SHapley Additive exPlanations

The goal of this analysis is to identify which features most influence the classification of emails into one of four categories:

* **Malicious (0)**
* **No Action (1)**
* **Spam (2)**
* **Warning (3)**

SHAP (SHapley Additive exPlanations) is a machine learning explainability technique that assigns each feature an importance value based on its contribution to a model’s prediction. In this project, SHAP was applied to an email classification model that categorizes emails as Malicious, Warning, No Action, or Spam. The purpose of this analysis is to understand which features most influence the model’s decisions for each class. This insight improves transparency by explaining why a prediction is made, guides feature engineering by highlighting the most impactful features, and supports the creation of realistic synthetic data for testing.