Wine Project Report

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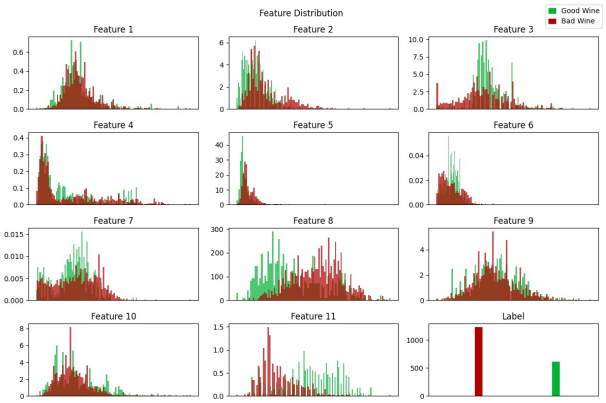

1 Preliminary Data Analysis

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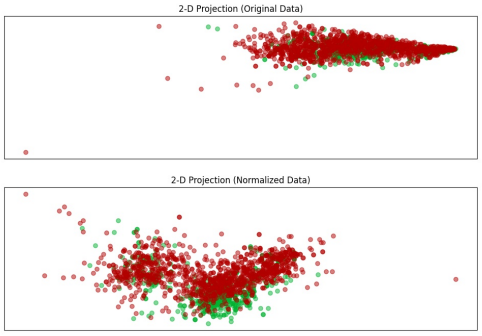

Table 1: Full-Covariance MVG

	PCA	Error Rate	DCF
$\pi_T = 0.33$	9	18.38	0.557
$\pi_T = 0.50$	9	20.07	0.401
$\pi_T = 0.67$	9	22.73	0.689
$\pi_T = 0.33$	8	19.90	0.603
$\pi_T = 0.50$	8	21.21	0.424
$\pi_T = 0.67$	8	23.87	0.723
$\pi_T = 0.33$	5	20.88	0.633
$\pi_T = 0.50$	5	21.32	0.426
$\pi_T = 0.67$	5	24.20	0.733

Table 2: Naive Bayes MVG

	PCA	Error Rate	DCF
$\pi_T = 0.33$	9	20.935	0.634
$\pi_T = 0.50$	9	21.533	0.431
$\pi_T = 0.67$	9	26.536	0.804
$\pi_T = 0.33$	8	21.425	0.649
$\pi_T = 0.50$	8	21.968	0.439
$\pi_T = 0.67$	8	26.373	0.799
$\pi_T = 0.33$	7	21.914	0.664
$\pi_T = 0.50$	7	22.132	0.443
$\pi_T = 0.67$	7	25.557	0.774

Table 3: Tied Covariance MVG

	PCA	Error Rate %	DCF
$\pi_T = 0.33$	11	19.47	0.590
$\pi_T = 0.50$	11	17.13	0.343
$\pi_T = 0.67$	11	25.77	0.781
$\pi_T = 0.33$	10	19.03	0.577
$\pi_T = 0.50$	10	17.35	0.347
$\pi_T = 0.67$	10	27.03	0.819
$\pi_T = 0.33$	9	19.09	0.578
$\pi_T = 0.50$	9	17.35	0.347
$\pi_T = 0.67$	9	26.70	0.809

Table 4: MVG (Normalized Samples)

	PCA	Error Rate	DCF
$\pi_T = 0.33$	10	20.66	0.626
$\pi_T = 0.50$	10	23.22	0.464
$\pi_T = 0.67$	10	27.46	0.832
$\pi_T = 0.33$	11	21.10	0.639
$\pi_T = 0.50$	11	23.27	0.465
$\pi_T = 0.67$	11	27.13	0.822
$\pi_T = 0.33$	7	21.32	0.646
$\pi_T = 0.50$	7	23.44	0.469
$\pi_T = 0.67$	7	27.62	0.837

Table 5: Naive Bayes MVG (Normalized Samples)

	PCA	Error Rate	DCF
$\pi_T = 0.33$	10	21.59	0.654
$\pi_T = 0.50$	10	22.08	0.442
$\pi_T = 0.67$	10	28.71	0.870
$\pi_T = 0.33$	11	21.10	0.639
$\pi_T = 0.50$	11	22.24	0.445
$\pi_T = 0.67$	11	28.49	0.863
$\pi_T = 0.33$	9	21.15	0.641
$\pi_T = 0.50$	9	22.35	0.447
$\pi_T = 0.67$	9	28.17	0.854

