**Week 1 (Byte wise fellowship)**

**Introduction to version control with Git and GitHub:**

**What is Version Control?**

Version control is a system that records changes to files over time, allowing you to recall specific versions later. It is essential for tracking modifications to code, documents, or any set of files where changes need to be monitored and managed.

**Git: A Distributed Version Control System**

Git is a popular distributed version control system designed to handle everything from small to very large projects with speed and efficiency. It was created by Linus Torvalds in 2005 for managing the Linux kernel development.

**Key features of Git include:**

* **Distributed:** Every user has a full copy of the repository, allowing work to continue even when offline.
* **Branching and Merging:** Lightweight and fast branching and merging are integral to Git, enabling parallel development and feature isolation.
* **Security and Integrity:** Git uses cryptographic hashes to ensure the integrity of your data.
* **Speed:** Operations like commit, branch creation, and merging are very fast due to Git's design.

**GitHub: Hosting and Collaboration Platform**

GitHub is a web-based platform built around Git, offering hosting for Git repositories. It adds features such as:

* **Remote Repositories :** Allows you to store your Git repositories online and access them from anywhere.
* **Collaboration:** Facilitates collaboration with features like pull requests, code review, and issue tracking.
* **Community and Social Coding:** Users can follow each other, star repositories, and contribute to open-source projects.

**Basic Git Workflow**

1. **Initialize a Repository :** Start tracking changes to your project by initializing a Git repository.

Bash command:

* **git init**

2. **Add and Commit Changes:** Add files to the staging area and commit changes to the repository.

Bash command:

* **git add <file(s)>**
* **git commit -m "Commit message"**

3. Branching and Merging: Create branches for new features or bug fixes, then merge changes back into the main branch (typically `master` or `main`).

Bash command:

* **git branch <branch-name>**
* **git checkout <branch-name>**
* **git merge <branch-name>**

4. **Remote Repositories (GitHub):** Link your local repository to a remote repository on GitHub.

Bash command:

* **git remote add origin <remote-repository-url>**
* **git push -u origin master**  # Push changes to the remote repository

5. **Collaboration :** Fork repositories, clone them locally, make changes, and propose them back via pull requests.

**Getting Started with Git and GitHub**

**To begin using Git and GitHub:**

**Install Git**: Download and install Git from **(https://git-scm.com.)**

- **Create a GitHub Account**: Sign up for GitHub at **(https://github.com).**

- **Configure Git:** Set up Git with your name and email.

Bash command:

* **git config --global user.name "Your Name"**
* **git config --global user.email "your.email@example.com"**

- Create a Repository: Either locally with `git init` or on GitHub via the web interface.

- Clone a Repository: Clone a repository from GitHub to your local machine.

Bash command:

* **git clone <repository-url>**

**Summary:**

Version control with Git and GitHub is essential for both individual developers and teams working collaboratively on projects, enabling efficient development workflows, code review processes, and project management.

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

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| --- | --- | --- | --- | --- |
|  | Artificial Intelligence (AI) | Machine Learning (ML) | Deep Learning (DL) | Data Science(DS) |
| Definition | Broad field focused on creating intelligent systems that perform tasks requiring human intelligence. | A subset of AI involves algorithms that learn from data to make predictions or decisions. | Subset of ML using neural networks with many layers to model complex patterns in data. | Interdisciplinary field using scientific methods to extract knowledge and insights from data. |
|  |  |  |  |  |
| Goal | Encompasses ML, DL, NLP, robotics, computer vision, etc. | Includes supervised (Labeled) unsupervised, (non-labeled data), and reinforcement learning (both labeled and non-labeled data) | Specialized in handling large datasets and tasks like image recognition, NLP, etc. | Encompasses data collection, cleaning, analysis, visualization, and interpretation. |
|  |  |  |  |  |
| Scope | Create systems that perform intelligent tasks like reasoning, problem-solving, and understanding natural language. | Enable machines to learn from data and improve performance over time. | Automatically discover representations in data through multiple layers of non-linear transformations. | Extract actionable insights from data to inform decision-making and solve complex problems. |
|  |  |  |  |  |
| Techniques | Various AI techniques including ML, DL, expert systems, and rule-based systems. | Algorithms like decision trees, support vector machines, and neural networks. | Neural networks like ANNS(data present in the form of numbers), CNNs(Data present in the form of images), RNNs,(Time-series data), and LSTMs. | Techniques from AI, ML, DL, statistics, and domain-specific methods. |
|  |  |  |  |  |
| Examples: | AI-powered chatbot that can understand and respond to human queries. | Spam filter that learns to detect spam emails based on past data. | Image recognition system that can identify objects in photos. | Analyzing customer data to identify purchasing patterns and improve marketing strategies. |

**Diagram:**

