Learning Progress Document

There were 3 basic tasks in week-1:

1-Introduction to version control with git & github
2-Git branching (hands-on)
3-Understanding key terminologies and differences between them (AI/ML/DL/Data Science)

-Introduction to version control with git & github-

- Version control is a system that tracks changes to files over time, enabling collaboration, change tracking, and the ability to revert to previous versions.

- Git, a distributed version control system, excels in handling projects of all sizes with speed and efficiency.

- It allows each developer to have a complete copy of the repository, facilitates easy branching and merging, and ensures data integrity.

- Git's features, such as the staging area and robust branching, make it a powerful tool for managing code.

- GitHub is a web-based platform that hosts Git repositories, providing tools for version control and collaborative software development.

- It offers features like pull requests, issue tracking, and continuous integration to streamline project management.

- GitHub enhances collaboration by allowing multiple developers to work on projects simultaneously, sharing code and tracking changes effectively.

Common git commands:

1. Git init   (initialize a repo)
2. Git add . (Add all files to staging area)
3. Git commit -m "some message" (commit changes)
4. Git push origin main (push code to github or some other platform)

GIT BRANCHING(HANDS-ON)

Git branching allows developers to create separate lines of development within a repository, enabling them to work on new features, bug fixes, or experiments without affecting the main codebase.

Branches in Git are lightweight and easy to create, allowing for parallel development and collaboration.

Once a branch's work is complete and tested, it can be merged back into the main branch (usually `master` or `main`) to incorporate the changes into the main codebase.

You can use the link below to get the same basic hands-on idea of git branching as I did:
https://learngitbranching.js.org/

Some commands:

git branch <branch_name> (Create a New Branch)

git checkout <branch_name> (Switch to a Branch)

git checkout -b <branch_name>(Create a New Branch and Switch to It)

git branch (List All Branches)

git merge <branch_name> (Merge Changes from Another Branch)

git branch -d <branch_name>   (Delete a Branch (Locally))

git branch -D <branch_name> (Delete a Branch (Forcefully))

git branch -m <old_branch_name> <new_branch_name> (Rename a Branch)

Understanding key terminologies and differences between them (AI/ML/DL/Data Science)

Data Science

Data science is an interdisciplinary field that employs scientific methods, processes, algorithms, and systems to extract knowledge and insights from structured and unstructured data. Its key components include data collection, data cleaning and preprocessing, exploratory data analysis (EDA), statistical modeling, machine learning (ML), and data visualization. Data science finds applications across various industries such as healthcare (e.g., predictive modeling for disease diagnosis), finance (e.g., risk assessment and fraud detection), marketing (e.g., customer segmentation and recommendation systems), and many more. It plays a crucial role in driving data-driven decision-making and deriving actionable insights from large and complex datasets.

Artificial Intelligence (AI)

Artificial intelligence (AI) refers to the simulation of human intelligence in machines, enabling them to perform tasks that typically require human cognition. Key components of AI include machine learning (ML), natural language processing (NLP), computer vision, and robotics. Machine learning, a subset of AI, involves algorithms that learn from data and make predictions or decisions based on patterns and statistical analysis. NLP focuses on

enabling computers to understand, interpret, and generate human language, while computer vision involves teaching machines to interpret and analyze visual information from images or videos. AI finds applications across various sectors such as healthcare (e.g., medical image analysis and drug discovery), autonomous vehicles, virtual assistants, finance (e.g., algorithmic trading), and personalized recommendations in e-commerce and entertainment. It continues to advance rapidly, shaping the future of technology and impacting various aspects of our lives.

Machine Learning (ML)

Machine learning (ML) is a specialized area within artificial intelligence (AI) that concentrates on crafting algorithms capable of learning from data. ML encompasses several types:

Supervised Learning: This type trains models using labeled data, enabling tasks like regression and classification.

Unsupervised Learning: Here, the focus is on finding patterns in unlabeled data, such as clustering similar data points.
Semi-supervised Learning: This method leverages both labeled and unlabeled data for training.

Reinforcement Learning: In this approach, machines learn through rewarding desirable actions, simulating how humans learn from feedback. Common ML algorithms include linear regression, decision trees, support vector machines, and neural networks, each serving specific purposes in data analysis and prediction.

Deep Learning (DL)

Deep learning is a subset of machine learning (ML) that employs artificial neural networks with multiple layers to learn from data representations. Its key components include deep neural networks (DNNs), convolutional neural networks (CNNs), recurrent neural networks (RNNs), and deep learning frameworks like TensorFlow and PyTorch. Deep learning excels in handling large and complex datasets, extracting intricate patterns, and making high-level abstractions. It finds applications in various domains such as

computer vision (e.g., image recognition and object detection), natural language processing (e.g., sentiment analysis and language translation), speech recognition, healthcare (e.g., medical image analysis and drug discovery), autonomous vehicles, and more. Deep learning's ability to model intricate relationships in data and derive meaningful insights has revolutionized many industries, making it a cornerstone of modern AI applications.

Differences between them (AI/ML/DL/Data Science)

Artificial intelligence (AI) is a broad field that encompasses the development of intelligent systems capable of performing tasks that typically require human intelligence. Machine learning (ML) is a subset of AI focused on developing algorithms that allow computers to learn from data and make predictions or decisions based on patterns. Deep learning (DL) is a specialized area within ML that uses neural networks with multiple layers to learn complex representations of data. Data science is an interdisciplinary field that combines domain expertise, programming skills, and statistical knowledge to extract insights and knowledge from data using various techniques, including ML and statistical analysis. While AI is the overarching field, ML and DL are specific techniques within AI, and data science is the practice of extracting knowledge and insights from data using a variety of tools and methodologies.