

# Random Forest - Intuition

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# Random Forest

- Random Forest is based on the idea of **Bootstrap Aggregation (Bagging)**
- **Combine multiple decision trees** to improve classification / regression, also known as **ensemble learning**.
- Intuition
  - Individuals often have **partial knowledge**, but a committee can pool expertise to make better decisions.
  - Individuals often make mistakes, but the “**majority**” is less likely to make mistakes.

# Random Forest

For  $k = 1$  to  $K$

$\mathbf{D}_k \leftarrow$  sample data subset

$\mathbf{F}_k \leftarrow$  sample feature subset

$h_k \leftarrow$  train classifier/predictor based on  $\mathbf{D}_k$  and  $\mathbf{F}_k$

Classification:  $\text{majority}(h_1(\mathbf{x}), \dots, h_K(\mathbf{x}))$

Regression:  $\text{average}(h_1(\mathbf{x}), \dots, h_K(\mathbf{x}))$

# Random Forest

- Majority Voting

