# Discovery Learning 1: Pattern Hunters
## Finding Natural Groups in Your World

### Machine Learning for Smarter Innovation - Pre-Lecture Activity

> **Learning Objectives**
>
> By completing this activity, you will discover:
> - How we naturally group things in everyday life
> - Why different people create different groupings
> - What makes clustering both intuitive and challenging
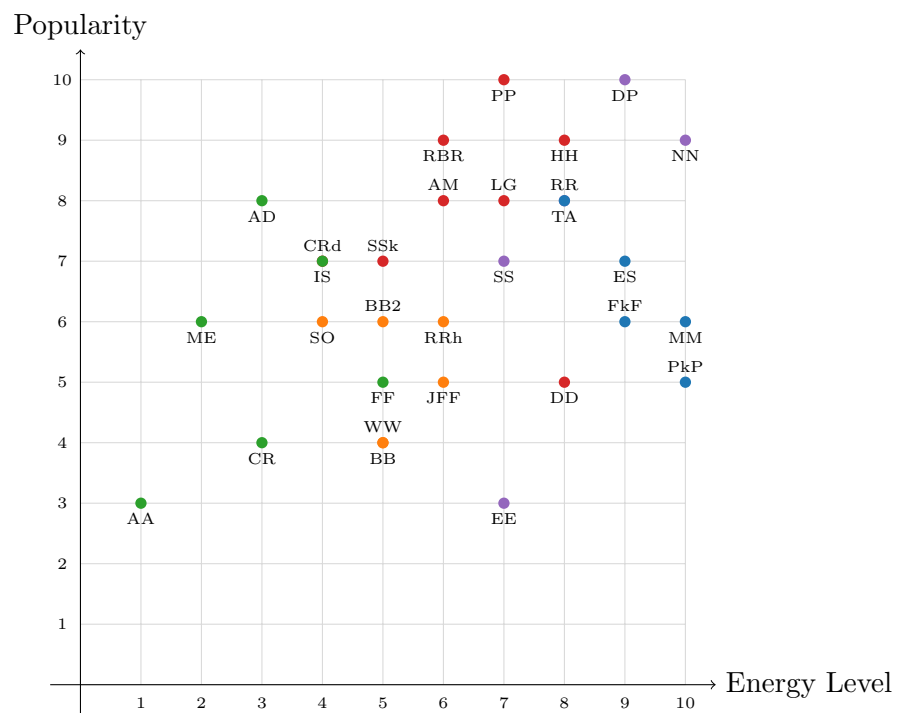
## Exercise 1: Festival Band Clustering

You're organizing a 3-day music festival with 30 bands. You need to group them into time slots and stages. Here's your band data:

| Band Name | Genre | Energy (1-10) | Popularity (1-10) | Year Formed |
|---|---|---|---|---|
| Electric Storm | Rock | 9 | 7 | 2018 |
| Acoustic Dreams | Folk | 3 | 8 | 2015 |
| Jazz Fusion Five | Jazz | 6 | 5 | 2010 |
| Neon Nights | Electronic | 10 | 9 | 2020 |
| Mountain Echo | Folk | 2 | 6 | 2012 |
| The Algorithms | Electronic | 8 | 8 | 2019 |
| Brass Brigade | Jazz | 5 | 4 | 2008 |
| Digital Pulse | Electronic | 9 | 10 | 2021 |
| Indie Sunrise | Indie | 4 | 7 | 2016 |
| Metal Mayhem | Metal | 10 | 6 | 2017 |
| Smooth Operators | Jazz | 4 | 6 | 2011 |
| Pop Paradise | Pop | 7 | 10 | 2020 |
| Folk Fusion | Folk | 5 | 5 | 2014 |
| Rock Revival | Rock | 8 | 8 | 2013 |
| Synth Symphony | Electronic | 7 | 7 | 2018 |
| Classical Remix | Classical | 3 | 4 | 2009 |
| Punk Patrol | Punk | 10 | 5 | 2019 |
| Blues Brothers 2.0 | Blues | 5 | 6 | 2015 |
| Hip Hop Heroes | Hip-Hop | 8 | 9 | 2021 |
| Country Roads | Country | 4 | 7 | 2016 |
| Latin Groove | Latin | 7 | 8 | 2017 |
| Reggae Rhythm | Reggae | 6 | 6 | 2014 |
| Soul Seekers | Soul | 5 | 7 | 2013 |
| Ambient Atmosphere | Ambient | 1 | 3 | 2011 |
| Disco Dynasty | Disco | 8 | 5 | 2012 |
| Alternative Minds | Alternative | 6 | 8 | 2020 |
| World Wanderers | World | 5 | 4 | 2010 |
| Funk Factory | Funk | 9 | 6 | 2018 |
| R&B Revolution | R&B | 6 | 9 | 2019 |
| Experimental Edge | Experimental | 7 | 3 | 2022 |

### Task A: Create Your Groups

Using the scatter plot below, create 3-5 groups of bands. Draw boundaries around your groups.

**Your grouping criteria:** _____

## Exercise 2: Real-World Pattern Hunt

### Task B: Find Clustering in Your Life

Identify how clustering happens in these everyday scenarios:

| **Supermarket** | **Music App** | **Social Feed** |
|---|---|---|
| Dairy<br>Produce<br>Bakery | Workout<br>Study<br>Party | Friends<br>News<br>Ads |

| **Library** | **Restaurant** | **App Store** |
|---|---|---|
| Fiction<br>Science<br>History | Appetizers<br>Mains<br>Desserts | Games<br>Productivity<br>Social |

**Pick one example above. What features determine the groups?**

- Example chosen: _____

- Feature 1: _____

- Feature 2: _____

- Feature 3: _____

## Reflection Questions

1. **Compare with a partner:** Did you create the same band groups? Why or why not?

   _____

   _____

2. **Scale challenge:** You grouped 30 bands. Imagine having 5,000 bands to organize. What would make this difficult?

   _____

   _____

3. **Feature importance:** If you could only use ONE feature (energy OR popularity), which would create better groups? Why?

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