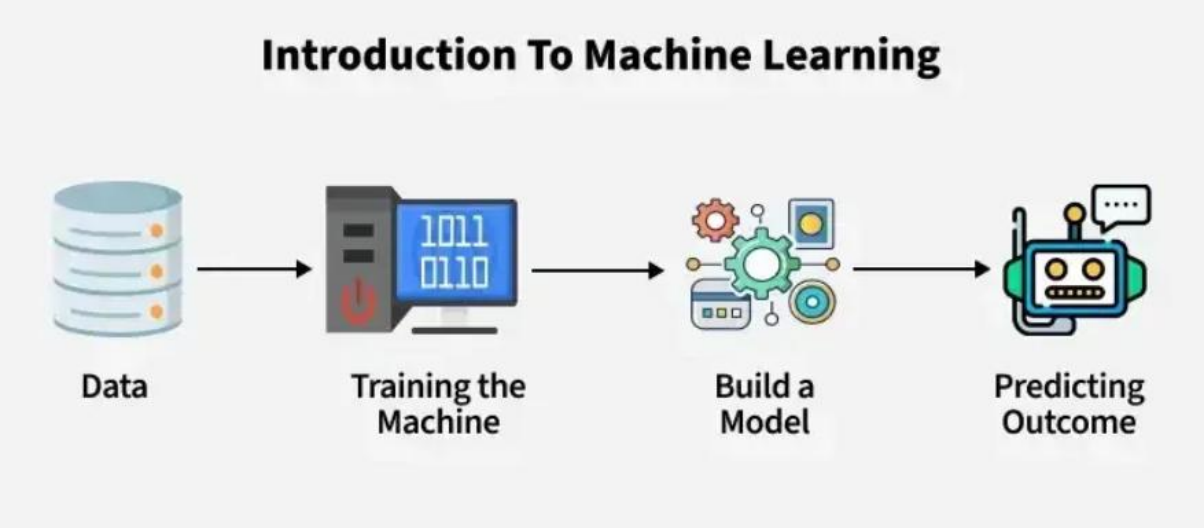
ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DAY – 1 **23 June 2025**

Introduction to Machine Learning

Machine learning (ML)

Machine learning (ML) enables computers to learn from data and make decisions or predictions without being explicitly programmed. By analyzing patterns in data, ML algorithms power a wide range of applications such as image recognition, speech processing, language translation, and recommender systems.



Why is Machine Learning needed?

Traditional programming can't handle tasks like image recognition or language understanding well, and it struggles with large data. Machine Learning solves these issues by learning from examples and making smart predictions. Here’s why it matters:

1. **Solves Complex Problems**
   ML can tackle tasks like language translation, medical diagnosis, and sentiment analysis.

2. **Handles Big Data**

   It quickly analyzes massive data to find patterns and make real-time predictions (e.g., fraud detection, social media recommendations).

3. **Automates Repetitive Tasks**

   ML reduces manual work by automating tasks like spam filtering, chat support, and invoice analysis.

4. **Personalizes User Experience**

   It delivers tailored content and suggestions (e.g., Netflix recommendations, online shopping suggestions).

5. **Improves Over Time**

   ML systems get smarter with more data—voice assistants, search engines, and self-driving cars all improve through learning.

Why Data Matters in Machine Learning

- Data is the core of ML—models learn from it.
- Good, diverse data leads to better predictions.
- Features from data help train models effectively.
- Validation and test data check model accuracy.
- New data helps models improve over time.