

# **WEEKLY PROGRESS REPORT**

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Domain: Data Science & Machine Learning Internship

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## **WEEK ENDING: 04**

### **I. OVERVIEW:**

This week represented the completion phase of my Data Science and Machine Learning internship. My primary focus was on revising all the topics covered during the internship, completing quizzes, finalizing my weekly reports, and preparing for certification. I reviewed concepts ranging from Python basics and statistics to machine learning algorithms and their real-world applications.

I had submitted this week's report earlier; however, it was rejected, and no specific reason was mentioned to me. Therefore, I prepared this revised version with updated content and improved clarity. During this week, I also reflected on my overall learning journey and ensured all pending tasks and submissions were completed successfully.

### **II. ACHIEVEMENTS:**

#### **a. Video Learning: Introduction to Machine Learning**

Through the video sessions, I understood that Machine Learning is a key area of Artificial Intelligence in which systems improve performance by learning from data rather than following strictly programmed rules. Instead of manual instructions, data is used to detect trends and make informed predictions.

The videos showed practical uses of Machine Learning in search engines, product recommendations on platforms like Amazon and Netflix, virtual assistants, automated chat services, and daily smartphone features such as face unlock and speech recognition. I also learned how data is divided into training and testing sets and how models are built and refined using that data.

### **b. Book Study: Introduction to Machine Learning (IoT Academy)**

I referred to the IoT Academy material, which was structured in slide format and made the concepts easier to follow. The book introduced fundamental ideas of Machine Learning, discussed its significance in present technologies, and provided several real-world applications.

It mainly covered supervised learning methods with emphasis on regression. I learned how regression models are created, how outputs are predicted, and the situations where regression is preferred. The examples and simple programs included in the material helped me connect theoretical concepts with actual implementation.

### **c. E-Book Study: Introduction to Machine Learning**

The e-book helped me explore Machine Learning in greater depth. It discussed multiple application areas such as recommendation systems, fraud detection, medical diagnosis, email spam filtering, and pattern recognition. It highlighted how probability and statistics support Machine Learning, explaining topics like probability distributions, expectation, variance, and Bayes' theorem.

I learned about important algorithms such as k-nearest neighbors, Naive Bayes, perceptron, k-means clustering, logistic regression, and support vector machines. Optimization ideas such as gradient descent and boosting techniques were also covered, which clarified how models are improved to perform better.

### **d. Quiz Learning: Test Your Knowledge – DS (Quiz-2)**

In this week, I attempted Quiz-2 and scored 18 out of 20. The quiz helped me assess my understanding of the topics covered so far. I learned that selecting model parameters through systematic techniques such as grid search can significantly improve model performance. I also understood how learning curves are useful for detecting overfitting and underfitting.

The quiz strengthened my understanding of the bias–variance trade-off and showed how maintaining a proper balance leads to better accuracy. I revised important topics such as data preprocessing, Python list operations, decision tree models, evaluation measures for Random Forest, and the application of Naive Bayes in medical classification scenarios.

### **III. CHALLENGES:**

#### **a. Learning New Terminology**

Machine Learning introduced a wide range of unfamiliar terms such as supervised and unsupervised learning, overfitting, underfitting, regularization, cross-validation, hyperparameters, and feature selection. Understanding these words was not just about memorizing definitions but about knowing where and how they are used in real problems. I had to revisit these concepts multiple times to develop clarity.

#### **b. Applying Concepts to Real Problems**

It was challenging to connect ideas from probability, statistics, and linear algebra to practical machine learning tasks. Understanding how statistical distributions influence predictions or how correlation and regression impact the selection of relevant features required careful observation and practice with examples. Translating theory into application took time and effort.

#### **c. Handling Mathematical Depth**

Many machine learning techniques are mathematically intensive. Topics like gradient descent, logistic regression, SVM, k-means clustering, and boosting involve equations and theoretical assumptions. Interpreting these mathematical concepts and linking them with implementation in Python needed extra concentration and step-by-step learning.

#### **d. Transitioning from Theory to Coding Practice**

Working with Python libraries such as scikit-learn was initially difficult. Combining different stages like preprocessing, feature engineering, model training, tuning parameters, and evaluating results into one complete workflow required repeated practice. Understanding evaluation measures such as accuracy, precision, recall, F1-score, confusion matrix, and ROC curve also demanded additional revision.

### **IV. LEARNING RESOURCES:**

#### **a. Video Lectures**

- Gave clear, visual explanations of machine learning ideas and how they are applied in the real world.
- Made topics such as supervised and unsupervised learning easier to understand through practical demonstrations.
- Showed the complete process of training, validating, and testing models and how they are used in areas like recommendations, image recognition, and spam detection.

- Helped revise important concepts including overfitting, underfitting, dataset quality, and the role of sufficient training samples.

### **b. IoT Academy Slides**

- Supported systematic learning of topics such as supervised learning, regression methods, and basic Python implementations.
- Contained well-organized slides and worked examples that simplified difficult theories.
- Illustrated how algorithms are applied in practice, from data preprocessing to model development and performance evaluation.
- Helped relate classroom concepts to real-life problems like prediction tasks and classification problems.

### **c. E-book**

- Improved my conceptual foundation and introduced more detailed machine learning theories and methods.
- Discussed several algorithms including k-nearest neighbors, Naive Bayes, perceptron, k-means clustering, logistic regression, and SVM.
- Explained how probability, statistics, and optimization methods such as gradient descent and boosting support machine learning models.
- Provided case studies from domains like healthcare, email filtering, recommendation systems, and forecasting applications.
- Helped me connect mathematical equations and theoretical ideas with practical coding implementations in Python.

## **V. UPCOMING GOALS**

### **a. GitHub Submission Recording**

I will watch the GitHub recording to understand the correct procedure for submitting the internship report. The recording will guide me through the proper format, structure, and steps required for a successful submission, ensuring that the report meets the expected standards.

### **b. Sample Internship Report**

I will review the sample internship report to understand the expectations and reporting standards. This will help me learn the appropriate presentation style, content organization, and level of detail required, so I can prepare my report accordingly.

### **c. Quiz Preparation**

I will prepare for and attempt the final Quiz-3 to assess my overall understanding of the internship topics. The quiz will cover concepts learned

throughout the program, including Machine Learning, Python implementation, and statistical foundations, helping me evaluate my knowledge and readiness for practical applications.

#### **d. Feedback Submission**

I will provide feedback on my internship experience, including the usefulness of the learning resources, guidance provided, and overall support. Sharing constructive comments will help improve the program for future participants and reflect on my own learning journey.

#### **e. Internship Certification**

Finally, I will complete all formalities to receive the internship certificate. This includes ensuring that all assignments, quizzes, and report submissions are completed accurately, marking the successful completion of the internship program.

### **VI. ADDITIONAL COMMENTS**

This final week gave me an opportunity to revisit and consolidate everything learned during the internship. I feel more confident in understanding machine learning workflows, model evaluation, and basic implementation using Python. The hands-on exercises, quizzes, and study materials were very useful in strengthening my foundation.

My previous report for this week was rejected, although I was not informed of the exact reason. I have therefore rewritten the report with fresh content, clearer explanations, and better structure. I hope this revised submission meets the expected requirements. Overall, the internship has been a valuable learning experience and has enhanced my interest in data science and machine learning.