Table 6: Tied Covariance MVG (Normalized Samples)

	PCA	Error Rate	DCF
$\pi_T = 0.33$	10	20.39	0.618
$\pi_T = 0.50$	10	19.03	0.381
$\pi_T = 0.67$	10	24.74	0.750
$\pi_T = 0.33$	9	20.28	0.615
$\pi_T = 0.50$	9	19.03	0.381
$\pi_T = 0.67$	9	24.25	0.735
$\pi_T = 0.33$	11	21.42	0.649
$\pi_T = 0.50$	11	20.12	0.402
$\pi_T = 0.67$	11	25.77	0.781

Bias	γ	C	Error Rate
0	5	0.1	27.168%
0	5	1.0	27.223%
0	10	0.1	27.442%
0	10	1.0	27.497%
1.0	5	1.0	36.004%
1.0	10	1.0	36.114%
1.0	5	0.1	36.443%
1.0	10	0.1	36.443%

Table 7: Kernel SVM

Bias	γ	C	PCA	Error Rate
0	5	0.1	10	27.168%
0	5	0.1	9	27.168%
0	5	0.1	8	27.168%
0	5	1	8	27.168%
0	5	1	10	27.223%
0	5	1	9	27.223%
0	10	0.1	8	27.387%
0	10	1	8	27.387%
0	10	0.1	10	27.442%
0	10	0.1	9	27.442%

Table 8: Kernel SVM With PCA

Bias	γ	C	PCA	Error Rate
0	0.5	1	9	13.282%
0.1	0.5	1	9	13.337%
0	0.5	1	10	13.502%
0	0.1	1	9	13.557%
0	0.1	1	10	13.776%
0.1	0.1	1	10	13.776%
0.1	0.5	1	10	13.776%
0.1	0.1	1	9	13.886%
0.1	0.5	1	8	13.996%
0	0.1	1	8	14.050%

Table 9: Kernel SVM With PCA and Z-Normalization

λ	Error Rate
0	16.026%
1e-09	16.081%
1e-06	16.081%
0.001	15.587%
0.1	18.057%

Table 10: Logistic Regression

λ	PCA	Error Rate
0.001	10	15.587%
0	8	15.862%
1e-09	8	15.862%
1e-06	8	15.862%
0.001	8	15.917%
0	10	16.081%
1e-09	10	16.081%
1e-06	10	16.136%
0	6	16.630%
1e-09	6	16.630%

Table 11: Logistic Regression With PCA

λ	PCA	Error Rate
0.001	10	15.038%
0	10	15.258%
1e-09	10	15.258%
1e-06	10	15.258%
0	8	15.532%
1e-09	8	15.532%
1e-06	8	15.532%
0.001	8	15.532%
0.001	6	16.246%
0	6	16.301%

Table 12: Logistic Regression With PCA and Z-Normalization

Bias	C	Error Rate
0	0.1	17.728%
0	1	16.520%
1	0.1	35.565%
1	1	38.090%
5.0	0.1	15.862%
5.0	1	47.805%
10.0	0.1	15.642%
10.0	1	16.081%

Table 13: Linear SVM

Bias	C	PCA	Error Rate
10	0.1	10	15.313%
5	0.1	10	15.642%
5	0.1	6	15.971%
10	0.1	8	16.301%
5	0.1	8	16.356%
10	0.1	6	16.575%
0.1	0.1	8	18.057%
0.1	0.1	6	18.222%
0.1	0.1	10	18.551%
0	0.1	8	18.716%

Table 14: Linear SVM With PCA

Bias	C	PCA	Error Rate
1	0.1	10	14.709%
5.0	0.1	10	14.929%
10.0	0.1	10	14.929%
1	1	10	15.038%
5.0	1	10	15.038%
10.0	1	10	15.038%
1	1	8	15.258%
5.0	0.1	8	15.258%
5.0	1	8	15.258%
10.0	0.1	8	15.258%

Table 15: Linear SVM With PCA and Z-Normalization