Testing AUTOENCODER Models

Table of Contents

[Loading the Data](#MW_H_0bf4)   
[Model Calling](#MW_H_4701)

## Loading the Data

X = test\_AE

X = *16513×9*

0.7744 0.6897 0.2890 0.2234 0.0858 0.6334 0.2433 ⋯

0.7716 0.6849 0.2890 0.3459 0.0943 0.5876 0.2570

0.3358 0.2569 0.1909 0.2128 0.0708 0.5056 0.1973

0.7796 0.6769 0.2747 0.2452 0.0923 0.6310 0.2408

0.7690 0.6639 0.2985 0.2234 0.0908 0.6568 0.2894

0.7745 0.6682 0.2966 0.2692 0.0939 0.6365 0.2459

0.8129 0.6282 0.2130 0.2720 0.1057 0.6407 0.2765

0.7737 0.6931 0.2879 0.2268 0.0930 0.6199 0.2451

0.3187 0.2517 0.2174 0.2344 0.0738 0.5108 0.2008

0.3521 0.2392 0.1736 0.2289 0.0758 0.5112 0.1929

⋮

y\_true = testResp\_AE

y\_true = *16513×1*

1

1

1

1

1

1

1

1

1

1

⋮

## Model Calling

[yfit,scores] = AE\_b1.predictFcn(X)

yfit = *16513×1*

1

1

1

1

1

1

1

1

1

1

⋮

scores = *16513×3*

1 0 0

1 0 0

1 0 0

1 0 0

1 0 0

1 0 0

1 0 0

1 0 0

1 0 0

1 0 0

⋮

% Compute confusion matrix

confMatrix = confusionmat(y\_true, yfit);

% Display Confusion Matrix

disp('Confusion Matrix:');

Confusion Matrix:

disp(confMatrix);

13683 0 0

0 888 1

0 0 1941

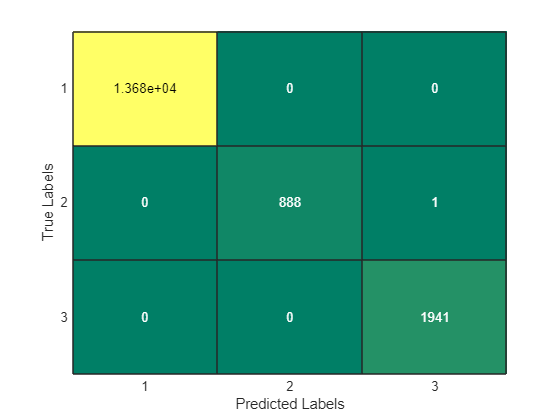
figure(2);

heatmap(confMatrix, 'Colormap', summer); % 'summer' gives a soft green-yellow gradient

xlabel('Predicted Labels');

ylabel('True Labels');

colorbar off;



% Compute Accuracy, Precision, and Recall

numClasses = size(confMatrix, 1);

precision = diag(confMatrix) ./ sum(confMatrix, 1)'; % Column-wise precision

recall = diag(confMatrix) ./ sum(confMatrix, 2); % Row-wise recall

accuracy = sum(diag(confMatrix)) / sum(confMatrix(:)); % Overall accuracy

% Compute F1-score for each class

f1Score = 2 \* (precision .\* recall) ./ (precision + recall);

% Compute overall Precision, Recall, and F1-score

overallPrecision = mean(precision, 'omitnan');

overallRecall = mean(recall, 'omitnan');

overallF1 = mean(f1Score, 'omitnan');

% Display metrics

fprintf('Accuracy: %.2f%%\n', accuracy \* 100);

Accuracy: 99.99%

fprintf('Class-wise Precision:\n');

Class-wise Precision:

disp(precision);

1.0000

1.0000

0.9995

fprintf('Class-wise Recall:\n');

Class-wise Recall:

disp(recall);

1.0000

0.9989

1.0000

disp('Class-wise F1-Score:');

Class-wise F1-Score:

disp(f1Score);

1.0000

0.9994

0.9997

% Display overall metrics

fprintf('Overall Precision: %.4f\n', overallPrecision);

Overall Precision: 0.9998

fprintf('Overall Recall: %.4f\n', overallRecall);

Overall Recall: 0.9996

fprintf('Overall F1-Score: %.4f\n', overallF1);

Overall F1-Score: 0.9997

% Compute ROC curve for multi-class classification

[X, Y, T, AUC] = perfcurve(y\_true, yfit, 1); % Change '1' to the positive class label

% Plot ROC curve

figure;

plot(X, Y, 'b-', 'LineWidth', 2);

hold on;

plot([0 1], [0 1], 'k--'); % Diagonal reference line

xlabel('False Positive Rate');

ylabel('True Positive Rate');

legend(sprintf('AUC = %.2f', AUC), 'Location', 'southeast');

grid on;

hold off;

