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	ML Open Book Test
	Explain the difference between Z-score Standardization Se Min-Max scaling in terms of formula, effect Se use cases.
>	2 Score Standardization:
	Formula = 2' = x-11
	where u is the mean & or is the standard
7	Effect: Data is transformed to have mean = 0 & sd = 1. This ensures all features contribute
	equally, regardless of their original units. Use Cases: Works well when the data follows a normal distribution realizated in
	a normal distribution - Preferred in algorithms
1-1-1-	a normal distribution - Preferred in algorithms like logistic Regression, 8VM, PCA, Linear Regression where assumptions about data distribution exist.
	exist.
9	Min Max Scaling: Formula: x'= x-xmin
	xmax-xmin
	Effect: Rescales features into a fixed range, typically [0,1] (can also be [-1,1]). It preserves the relationships b'w values but compresses
1.4.4.4	the relationships b'w values but compresses
	Use Cases: Reclared las along that rely
	Ose Cases: Referred for algorithms that rely on distance calculations (K-MM, K-Means) or neural networks where bounded inputs speed up gradient
	networks where bounded inputs speed up gradient descent.

5 to The tanh function outputs values in [-1,1]

If inputs are scaled using Min-Mox into [-1,1]

they mouth the activation's range > leads to

faster training & convergence.

If Z-scare scaling is used, values may fast

autible [-1,1] causing neurons to saturate at

extreme values.

6. Decision Trees & Random Forests:

> work by splitting data based on feature

Hence scaling doesn't affect splits.

K-MM:-

> Relies on distance metrics like Euclidean distance > Example: If one feature is in km's & another in m's , the feature with larger scale will dominate > Hence, scaling (2-score or Min-max) is exertial.

7. Cosine similarity measures the angle between 2 vectors not their magnitude.

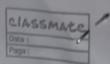
Therefore absolute scaling is not impostant but L2 normalization is often used to ensure all downers vectors have unit length.

· Eq. Doc A = [2,2,2], Doc B = [100,100,100]

both represent the same direction. Without

normalization they might differ, but cosine

similarity treats them equally after normalization



			Page:		
1.	Mcthod Formula  Z-score (x-u)  Standardization	Effect on Mean/Var Mean=0, SD=1	Switability for autient Sensitive to outliers		
	Min-Max (x-xmin) Scaling (xmax-xmin	Range [0,1] 01	Very senitive		
3.	Robust (x-median) Scaling IRR	Median-centered Scale = Jak			
9.	· Problem: outliers cause the Range (max-min) to become too large.				
	26g Suppose data is mostly 10-20, but one value = 1000. After Min-Max scaling, 10-20 compresses into [0,0.01] while 1000 maps to 1.				
	> this makes normal Values indistinguishable.  • Better choice: Robust scaling (median, JOR) or  Z-score with outlier dipping/ winsonization.				
	Paddem: tradient describent fore feature has valued decimals, the larger deminates. This cause > Slow covergence or > Oscillations in optimized	nization.	Le another in		
	Fix:- 1) Zerore Standon to mean 0 & 2) Min Max scaling: compres 3) Both methods make fear	var leatures to [	[],0		