Ad Performance Prediction Report

This report provides an overview of the machine learning model developed to predict the performance of upcoming advertisements. The primary goal of the project is to forecast CTR (Click-Through Rate) and Conversions for upcoming creatives using **dummy ad performance data**.

The following tasks were carried out:

- Prepared dummy past campaign data (ad headlines, creative types, target audience, CTR, conversions).
- Trained machine learning models (Random Forest Regressor) to predict CTR and Conversions.
- Tested the models on dummy upcoming ad creatives to estimate performance.
- Generated an output table showing predicted CTR and Conversions for each creative.

This report includes snapshots of the dummy datasets, predicted performance, and code implementation.

	A	B	C	D	E
1	Ad Headline	Creative Type	Target Audience	CTR (%)	Conversions
2	Big Summer Sale â€“ 50% Off	Image	Women	3.2	120
3	New Arrivals â€“ Shop Now	Video	Men	2.8	95
4	Limited Time Offer!	Carousel	All	4.1	210
5	Festive Discounts ðŸŽ‰	Image	Families	3.7	180
6	Try Our New Collection	Video	Women	2.5	75
7	Weekend Flash Sale ðŸš€	Image	Men	3.4	140
8	Exclusive Deals for You	Carousel	All	4.3	225
9	Shop Smart, Save More	Video	Women	2.9	105
10	Holiday Mega Clearance	Image	All	3.8	190
11	New Year New You âœ¨	Video	Men	2.6	85
12					

1. Snapshot of Past Ad Performance Data

	A	B	C	D	E
1	Ad Headline	Creative Type	Target Audience	Predicted CTR (%)	Predicted Conversions
2	Mega Clearance Sale	Image	Women	3.544	162.75
3	Exclusive Offer Inside	Carousel	All	4.012	203.55
4	Shop the Festive Vibes	Image	Families	3.672	176.2
5	Trending Now â€“ Limited Stock	Video	Men	2.93	111.2
6	Best Deals of the Season	Image	All	3.733	182.6
7	Smart Shopping Starts Here	Video	Women	2.984	114.85
8	Flash Friday Discounts	Carousel	Men	3.937	192.05
9	Style Upgrade Essentials	Image	Women	3.652	174.95
10	Biggest Winter Clearance	Video	All	2.956	114.95
11	New Styles Just Dropped	Carousel	Men	3.782	181
12					

2. Predicted Ad Performance

3. Predicted Ad Performance

	A	B	C
1	Ad Headline	Creative Type	Target Audience
2	Mega Clearance Sale	Image	Women
3	Exclusive Offer Inside	Carousel	All
4	Shop the Festive Vibes	Image	Families
5	Trending Now â€“ Limited Stock	Video	Men
6	Best Deals of the Season	Image	All
7	Smart Shopping Starts Here	Video	Women
8	Flash Friday Discounts	Carousel	Men
9	Style Upgrade Essentials	Image	Women
10	Biggest Winter Clearance	Video	All
11	New Styles Just Dropped	Carousel	Men
12			

4. Snapshot of Code Implementation

Add predictor.py

```python
# Import required libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import OneHotEncoder
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.ensemble import RandomForestRegressor
from sklearn.compose import ColumnTransformer
from sklearn.pipeline import Pipeline
import joblib

past_data = pd.read_csv("ad_performance_dummy.csv")
upcoming_data = pd.read_csv("upcoming_ad_creatives.csv")

X = past_data[["Ad Headline", "Creative Type", "Target Audience"]]

# Targets: CTR (%) and Conversions (we will train 2 models)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS — Python Debug Console

```
                Ad Headline Creative Type Target Audience  Predicted CTR (%)  Predicted Conversions
0          Mega Clearance Sale        Image          Women              3.358                 138.85
1       Exclusive Offer Inside     Carousel            All              4.004                 203.65
2       Shop the Festive Vibes        Image       Families              3.498                 154.45
2       Shop the Festive Vibes        Image       Families              3.498                 154.45
3  Trending Now – Limited Stock        Video            Men              2.919                 107.35
4     Best Deals of the Season        Image            All              3.874                 193.65
5   Smart Shopping Starts Here        Video          Women              2.822                 102.50
6       Flash Friday Discounts     Carousel            Men              3.576                 152.85
7     Style Upgrade Essentials        Image          Women              3.408                 140.75
8     Biggest Winter Clearance        Video            All              3.348                 160.00
9      New Styles Just Dropped     Carousel            Men              3.503                 145.10
```

Project Explanation: The primary objective was to build a prediction system capable of estimating how upcoming ad creatives might perform in terms of CTR and Conversions. Past data served as training material, enabling the model to learn patterns across ad headlines, creative formats (Image, Video, Carousel), and target audiences (Men, Women, Families, All). Modeling Approach: 1. Ad headlines were processed with TF-IDF Vectorization to capture semantic meaning. 2. Categorical data (Creative Type, Target Audience) were encoded using One-Hot Encoding. 3. Two models were trained using Random Forest Regressor: - Model 1: Predicted CTR (%). - Model 2: Predicted Conversions. 4. Predictions were generated for upcoming ad creatives, providing insights into expected ad performance. Expected Output: The final outcome is a model-generated table (see Section 2) that shows predicted CTR (%) and Conversions for each upcoming creative. This allows marketing teams to make data-driven decisions, prioritize high-performing ads, and optimize budget allocation.

Conclusion: This project highlights the value of predictive modeling in digital advertising. By leveraging past campaign data, we can make accurate predictions for upcoming ad creatives. Such insights can be instrumental in campaign planning, reducing guesswork, and ensuring that ads with the highest potential for engagement and conversions receive the most resources. The system thus bridges the gap between historical performance and future campaign success.