Supervised VAE (SVAE) with latent 4

Binary supervised classifier

CV results

Average accuracy: 0.9784615384615385

Balanced acc: 0.8783333333333334

Average specificity: 0.9966666666666667

Average sensitivity (Detection rate): 0.76

Average loss: [3.45949533]

Average False Alarm: 0.24000000000000002

Average F1: 0.8444444444444444

Average cm:

	True 0	True 1
Predicted 0	11.959999999999999	0.24
Predicted 1	0.04	0.7599999999999999

Test result on unseen data:

Average accuracy: 0.6498

Balanced acc: 0.6497999999999999

Average specificity: 0.9643999999999999

Average sensitivity (Detection rate): 0.3352

Average loss: nan

Average False Alarm: 0.6648

Average F1: 0.48905748468047855

Average cm:

	True 0	True 1
Predicted 0	96.43999999999998	66.47999999999999
Predicted 1	3.5599999999999996	33.519999999999996

Supervised VAE (SVAE) with latent 16

Binary supervised classifier

CV results

Average accuracy: 0.9753846153846154

Balanced acc: 0.8766666666666667

Average specificity: 0.9933333333333333

Average sensitivity (Detection rate): 0.76

Average loss: [3.28985469]
Average False Alarm: 0.24000000000000005
Average F1: 0.8260869565217391
Average cm:

	True 0	True 1
Predicted 0	11.919999999999998	0.24000000000000005
Predicted 1	0.08	0.76

Test result on unseen data:
Average accuracy: 0.6533
Balanced acc: 0.6533
Average specificity: 0.9642000000000001
Average sensitivity (Detection rate): 0.3424
Average loss: nan
Average False Alarm: 0.6576
Average F1: 0.49687998839065445
Average cm:

	True 0	True 1
Predicted 0	96.42	65.75999999999999
Predicted 1	3.5800000000000005	34.239999999999995

VAE with reconstruction probability (rcp)

http://dm.snu.ac.kr/static/docs/TR/SNUDM-TR-2015-03.pdf
CV results
Average accuracy: 0.8476923076923077
Balanced acc: 0.6333333333333334
Average specificity: 0.8666666666666667
Average sensitivity (Detection rate): 0.38000000000000006
Average loss: [0.36137612]
Average False Alarm: 0.62
Average F1: 0.2773722627737227
Average cm:

	True 0	True 1
Predicted 0	10.64	0.6199999999999999

	True 0	True 1
Predicted 1	1.3599999999999999	0.38

Test result on unseen data:

Average accuracy: 0.5299999999999999
Balanced acc: 0.53
Average specificity: 0.85
Average sensitivity (Detection rate): 0.21
Average loss: nan
Average False Alarm: 0.79
Average F1: 0.3088235294117647
Average cm:

	True 0	True 1
Predicted 0	84.99999999999999	79.0
Predicted 1	14.999999999999996	21.0

VAE with reconstruction probability (rcp) test using conf for best F1

Calculate the best value that separates class 0 and class 1 that gives best F1 and use that value in testing

CV results

Average accuracy: 0.8476923076923076
Balanced acc: 0.6241666666666666
Average specificity: 0.8883333333333333
Average sensitivity (Detection rate): 0.36000000000000004
Average loss: [0.37183713]
Average False Alarm: 0.64
Average F1: 0.26666666666666666
Average cm:

	True 0	True 1
Predicted 0	10.66	0.6399999999999999
Predicted 1	1.34	0.36

Test result on unseen data:

Average accuracy: 0.612
Balanced acc: 0.612

Average specificity: 0.3226
Average sensitivity (Detection rate): 0.9014
Average loss: nan
Average False Alarm: 0.09859999999999998
Average F1: 0.6990848456646502
Average cm:

	True 0	True 1
Predicted 0	32.260000000000005	9.86
Predicted 1	67.74000000000001	90.14000000000001

