

## Modul : Supervised Learning

### k-Nearest Neighbor

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# k-Nearest Neighbor

Supervised Learning

Instance-Based Classifier  
(Store all training data)

Lazy learner



No hypothesis

Unseen data prediction: Find class from similar stored data



# Classification (Predict unseen data)

Measures ‘distance’ of query (unseen data) to all instance (in training data)

Find k ‘most similar’ instances  
(k nearest neighbor)

Find the majority class from k  
nearest neighbor

Class/ Label Prediction: Majority Class of k  
nearest neighbor

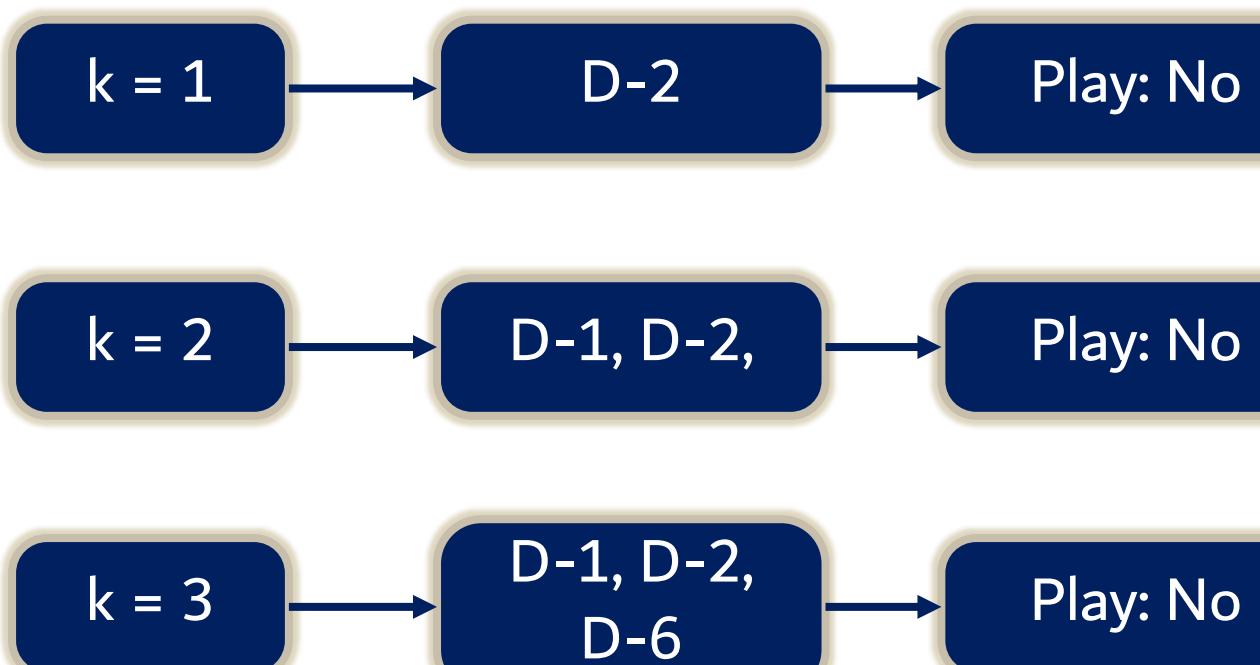


## Example: Play Tennis Dataset

outlook	temp.	humidity	windy	play	outlook	temp.	humidity	windy	play
sunny	hot	high	false	no	sunny	mild	high	false	no
sunny	hot	high	true	no	sunny	cool	normal	false	yes
overcast	hot	high	false	yes	rainy	mild	normal	false	yes
rainy	mild	high	false	yes	sunny	mild	normal	true	yes
rainy	cool	normal	false	yes	overcast	mild	high	true	yes
rainy	cool	normal	true	no	overcast	hot	normal	false	yes
overcast	cool	normal	true	yes	rainy	mild	high	true	no

# Classify New Instance: <Sunny, Cool, High, True>

outlook	temp.	humidity	windy	play	Distance
sunny	hot	high	false	no	2
sunny	hot	high	true	no	1
overcast	hot	high	false	yes	3
rainy	mild	high	false	yes	3
rainy	cool	normal	false	yes	3
rainy	cool	normal	true	no	2
overcast	cool	normal	true	yes	2
sunny	mild	high	false	no	2
sunny	cool	normal	false	yes	2
rainy	mild	normal	false	yes	4
sunny	mild	normal	true	yes	2
overcast	mild	high	true	yes	4
overcast	hot	normal	false	yes	2
rainy	mild	high	true	no	2



# Notes on k-Nearest Neighbor

## Advantages

Approximation can be less complex for complex target function

## Disadvantages

Cost of classifying new instance high

Consider all features → target function depends only on a few features



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**THANK YOU**