Using different ML Models

Machine Learning (ML) is a branch of **Artificial Intelligence** that enables computers to **learn from data** instead of being explicitly programmed with rules.

Why Machine Learning?

Traditional AI programs (like Deep Blue) were good at **one specific task** (e.g., chess). ML allows us to write **general-purpose programs** that learn to solve many tasks — like playing Go, recognizing images, or filtering spam — just by learning from examples.

AlphaGo, for instance, learned to play Go by playing against itself millions of times, improving its strategy without human intervention and becoming the world champion.

What Is a Classifier?

A **classifier** is a type of ML model. It:

- Takes **input data** (like weight and texture of a fruit),
- Learns from **examples** (training data),
- And **predicts labels** (like "apple" or "orange").

This process is called **supervised learning**.

Features and Labels

In ML, we work with:

- **Features**: Characteristics of the data (e.g., weight, color).

- **Labels**: The categories we want to predict (e.g., “apple”, “orange”).

If classifier is a box of rules, you can think of learning algorithm as a procedure that created them. It finds patterns in the training data to create a model that can predict labels for new data.

How Does It Work? (Simple Example)

Let’s train a machine to tell **apples** from **oranges**:

```
from sklearn import tree

# Step 1: Collect training data
features = [[140, 1], [130, 1], [150, 0], [170, 0]]  # [weight, texture]
labels = [0, 0, 1, 1]  # 0 = Apple, 1 = Orange

# Step 2: Train the model
clf = tree.DecisionTreeClassifier()
clf = clf.fit(features, labels)

# Step 3: Make a prediction
print(clf.predict([[160, 0]]))  # Predicts: Orange (1)
```

- `fit()` means **find patterns in the data**
- After training, the model can predict new fruits!

Why Is This Cool?

- You don’t write rules — the machine **learns** them.
- You can solve new problems just by changing the **training data**.

Summary

- Machine Learning lets us build adaptable programs.
- A **classifier** learns from examples to make predictions.
- With tools like **scikit-learn**, writing your first ML model takes just **6 lines of code**!