What I Learned About Artificial Intelligence (AI) and Machine Learning (ML)

Over the past lessons, I learned the basics of Artificial Intelligence (AI) and Machine Learning (ML), which are exciting fields shaping the future of technology.

What is Artificial Intelligence?

AI is a branch of computer science focused on making machines perform tasks that usually require human intelligence, such as image recognition, speech understanding, decision-making, and translating languages. I learned that John McCarthy first coined the term "Artificial Intelligence" in 1956, and the main goal is to build systems that can solve real-world problems just like humans do.

Types of Artificial Intelligence

One important type is Artificial Narrow Intelligence (ANI), also called Weak AI. This means AI systems that are designed to perform specific tasks (like recognizing faces or translating between languages) instead of being generally intelligent like humans.

Programming Languages in AI

I found out that Python is the most popular programming language for AI and ML because it’s easy to use and has many helpful libraries. Other languages mentioned were R, Lisp, and Java, which are used in different areas of AI development.

What is Machine Learning?

Machine Learning was defined by Arthur Samuel in 1959. ML is a part of AI that teaches computers to learn from experience and data, so their performance improves over time. The idea is that instead of programming every rule, we let the computer find patterns in data and make predictions.

The Machine Learning Process

I learned the main steps involved in ML:

1. Define the Objective: Decide what problem we want to solve or what prediction to make.
2. Data Gathering: Collect relevant data for the problem, like numbers, images, or weather information.
3. Preparing Data: Clean, format, and fix the data so the computer can use it easily; this includes handling missing values and errors.
4. Exploratory Data Analysis: Study the data to understand patterns and relationships.
5. Building a Model: Train a machine learning algorithm using the cleaned data to learn the task.
6. Model Evaluation & Optimization: Test how well the model performs and tune its parameters to improve accuracy.
7. Predictions: Use the trained model to make predictions or solve new problems.

Key Terms in Machine Learning :

Some important new terms I learned:

* Algorithm: The set of rules the computer follows to learn from data.
* Response Variable: The result or output we want to predict.
* Predictor Variable: The input features or data that help make predictions.
* Training Data: The dataset used to teach the model.
* Testing Data: Data used to check how well our model works.

Conclusion

Overall, these lessons helped me understand how AI and ML work, and how they help make technologies smarter—like self-driving cars, game-playing computers, and healthcare diagnosis systems.

Code Snippets with output :

The link below contains the code snippets that we have practiced during the sessions :

<https://colab.research.google.com/drive/12t-J7MSnYF8X03KzDKEcI9L7owuV-kFj?usp=sharing>

What I Learned: NumPy, pandas, and Matplotlib in Python

During my recent lessons and hands-on work in the notebook, I learned to use three major Python libraries—NumPy, pandas, and Matplotlib—that are really important for AI, machine learning, and data analysis.

NumPy

NumPy is the library I used for working with arrays, which are like lists of numbers, and for doing mathematical operations quickly.

* I learned to make single and multi-dimensional arrays, fill arrays with zeros or any number I want, and create sequences or random numbers.
* For example, using np.array([10, 20, 30]) makes a list of three numbers, and np.zeros((5,5)) makes a big square filled with zeros.
* I practiced index operations, combining arrays, finding intersections or differences between them, and doing math (like addition, subtraction, multiplication) directly.
* I also used NumPy to calculate things like average, median, and standard deviation on my data.

pandas

pandas helped me organize bigger sets of data, almost like working with a spreadsheet in Python.

* I used pd.Series([1, 2, 3, 4, 5]) to make a list with labels, and I know pandas is even more powerful for working with tables called dataframes.
* It’s perfect for reading files, fixing data, and quickly summarizing lots of information, which is helpful in machine learning projects.

Matplotlib

I learned Matplotlib is the main library for creating visual graphs from my data.

* By using import matplotlib.pyplot as plt, I could make line graphs, bar charts, scatter plots, and histograms.
* For example, after doing calculations with NumPy or pandas, I can plot that data to see patterns and trends.
* Matplotlib is great for making my results easy to understand, both for myself and anyone I share them with.

My Experience

Putting all of this together, I discovered how NumPy makes working with numbers and arrays fast, pandas helps with bigger, labeled datasets, and Matplotlib turns those numbers into visual stories with graphs and charts.