

Climbing the Influence Tiers on TikTok: A Multimodal Study

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Supplementary Material

Values Used to Find Best Hyperparameters

To found the best hyperparameters for the selected machine learning algorithms, tested the following values:

- XGBoost (XGB): $\eta=[0.01, 0.1, 0.3]$, $\max_depth=[\text{None}, 3, 6, 12]$, $\min_child_weight=[1, 5, 10]$, $\gamma=[0, 1, 5]$, $\text{colsample_bytree}=[0.6, 0.8, 1.0]$;
- Random Forest (RF): $n_estimators=[50, 100, 250]$, $\text{criterion}=[\text{gini}, \text{entropy}]$, $\max_depth=[3, 5, 7]$, $\min_samples_leaf=[1, 3, 5]$;
- Logistic Regression (LR): $\text{penalty}=[l1, l2, \text{none}]$, $C=[0.1, 1, 10]$, $\text{solver}=[\text{liblinear}, \text{lbfgs}]$;
- Decision Tree (DT): $\text{criterion}=[\text{gini}, \text{entropy}]$, $\max_depth=[3, 5, 7]$, $\min_samples_leaf=[1, 3, 5]$;
- Naive Bayes (NB);
- Support Vector Machine (SVM): $C=[0.1, 1, 10, 100]$, $\text{kernel}=[\text{linear}, \text{poly}, \text{rbf}]$, $\gamma=[\text{scale}, \text{auto}]$;
- Deep Neural Network (DNN): $\text{hidden_layer_size}=[64, 128, 256]$, $\text{activation}=[\text{tanh}, \text{relu}]$, $\text{solver}=[\text{sgd}, \text{adam}]$;
- K-Nearest Neighbors (KNN): $n_neighbors=[3, 5, 7, 10]$, $\text{weights}=[\text{uniform}, \text{distance}]$.

Models Accuracy

If our feature extraction models are not accurate, the analyses could lose significance. For these reasons, in our experiments, we adopted several strategies to mitigate possible errors. First, we exclusively employed state-of-the-art models, choosing those that exhibited superior performance as acknowledged by the research community. Furthermore, to fortify the robustness of our findings, we first aggregated results for each influencer by consolidating data from multiple videos. This approach diminishes the impact of minor errors, emphasizing the significance of prominent values. To enhance precision during aggregation, we segmented numeric values into bins, thereby mitigating the potential influence of small discrepancies. Last, two authors of this paper conducted a manual double-check on a representative sample of 100 videos to thoroughly evaluate the performance of our classifiers. The outcomes of this reassessment are presented in Table1. Agreement between annotators has been calculated through Cohen’s Kappa, a statistical measure that

assesses the level of agreement between two raters beyond what would be expected by chance alone. A value of 1 represents a perfect agreement, while 0 represents no agreement. Accuracies have been calculated over samples on which annotators were in agreement. As shown in the table, all classifiers present accuracies above 80%, which affirms our results stand on a solid foundation.

Table 1: Feature extraction authors’ agreement (Kappa) and accuracies.

Category	Kappa	Accuracy (%)
Audio Emotion	0.79	0.86
Audio Valence	0.64	0.80
Audio Arousal	0.70	0.91
Audio Dominance	0.68	0.92
Age	0.83	0.90
Gender	0.98	0.90
Video Emotion	0.94	0.82

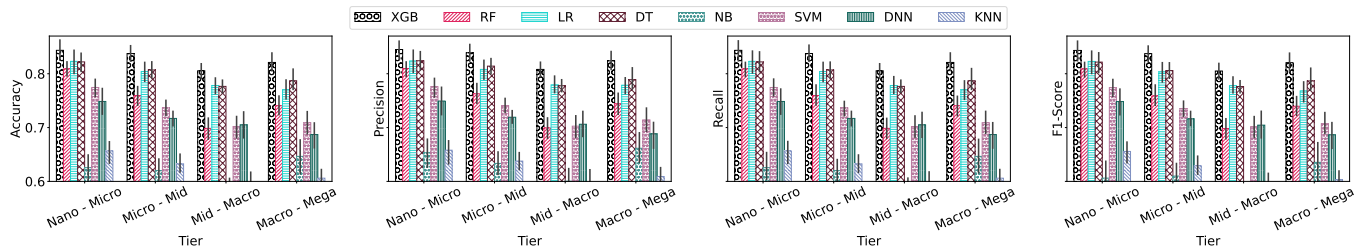


Figure 1: Classification results to predict the influencer tier on TikTok using several classifiers.

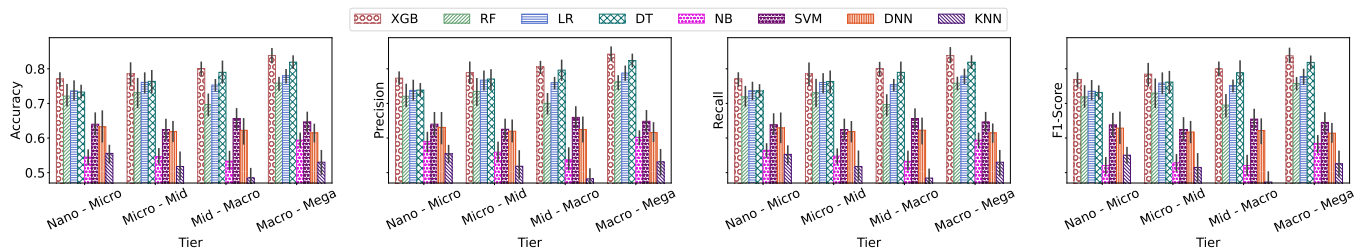


Figure 2: Classification results to predict the influencer tier on YouTube using several classifiers.