Project Design Phase-I
Proposed Solution
Template

Date	22 October 2023
Team ID	Team-593170
Project Name	Walmart Sales Analysis for Retail Industry with Machine Learning
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Walmart, a leading retail corporation operating a chain of hypermarkets, is seeking to improve its sales forecasting accuracy. The company wishes to understand the impact of holidays on store sales and use this knowledge to make informed business decisions. Walmart provides sales data from 45 stores, including store information and monthly sales records. They run promotional markdown events, which correspond to holidays such as the Super Bowl, Labor Day, Thanksgiving, and Christmas. These holiday weeks are given five times more weight in the evaluation than regular weeks. The objective is to develop a robust machine learning model that can accurately forecast sales and quantify the influence of these holidays on sales
2.	Idea / Solution description	The idea and solution involve using machine learning to analyze historical sales data from Walmart's 45 stores, focusing on the impact of holidays (Christmas, Thanksgiving, Super Bowl, and Labor Day) on sales. The key steps include data preparation, exploratory analysis, feature engineering, model development (Random Forest, Decision Tree, XGBoost, ARIMA), model evaluation, creating a Flask web application for interactive access, deploying it on IBM or another platform, and providing actionable insights to Walmart. This solution aims to enhance sales forecasting, optimize inventory management, and improve decision-making during holiday periods.

3.	Novelty / Uniqueness	The uniqueness of this project lies in its holistic approach, incorporating a multi-algorithm ensemble, rigorous holiday impact analysis, an interactive Flask-based web application, IBM deployment, continuous model monitoring, and actionable insights. This comprehensive solution not only provides highly accurate sales forecasts but also offers Walmart an advanced tool to understand the specific influence of holidays on sales, make data-driven decisions, and optimize inventory management, setting it apart in the realm of retail analytics.
4.	Social Impact / Customer Satisfaction	By accurately forecasting sales and understanding the impact of holidays, it enables Walmart to better serve its customers. With improved inventory management, the retailer can ensure that products are available when and where customers need them, reducing out-of-stock situations and improving customer satisfaction. This, in turn, leads to a more positive shopping experience for customers. Additionally, by optimizing promotional strategies around holidays, Walmart can provide more targeted and relevant offers to its customers, enhancing their overall shopping experience. The project's continuous monitoring and updates ensure that these benefits are sustained over time, further contributing to customer satisfaction. Ultimately, this project has the potential to enhance Walmart's competitiveness and customer loyalty, positively impacting both the retail industry and the communities it serves.
5.	Business Model (Revenue Model)	The business model for the Walmart Sales Analysis and Forecasting project involves multiple revenue streams, including subscription-based access to the analysis platform, pay-per-use options, consulting services, data insights reports, data licensing to third parties, white label solutions for customization and branding, premium feature offerings, referral programs, and potential data partnerships with revenue-sharing arrangements. These revenue avenues cater to the diverse needs of retailers and data-driven companies seeking accurate sales forecasting and actionable insights, ensuring the project's sustainability and growth potential.

6.	Scalability of the Solution	The scalability of this solution is notable due to several key factors. Firstly, the machine learning models employed for sales forecasting can be easily scaled to accommodate additional stores or retail locations, making it feasible for Walmart to expand its use of the system. The use of cloud-based platforms, such as IBM for deployment, ensures that the solution can handle increased computational demands as data volume and user interactions grow. Furthermore, the continuous monitoring and update system can be extended to adapt to changing business requirements and increasing data volumes, preserving the solution's accuracy and relevance over time. Additionally, the white label and data licensing options facilitate scalability by allowing other retailers and businesses to benefit from the same solution. As the demand for data-driven decision-making in retail continues to grow, this solution can readily expand to serve the broader retail industry, making it highly scalable.