Weekly Report: Rafid Ul Karim - Alpha AI

Week 2 (March 24 – March 27)

1. Course Documentation & Literature Review

a. Progress & Learnings:

- Provided documentation related to the courses completed. These include materials from Unsupervised Learning, Recommenders, Reinforcement Learning as well as Linear Algebra.
- Completed a deep dive into research on XGBoost by reading the accompanying research paper.
- Produced a comprehensive literature review on XGBoost, highlighting its scalable tree boosting system and key innovations such as regularization in gradient boosting, sparsity-aware split finding, and system-level optimizations.

b. Key Concepts Covered:

- Advanced unsupervised learning techniques, recommender systems, and reinforcement learning principles.
- XGBoost's innovations: regularized learning objective, weighted quantile sketch for split finding, and sparse data handling.
- Fundamental concepts in linear algebra relevant to machine learning methodologies.

c. Deliverables/Resources:

- Available in 'Cloudly-Alpha-AI-Team-1" repository.:
    - Documentation - Unsupervised Learning, Recommenders, Reinforcement Learning – Rafid Ul Karim.pdf
    - Documentation - Linear Algebra – Rafid Ul Karim.pdf
    - Literature Review - XGBoost – Rafid Ul Karim.pdf

2. Agile Development Lecture

a. Progress & Learnings:

- Attended one of the two lectures on Agile Development.
- Gained insights into agile methodologies including Scrum and Kanban, which are integral to Cloudly's agile frameworks.
- Explored Agile Roles and Responsibilities covering positions such as Product Owner, Scrum Master, and the Development Team, alongside an introduction to Disciplined Agile Delivery (DAD).

b. Key Concepts Covered:

- Fundamentals and benefits of *Agile Development*, emphasizing iterative progress and adaptability.
- Overview of *Scrum* and *Kanban* frameworks as employed at Cloudly.
- Role-specific responsibilities ensuring effective agile workflow and project management.

c. Deliverables/Resources:

- Lecture notes and supplementary materials on Agile Development (no formal deliverables).

3. ML Specialization Course Update & Future Plans

a. Progress & Learnings:

- Completed the *Machine Learning Specialization* course, marking the successful end of this learning module.
- Moving forward, the focus will shift toward obtaining full certification; the next course to tackle is *Mathematics for Machine Learning: Multivariate Calculus*.
- Plans include further experimentation with machine learning models to deepen the practical understanding of the advanced techniques covered.

b. Key Concepts Covered:

- Consolidation of key machine learning principles learned in the completed specialization.

- A preview of topics in *multivariate calculus* relevant to machine learning in preparation for the next course.
- Emphasis on the importance of hands-on experimentation to bridge theory with applied model development.