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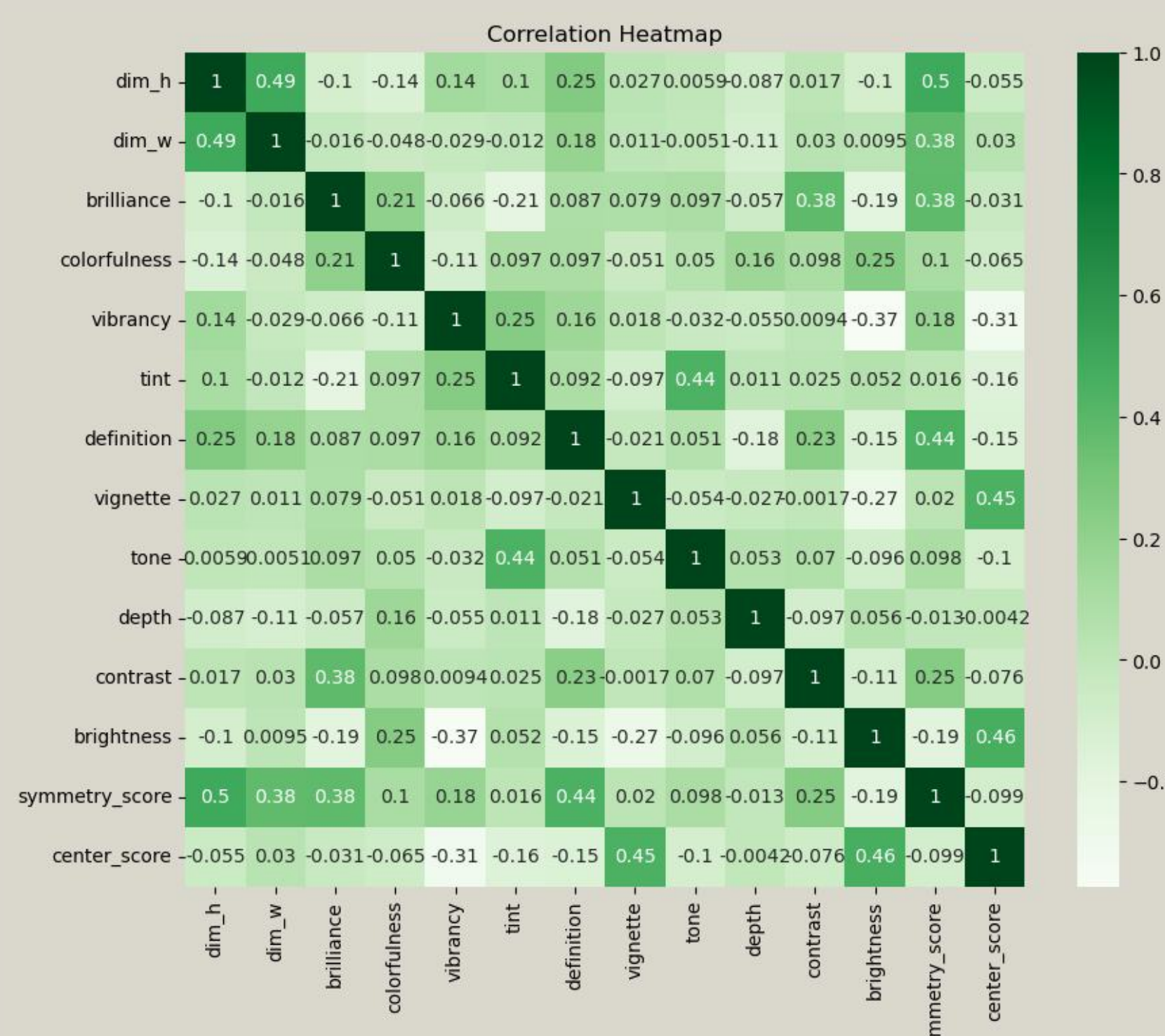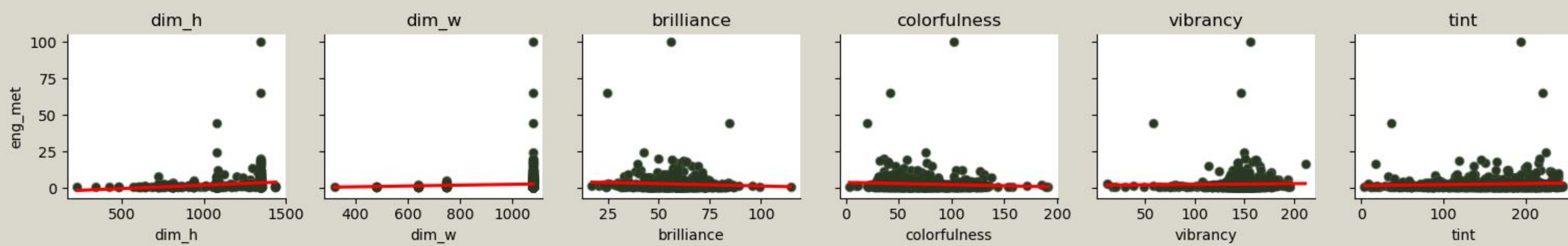