VAE with rcp using encoder

Reconstruct the point, then pass the point through the encoder to calculate reconstruction probability

CV results

Average accuracy: 0.6461538461538461
Balanced acc: 0.4691666666666666
Average specificity: 0.6783333333333332
Average sensitivity (Detection rate): 0.26
Average loss: [0.73917013]
Average False Alarm: 0.74
Average F1: 0.1015625
Average cm:

	True 0	True 1
Predicted 0	8.139999999999999	0.74
Predicted 1	3.8600000000000003	0.26

Test result on unseen data:

Average accuracy: 0.4949
Balanced acc: 0.4949
Average specificity: 0.6628000000000001
Average sensitivity (Detection rate): 0.327
Average loss: nan
Average False Alarm: 0.6729999999999999
Average F1: 0.3929816127869247
Average cm:

	True 0	True 1

	True 0	True 1
Predicted 0	66.28	67.3
Predicted 1	33.72	32.7

VAE using distance

Detecting anomalies using distance, prediction used the distance that gave best F1

CV results

Average accuracy: 0.8153846153846154
Balanced acc: 0.7625
Average specificity: 0.8250000000000001
Average sensitivity (Detection rate): 0.7
Average loss: [0.7391067]
Average False Alarm: 0.3
Average F1: 0.3684210526315789
Average cm:

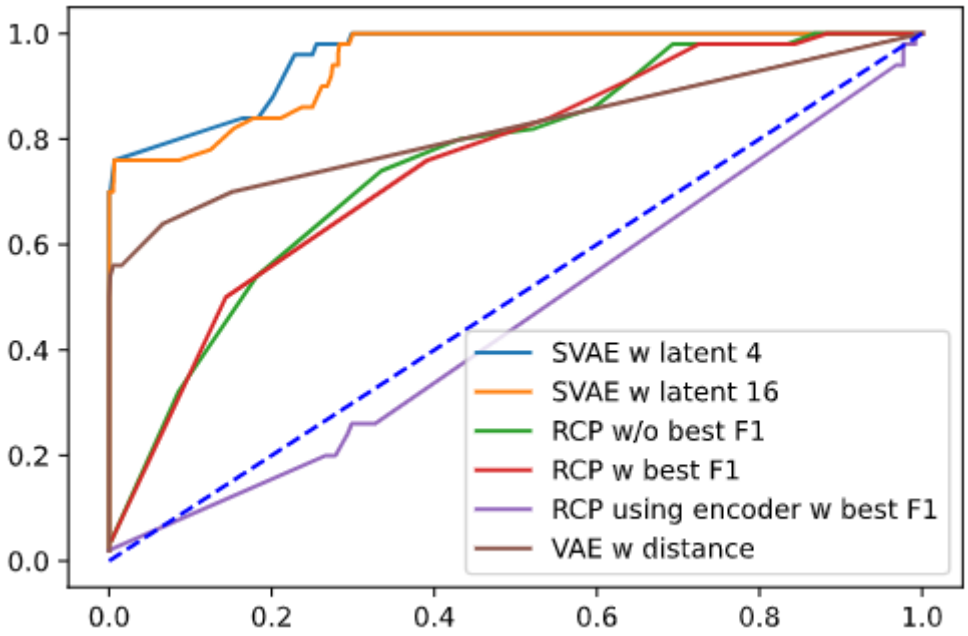
	True 0	True 1
Predicted 0	9.9	0.3
Predicted 1	2.1	0.7

Test result on unseen data:

Average accuracy: 0.8245
Balanced acc: 0.8245
Average specificity: 0.8408
Average sensitivity (Detection rate): 0.8082
Average loss: nan
Average False Alarm: 0.1918
Average F1: 0.8215919487648674
Average cm:

	True 0	True 1
Predicted 0	84.08000000000001	19.18
Predicted 1	15.920000000000002	80.82000000000001

Crossvalidation results



Post crossvalidation (100 inliers and 100 outliers)