**Weekly Progress Report**

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**Domain:** Data Science and Machine Learning  
**Date of Submission:** 19 - 02 - 2025

**Week Ending:** 03

**I. Overview:**

This week, I focused on deepening my understanding of **probability and statistics** by studying **"An Introduction to Probability and Statistics"** by **Vijay K. Rohatgi and A. K. Md. Ehsanes Saleh**. The main objective was to strengthen my grasp of key concepts essential for data science applications, including **probability theory, random variables, and statistical inference**.

**II. Achievements:**

1. **Book Study:**
   * Read chapters covering:
     + Fundamental probability rules and axioms (Bayes' Theorem, independence).
     + Random variables and their probability distributions (both discrete and continuous).
     + Combinatorial techniques for finite sample spaces.
2. **Practical Applications:**
   * Worked on examples related to **probability spaces, sampling methods, and combinatorial probability**.
   * Explored real-world applications of these concepts in problem-solving scenarios.

**III. Challenges:**

1. **Complex Topics:**
   * Advanced topics, such as **moment inequalities and combinatorial methods**, required extra effort and additional practice for better comprehension.
2. **Time Management:**
   * Managing book study along with other responsibilities was slightly challenging this week.

**IV. Learning Resources:**

* **"An Introduction to Probability and Statistics"** by **Vijay K. Rohatgi and A. K. Md. Ehsanes Saleh**.
* Online tutorials and video lectures to simplify complex statistical concepts.
* Practice problems from the book to reinforce understanding and improve problem-solving skills.

**V. Next Week's Goals:**

1. **Further Book Study:**
   * Explore chapters covering **statistical inference and hypothesis testing**.
   * Work on more advanced problems to improve practical application skills.
2. **Project Development:**
   * Start integrating **statistical methods into datasets** for projects, including:
     + **Crop and Weed Detection**
     + **Predicting the Lifetime of a Bearing in Manufacturing**

**VI. Additional Comments:**

This week's learning has provided a **strong statistical foundation**, which is essential for data science and machine learning. I am excited to apply these concepts to real-world projects and further enhance my practical understanding.