407407407408	85.18518518518519	74.07407407407408
FAR [%]	25.92592592592592 7	14.81481481481481 5	25.92592592592592 7
FRR [%]	0	0	0

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right	25	22	26
Classified wrong	2	5	1
Accuracy [%]	92.5925925925926	81.48148148148148	96.29629629629629
FAR [%]	0	3.703703703703703 7	0
FRR [%]	7.407407407407407	14.81481481481481 5	3.703703703703703 7

Dataset with only images with All Lights

Process image with wavelet transformation (db4) and get horizontal, vertical and diagonal detail of image and get some characteristics from Gray Level Coorence Matrix - contrast, homogeneity, energy, correlation for these three results

vector - contrast for horizontal detail, homogeneity for horizontal detail, energy for horizontal detail, correlation for horizontal detail, contrast for vertical detail, homogeneity for vertical detail, energy for vertical detail, correlation for vertical detail, contrast for diagonal detail, homogeneity for diagonal detail, energy for diagonal detail, correlation for diagonal detail

	Trained	**Tested**
Live		
Fake		
Sum		

ANN:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right			
Classified wrong			
Accuracy [%]			
FAR [%]			
FRR [%]			

SVM:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right			
Classified wrong			
Accuracy [%]			
FAR [%]			
FRR [%]			

CLF:

	Otsu segmentation	Adaptive Gaussian Segmentation	Adaptive Mean Segmentation
Classified right			
Classified wrong			
Accuracy [%]			
FAR [%]			
FRR [%]			