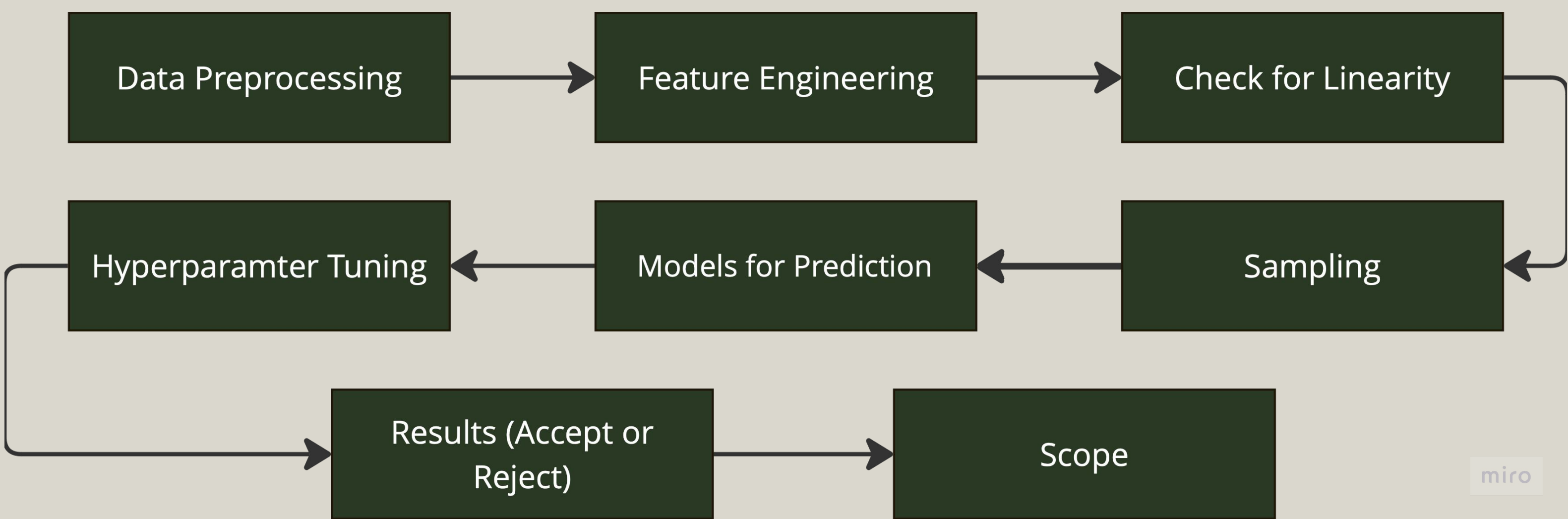# Image Aesthetics Impact on Social Media Engagement

