

## **Weekly Report – Week 15**

**Course:** Applied Data Science with AI

**Semester:** BSSE 7<sup>th</sup> Semester Regular

**Week #:** 15

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**Project Title:** 4 → Credit Card Fraud Detection

## **1. Reading Summary**

### **Reading Materials:**

- Purdue OWL – Report Writing and Academic Formatting
- Guidelines for Writing Technical and Research Project Reports

### **Key Learnings:**

This week focused on transforming technical project work into a complete academic report. From the Purdue OWL resources, I learned how to structure a formal project report using proper sections such as introduction, literature background, methodology, results, discussion, and conclusion. The reading emphasized clarity, logical flow, and consistency throughout the document.

I learned that a good project report does not simply list code or results, but explains *why* certain methods were chosen, *how* experiments were conducted, and *what* the results mean. This is especially important in AI and machine learning projects, where models may behave like black boxes if not properly explained.

Another important learning was about academic writing style. I understood how to write in a clear, objective, and professional tone while avoiding unnecessary complexity. The readings also stressed the importance of proper formatting, headings, spacing, and referencing, which make the document readable and academically acceptable.

In addition, I learned about ethical academic practices such as avoiding plagiarism, properly referencing sources, and clearly presenting original work. These principles helped me ensure that my project report is authentic, well-documented, and suitable for evaluation.

### **Reflection:**

These readings helped me convert my semester-long Credit Card Fraud Detection project into a well-organized academic document. I realized that even a strong technical project can lose value if it is not clearly documented. This week allowed me to reflect on all the work completed from Week 1 to Week 14 and present it in a professional and

understandable form. It gave me confidence that my project is not only technically strong but also academically complete.

## **2. Classroom Task Documentation**

### **Peer Review of Project Reports**

During this week's class activity, I participated in a peer review session where students reviewed each other's project draft reports. I carefully reviewed a classmate's project and provided feedback on clarity, organization, methodology explanation, and result interpretation.

Similarly, I received feedback from peers on my own draft report. The suggestions mainly focused on improving explanation flow, adding more detail in the methodology section, and refining the conclusion. Based on this feedback, I revised my report to make explanations clearer and more structured.

This activity helped me understand how readers interpret my work and allowed me to improve the overall quality of my project documentation.

## **3. Weekly Assignment Submission**

### **Assignment Title:**

**Project Draft Report and Final GitHub Repository**

### **Work Performed:**

For the Week 15 assignment, I completed the full draft of my Credit Card Fraud Detection project and prepared it for final submission. The report includes the complete end-to-end pipeline of the project, starting from problem understanding to final explainability.

The draft report contains the following sections:

## **1. Introduction and Problem Statement**

Explained the importance of fraud detection in modern digital financial systems and the challenges faced due to highly imbalanced data.

## **2. Dataset Description and Preprocessing**

Described the credit card transaction dataset, feature anonymization, data cleaning, scaling, and preprocessing steps.

## **3. Exploratory Data Analysis (EDA)**

Included visual analysis, fraud vs non-fraud distribution, correlation analysis, and statistical insights.

## **4. Model Development**

Documented all implemented models:

- Logistic Regression
- Random Forest
- Artificial Neural Network (ANN)
- Recurrent Neural Network (RNN/LSTM)
- Unsupervised Learning (K-Means + PCA)

## **5. Model Evaluation**

Compared models using accuracy, precision, recall, F1-score, ROC curve, and AUC, focusing on recall due to fraud imbalance.

## **6. Model Deployment**

Explained deployment of the trained model using Flask API for real-time fraud prediction on localhost.

## **7. Explainability and Ethics**

Added SHAP and LIME explainability to justify fraud predictions and discussed ethical considerations such as transparency and fairness.

## **8. Conclusion and Future Work**

Summarized project outcomes and suggested future improvements like real-time streaming data and advanced ensemble methods.

Along with the report, I finalized my GitHub repository by organizing weekly assignments, notebooks, saved models, and documentation. I ensured that the repository reflects the complete project journey from Week 1 to Week 15.

### **GitHub Link for project:**

<https://github.com/amna84703-jpg/DataScience-AI-Projects>

## **4. Project Progress Milestone**

By the end of Week 15, the Credit Card Fraud Detection project reached its final milestone.

The complete end-to-end system is ready, including:

- Data preprocessing
- Machine learning and deep learning models
- Evaluation and comparison
- Deployment through API
- Explainability using SHAP and LIME
- Proper academic documentation

The project is now fully prepared for final academic submission and evaluation.

## **5. Self-Evaluation**

I completed all task on time.