

Clustering Algorithms: Simple Comparison

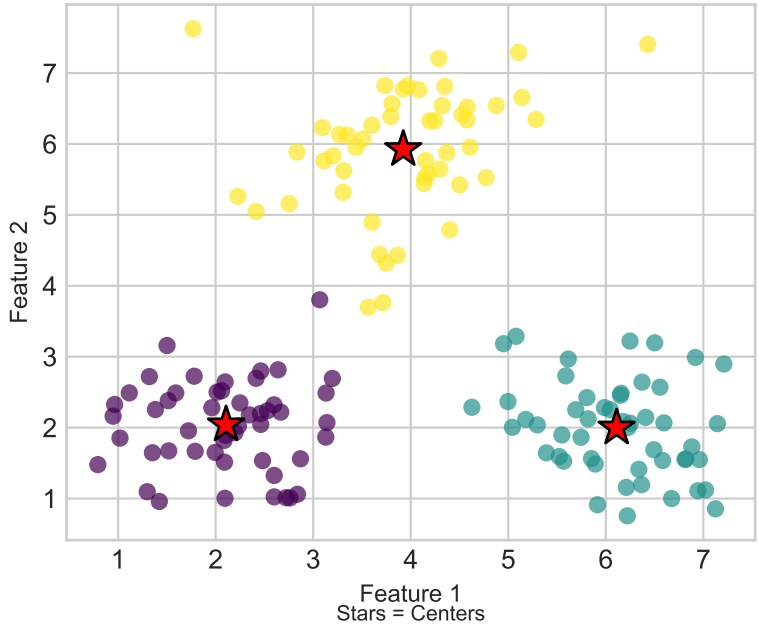
Three Different Ways to Find Groups

K-Means: How it Works

1. Pick 3 center points
2. Assign each point to nearest center
3. Move centers to middle of groups
4. Repeat until stable

Like organizing by neighborhoods

K-Means Result



When to Use K-Means

Good for:

- Round groups
- Similar sizes
- Fast results

Not good for:

- Weird shapes
- Different sizes

Speed & Difficulty

Speed: FAST

Difficulty: EASY

You need to know:

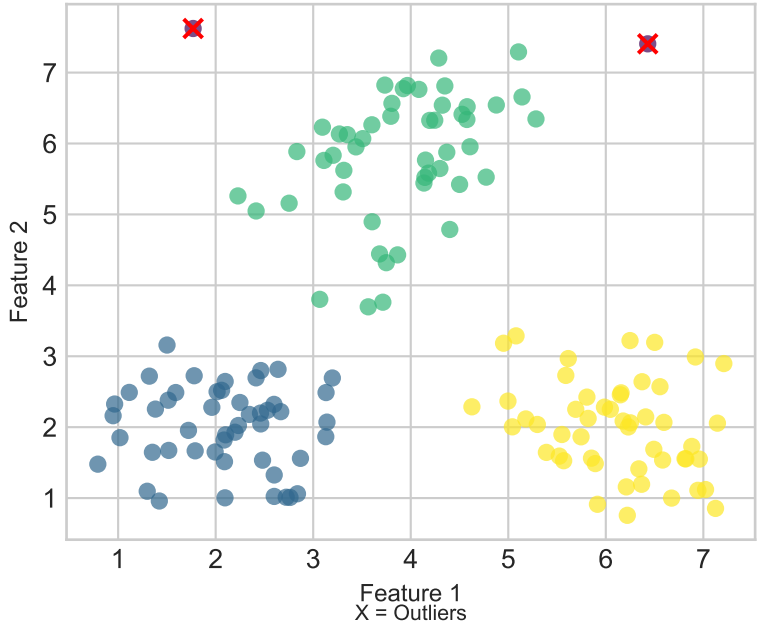
- How many groups (K)

DBSCAN: How it Works

1. Look at each point
2. Count neighbors nearby
3. If enough neighbors → core point
4. Connect core points → groups

Like finding crowds at a party

DBSCAN Result



When to Use DBSCAN

Good for:

- Any shape groups
- Finding outliers
- Unknown group count

Not good for:

- Different densities
- Need exact K groups

Speed & Difficulty

Speed: MEDIUM

Difficulty: MEDIUM

You need to know:

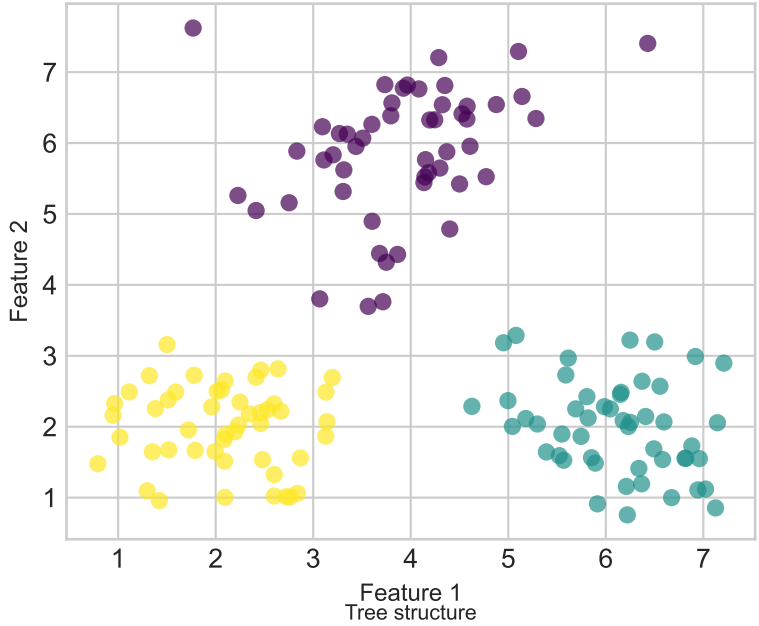
- Distance (eps)
- Min neighbors

Hierarchical: How it Works

1. Start: each point alone
2. Find closest pair
3. Merge into group
4. Repeat until all connected

Like a family tree

Hierarchical Result



When to Use Hierarchical

Good for:

- See all groupings
- Small datasets
- Need tree view

Not good for:

- Large datasets
- Need speed

Speed & Difficulty

Speed: SLOW

Difficulty: EASY

You need to know:

- How many groups
- OR cut height

Quick Decision Guide: Need speed? → K-Means | Weird shapes? → DBSCAN | Want to see structure? → Hierarchical