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Introduction

The aesthetic quality of images is a crucial factor influencing user engagement on social media platforms. For users aiming to establish a business account focused on food-related content, understanding and improving the aesthetic appeal of their posts can significantly enhance their online presence and engagement.
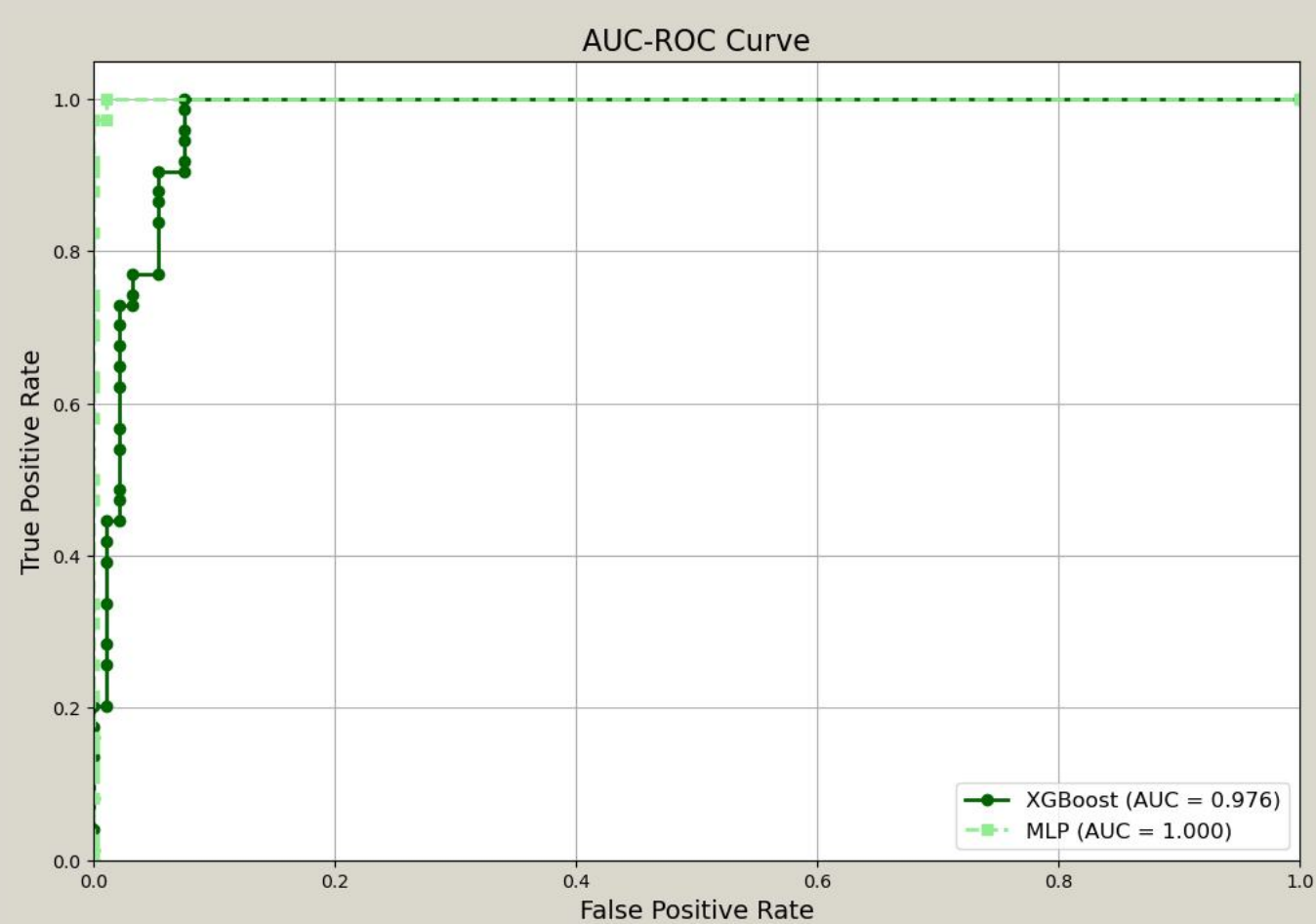

Correlation Heatmap

Workflow

Data Preprocessing → Feature Engineering → Check for Linearity → Sampling → Models for Prediction → Hyperparamter Tuning → Results (Accept or Reject) → Scope


Methodology

1. Preprocessing, developing image aesthetics (such as sharpness, hue, and saturation), and computing the engagement metric.

2. Identifying outliers and assessing multicollinearity and linear relationships between predictors and the target variable.

3. Addressing class imbalance issues through sampling techniques like bootstrapping.

4. Models and their accuracy :
   i) Logistic Regression - 0.72
   ii) Non-Linear Support Vector Classifier - 0.81
   iii) Decision Tree - 0.89
   iv) Random Forest Classifier - 0.93
   v) XG Boost - Extreme Gradient Boosting - 0.93
   vi) MLP - Multilayer Perceptron - 0.96

5. Hyperparameter tuning - Number of trees for Decision Tree and Random forest, Max Depth, No. of estimators, Epochs, Learning Rate etc.

Confusion Matrix - XGBoost, Confusion Matrix - MLP, Confusion Matrix - Random Forest, Confusion Matrix - Decision Tree, Confusion Matrix - Logistic Regression, Confusion Matrix - SVC

AUC-ROC Curve

The AUC (Area Under the Curve) quantifies the overall ability of the model to distinguish between positive and negative classes.

