DS 301 – Machine Learning Techniques – In-class Quiz
Max Marks: 100

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Question 1: Find IQR for the following data:

Data = [1000, 90, 60, 10, 80, 70, 20]

(20 Marks)

Answer:
10, 20, 60, 70, 80, 90, 1000

Q1 = (n+1)/4
Q1 = (7+1)/4
Q1 = 2nd
Q1 = 20

Q3 = 3((n+1)/4)
Q3 = 3((7+1)/4)
Q3 = 6th
Q3 = 90

IQR = Q3 - Q1
IQR = 70

Question 2: Scale the values provided in the below using different scaling techniques and fill in the table with scaled values. **(40 Marks)**

Answer:

Min: 10
Max: 1000
Mean: 190
Median: 70
Standard Deviation: 331.8
IQR: 70

Data	Scaled – MinMax	Scaled – Normalization	Scaled – Standard Scaler	Scaled – Robust Scaler
1000	1	0.98845312	2.44097418	20.66666667
90	0.08080808	0.08896078	-0.30135484	0.44444444
60	0.07070707	0.07907625	-0.33149032	0.22222222
10	0.06060606	0.06919172	-0.3616258	0.
80	0.05050505	0.05930719	-0.39176129	-0.22222222
70	0.01010101	0.01976906	-0.51230322	-1.11111111
20	0	0.00988453	-0.54243871	-1.33333333

Question 3: Explain the difference between feature selection and feature extraction? Also, explain for what type of machine learning algorithms Linear Discriminant Analysis (LDA) and Principal Component Analysis (PCA) are useful? Do we need to perform feature scaling before performing LDA and PCA and why? **(40 Marks)**

Answer:

Feature selection means keeping only the most relevant original features, removing the ones that don't add value. Feature extraction transforms existing features into new ones, usually reducing dimensionality.

PCA is an unsupervised method that reduces dimensionality and removes multicollinearity, useful for distance-based models like k-NN, SVM, or clustering.

LDA is supervised and focuses on finding the best separation between classes, useful for classification tasks. Both PCA and LDA need feature scaling because they depend on means and variances. Without scaling, variables with larger values dominate the result.

Submission Instructions:
Answer all questions in the document and convert it into PDF. Submit the PDF file in the Quiz submission on Google Classroom by the end of the day.