

## ✓ Week 1 Assignment 1: Exploring the Landscape of AI & ML in Society

### 1. A Quick Look at the Journey of AI & ML

Artificial Intelligence, or AI, began as an idea in the 1950s. Alan Turing asked a big question: "Can machines think?" This led to the famous Turing Test. In 1956, the term "AI" was officially born at the Dartmouth Conference. Over time, AI grew through ups and downs—from logic-based systems in the 60s, to expert systems in the 80s, and the rise of machine learning (ML) in the 90s. The 2000s brought deep learning, which made things like self-driving cars and voice assistants possible.

#### Big Moments in AI:

- 1950: Turing Test introduced
- 1956: The birth of AI at the Dartmouth Conference
- 1997: IBM's Deep Blue beats chess champ Garry Kasparov
- 2011: Watson wins Jeopardy!
- 2016: AlphaGo defeats Go master Lee Sedol

### 2. How AI & ML Are Helping Us Today

- **Healthcare:** AI helps doctors spot diseases early, like finding tumors in scans.
- **Finance:** Banks use ML to catch fraud fast and protect our money.
- **Retail:** Online stores suggest items you might like, thanks to AI.
- **Transport:** Self-driving cars use AI to make smart driving decisions.
- **Manufacturing:** Factories use ML to predict and prevent machine failures.

## ✓ 3. What Should We Worry About?

AI is powerful, but it's not perfect. It can show bias if trained on unfair data. It needs lots of personal data, raising privacy issues. And yes, it might replace some jobs. But we can reduce the risks by using fair data, keeping AI systems transparent, and helping people learn new skills.


- 1. Bias in Algorithms :** AI can reflect and amplify human bias if trained on unfair data—leading to discrimination in hiring, lending, and more.
- 2. Privacy Violations :** AI systems often collect large amounts of personal data, raising risks of misuse, data leaks, and loss of user control.
- 3. Job Displacement :** Automation can replace human jobs, especially in manual or repetitive tasks, leading to unemployment if no reskilling is provided.

## ✓ 4. How Machines Learn

- **Supervised Learning:** Like learning with a teacher. We give examples with answers. (e.g., predicting house prices)
- **Unsupervised Learning:** The machine finds patterns on its own. (e.g., grouping customers by habits)
- **Reinforcement Learning:** Learning by trial and error. (e.g., training a robot to walk)

```
# A Tiny Python Example: Linear Regression
import numpy as np
from sklearn.linear_model import LinearRegression
```

```
X = np.array([[1], [2], [3], [4], [5]])
y = np.array([2, 4, 6, 8, 10])
model = LinearRegression().fit(X, y)
print("Prediction for 6:", model.predict([[6]]))
```

 Prediction for 6: [12.]

```
# KMeans Clustering - Grouping similar data
import numpy as np
from sklearn.cluster import KMeans
import matplotlib.pyplot as plt

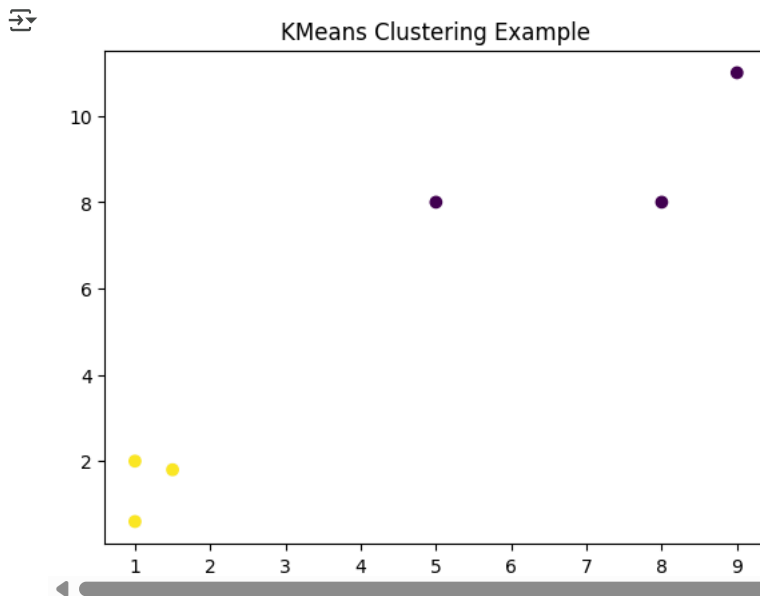
X = np.array([[1, 2], [1.5, 1.8], [5, 8],
              [8, 8], [1, 0.6], [9, 11]])
kmeans = KMeans(n_clusters=2)
kmeans.fit(X)
```

```

labels = kmeans.labels_

plt.scatter(X[:, 0], X[:, 1], c=labels)
plt.title("KMeans Clustering Example")
plt.show()

```



```

# Basic Reinforcement Learning Idea - Grid Navigation with Rewards
import random

actions = ['left', 'right']
state = 0
goal = 10
for step in range(20):
    action = random.choice(actions)
    if action == 'right':
        state += 1
    else:
        state = max(0, state - 1)
    print(f"Step {step + 1}: Action = {action}, Position = {state}")
    if state == goal:
        print("Reached the goal!")
        break

```

```

Step 1: Action = left, Position = 0
Step 2: Action = left, Position = 0
Step 3: Action = left, Position = 0
Step 4: Action = right, Position = 1
Step 5: Action = left, Position = 0
Step 6: Action = right, Position = 1
Step 7: Action = right, Position = 2
Step 8: Action = left, Position = 1
Step 9: Action = left, Position = 0
Step 10: Action = left, Position = 0
Step 11: Action = right, Position = 1
Step 12: Action = right, Position = 2
Step 13: Action = right, Position = 3
Step 14: Action = left, Position = 2
Step 15: Action = left, Position = 1
Step 16: Action = left, Position = 0
Step 17: Action = right, Position = 1
Step 18: Action = right, Position = 2
Step 19: Action = right, Position = 3
Step 20: Action = right, Position = 4

```

## 5. How AI Projects Work (The ML Pipeline)

1. **Collect Data:** Get the right data from the right places.
2. **Prepare It:** Clean it up, remove errors, and format it.
3. **Train the Model:** Let the machine learn from the data.
4. **Evaluate:** Test how well it works.
5. **Deploy:** Use it in a real-world app or system.
6. **Monitor:** Keep an eye on it and improve over time.

**Challenges?** Getting clean data, choosing the right model, and making sure it keeps working well as things change.

This notebook gives a beginner-friendly overview of how AI and ML are changing our world. With the right care, they can help us solve big problems and improve lives.