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**AI/ML Developer Intern Internship Week 01**

**Dated:** 22/07/2024

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| **Introduction to Git control version and GitHub**  **What is Version Control?**  A version control system keeps record of changes to files over time, and it facilitates several users working on projects collaboratively and making versions of files.  It enables the developer to track changes, revert back to previous versions, work collaboratively with other people, and preserve a record of a project's evolution.  **Git: A Distributed Version Control System**  Git is a popular, distributed version control system developed by Linus Torvalds in 2005. Unlike centralized version control systems, in Git, each user has a local full copy of the repository.  Key features of Git include the following:  **Branching and Merging:** Anyone can easily create branches for features and work on them in isolation, then merge them back to the master branch.  **Speed and Performance:** Since it is local, it runs fast.  **Distributed Nature:** Every user has the entire repository duplicated, improving collaboration and redundancy.  **Integrity:** It guarantees the integrity of files by means of SHA-1 hashes.  **GitHub: A Collaboration Platform**  GitHub is a web-based platform that makes use of Git for version control. It offers a place where developers can store and share their code.  Key features of GitHub include:  **Repositories:** A central location including all the project files and their entire history.  **Forking:** Make a personal copy of someone else's repository to work on independently.  **Pull Request:** Propose changes to a repository, and the changes can be reviewed and merged by that repository's maintainers.  **Projects and Issues:** Tools for tracking tasks, bugs, and feature requests. GitHub Actions: Automation of workflows, such as testing and deployment  **What have I learned?**  I learned to create a repository in GitHub, clone a repository, commit changes and many more. |
| **Git Branching Hands on Learning**  **Git Branching Introduction**  Git branching is one of the major strengths of Git. It allows developers to diverge from the main codebase to work on new features, fix bugs, or experiment in an independent way from the rest of the code base. This ensures no instability of the main branch while development takes place in other branches.  **Key Concepts**  **Head**: A pointer to a snapshot of your changes. The default branch in Git is main or master.  **HEAD:** A reference to the current branch.  **Merge:** Apply changes from one branch to another.  **Rebase:** Apply your commits onto the top of another base branch.  **Common Branching Workflows**  **Feature Branch Workflow:**  For every feature or bug fix, create a new branch.  Merge the feature branch into the main branch upon completion.  **Gitflow Workflow:**  Besides the main and develop branches, there are several other additional branches – feature, release and hotfix.  It is a structured approach with different branches, for creation, release, and hot fixing.  **Forking Workflow:**  This command forks an entire repository under your own personal account.  Modify changes in your fork, then pull requests propose a change to the original repository.  **What I learned?**  I learned creating, switching, deleting and merging the branches. |
| **Understanding key terminologies and differences between them (AI/ML/DL/Data Science)**  **Artificial Intelligence**  AI is the broad field of creating machines or systems that can perform tasks typically requiring human intelligence.  **Key Features:**  Requires a diversity of technologies, spanning simple rule-based through complicated machine learning models.  The subfields of AI include machine learning, natural language processing, computer vision, and robotics.  **Examples:**  Chatbots  Recommendation systems  Autonomous Vehicles  **Machine Learning**  It is a subfield of artificial intelligence involving the design of algorithms that allow computers to learn from, and hence make predictions or decisions based on, the input data.  **Key Features:**  The statistical methods applied rely on machines improving their performance over time.  Types of ML include supervised learning, unsupervised learning, and reinforcement learning.  **Examples:**  Filtering of spam emails  Fraud detection  Predictive Maintenance  **Deep Learning (DL)**  DL is a subset of ML that makes use of many layers of neural networks (deep neural networks) in the analysis of various types of data.  **Key Features:**  It excels in tasks involving large amounts of unstructured data: images, audio, and text.  It requires significant computational power and large datasets.  **Examples:**  Image and speech recognition  Language translation  Game playing AI like AlphaGo  **Data Science**  Data Science is an Interdisciplinary Field Oriented toward the Extraction of Knowledge and Insights from Data Using Techniques of Statistics, Machine Learning, and Data Analysis.  **Key Features:**  It involves data collection, cleaning, preprocessing, analysis, and visualization.  It makes use of tools and techniques from machine learning but it also includes traditional statistical methods.  **Examples:**  Market Analysis  Customer Segmentation  Healthcare Analytics  **Differences:**  **Scope:**  **AI:** It has the broadest scope; it encompasses all types of intelligent systems.  **ML:** It is focused only on learning from data.  **DL:** Deep Learning; it is a specialized part of Machine Learning oriented toward deep neural networks.  **Data Science:** It is broader than ML/DL. It means handling and analyzing the whole process of data.  **Techniques:**  **AI:** Rule-based, ML, expert systems, etc.  **ML:** Methods of statistical learning like regression, classification, clustering.  **DL:** Many layers of a neural network.  **Data Science:** Blend of ML/DL techniques with handling, visualization, and traditional statistics on data.  **Applications:**  **AI:** General problem-solving, decision-making.  **ML:** Specific tasks, such as predictions or pattern recognition.  **DL:** Intricate tasks involving large, unstructured datasets.  **Data Science:** Generation of insights, business intelligence, or scientific research. |