SHAP Analysis and Model Report

1. Introduction:

This report explains how our model predicts food hamper demand and how different factors affect predictions. We used SHAP (SHapley Additive Explanations) to understand which features matter the most.

2. Model Overview:

- Algorithm Used: XGBoost (a machine learning model that improves predictions over time).

- Target Variable: 'quantity' (number of food hampers needed).

Most Important Features (from SHAP analysis):

  - quantity_weekly = The past week's food demand affects future demand the most.

  - week_of_year = Demand changes depending on the time of year.

  - is_peak_season= Demand is higher in certain peak seasons.

3. SHAP Analysis Result:

3.1 Feature Importance:

- 'quantity weekly' is the most important factor in predicting food hamper demand.

- 'week_of_year' shows that different weeks of the year have different levels of demand.

- 'is_peak_season' confirms that demand increases during certain times.

3.2 SHAP Dependence Plots:

-Quantity Weekly:Higher weekly demand means future demand is likely to increase.

-Week of Year: Demand changes depending on the time of year.

-Is Peak Season: Demand increases during busy periods.

4. Key Takeaways and Recommendations:

- Past weekly demand is the best predictor of future demand.

- Seasonality matters-demand changes throughout the year.

- peak seasons lead to increased demand, so planning ahead is important.

5. Conclusion:

This analysis helps explain why the model makes certain predictions. With these insights, we can plan food distributions better and reduce shortages. Fixing the dashboard will help visualize these insights more clearly.

This report summarizes our Explainable AI (XAI) study on food hamper demand prediction.