Learning Curve - MLP

The learning curves shows the MLP model's performance improves with more training examples.
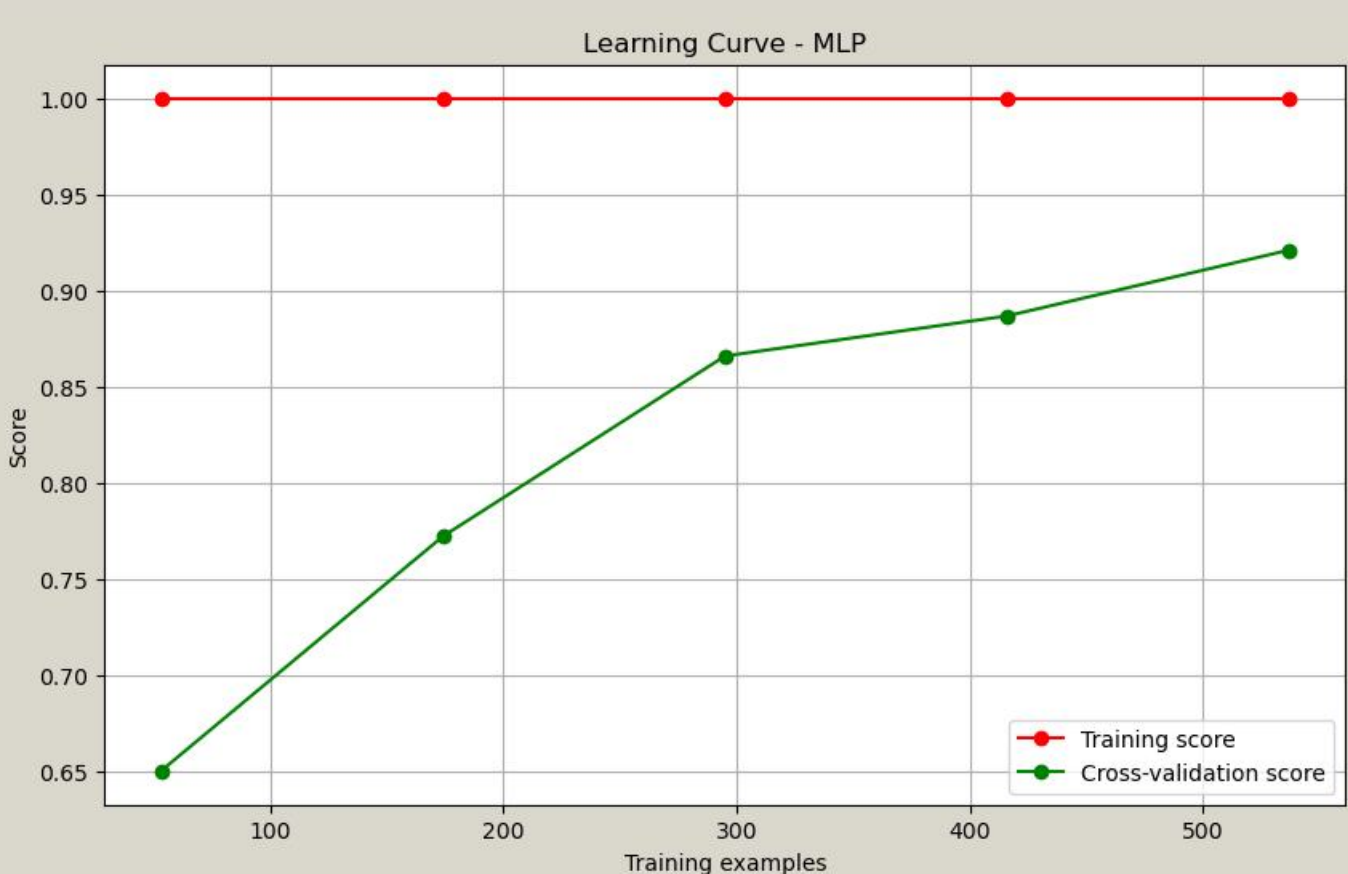
Conclusion & Scope

Integrating machine learning and deep learning enables the forecasting of engagement patterns for each image within a dataset, providing valuable insights for optimizing content and boosting engagement. While Random Forest, XGBoost, and MLP yield satisfactory results, MLP exhibits some signs of overfitting. The results could be enhanced with higher-quality data, a larger dataset, and possibly a different approach to managing class imbalance, such as using Synthetic Minority Oversampling Technique (SMOTE).

Scope: This approach could evolve into predicting overall engagement metrics by considering all variables (like caption-sentiment analysis, caption language, no. of hashtags, etc) influencing engagement alongside image aesthetics.

References

Li, Z., Zhang, Z. and Gao, S. (2023). Classical learning or deep learning: a study on food photo aesthetic assessment. Multimedia Tools and Applications, 83(12), pp.36469–36489. doi:https://doi.org/10.1007/s11042-023-15791-2.

Sheng, K., Dong, W., Huang, H., Chai, M., Zhang, Y., Ma, C. and Hu, B.-G. (2020). Learning to assess visual aesthetics of food images. Computational Visual Media. doi:https://doi.org/10.1007/s41095-020-0193-5.

Hou, L. and Pan, X. (2023). Aesthetics of hotel photos and its impact on consumer engagement: A computer vision approach. Tourism Management, 94, p.104653. doi:https://doi.org/10.1016/j.tourman.2022.104653.

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