Netflix Thumbnail Genre Prediction Dashboard

Project Overview

This project aims to build a Convolutional Neural Network (CNN) model to classify Netflix thumbnail poster images into genres (e.g., Action, Drama, Comedy, Thriller, Romance) using deep learning.
A balanced dataset of 2,330 posters across 5 genres was created and used to train and evaluate the model.
The model was deployed as an interactive app on Streamlit (Live App), allowing users to test predictions in real time.
To bridge the gap between AI and business decision-makers, a Tableau dashboard was developed, showcasing model performance, misclassification patterns, and genre-specific insights.
The project is designed to enhance content metadata tagging, improve user recommendation engines, and reduce operational errors in content classification.

Business Challenge

Global streaming platforms like Netflix, Amazon Prime, and Disney+ often rely on manual tagging or rule-based systems to categorize content posters into genres.
Misclassified or inconsistently tagged posters can mislead viewers, reduce click-through rates, and negatively affect content recommendations.
There's a pressing need for automated, accurate, and explainable genre classification models that can scale across thousands of titles without manual intervention.
Business stakeholders need clear, actionable insights into model behavior — not just raw predictions.

Click Here to Go to: Model Performance Summary Dashboard

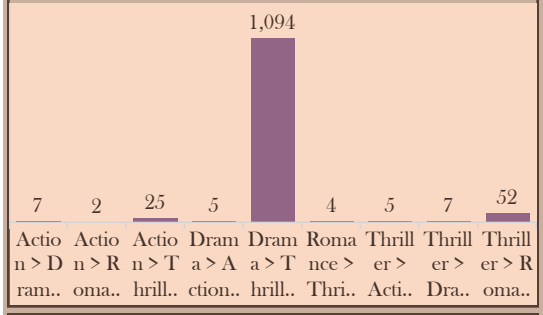
Model Performance

Total Posters
1,201

Misclassification Rate
79.77%

Model Accuracy (%)
20.23%

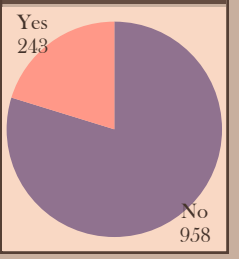
Top 3 Prediction Pattern



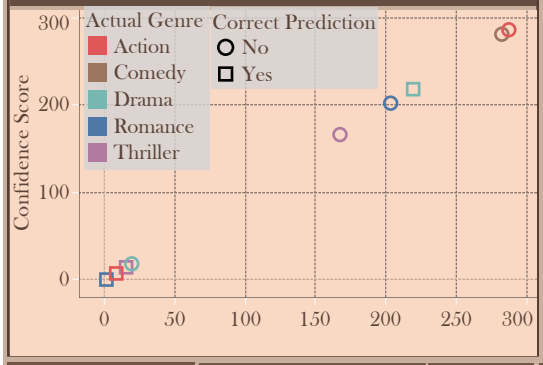
Actual vs Predicted Genre

Predicted Genre	Actual Genre: Act..	Co..	Dra..	Ro..	Th..
Action	8	10	5	4	7
Drama	272	256	219	192	160
Romance		3		1	
Thriller	15	13	14	7	15

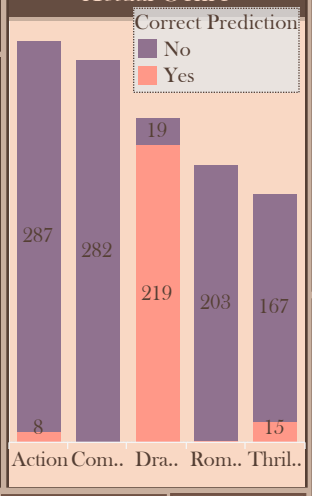
Predictions Distribution



Confidence Scores vs Total Posters Based on Actual Genre



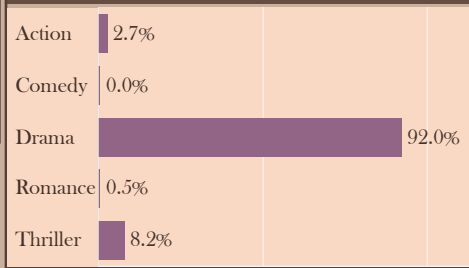
Correct vs Incorrect by Actual Genre



Predictions Table

Filename	Predicted Genre	Top 3 Predictions
11.jpg	Thriller	Thriller > Romance > Dr
13.jpg	Drama	Drama > Thriller > Roma
18.jpg	Drama	Drama > Thriller > Roma
19.jpg	Drama	Drama > Thriller > Roma
22.jpg	Drama	Drama > Thriller > Roma
27.jpg	Drama	Drama > Thriller > Roma
38.jpg	Drama	Drama > Thriller > Roma

Accuracy by Actual Genres



Correct Prediction.. All

Flag-Correct Predictions 0 to 1

File Name All

Predicted Genre All

Actual Genre All

Netflix Thumbnail Genre Prediction Summary

Conclusion

Total Posters Analyzed: 1,201
Overall Model Accuracy: 20.23% — Only 243 out of 1,201 posters were correctly classified by genre.
Misclassification Rate: 79.77%, indicating high confusion in genre prediction across most categories.
Accuracy by Genre:
Drama: 92.0% — The model performs exceptionally well in identifying Drama posters.
Thriller: 8.2%
Action: 2.7%..

Business Impact

Let's assume the model is deployed by Netflix or similar platforms to classify 100,000+ poster thumbnails annually.
The average manual tagging cost per poster is approximately $1.25.
Therefore, total annual manual tagging cost = $1.25 × 100,000 = $125,000.

Without the model:
All poster genres would need to be manually tagged.
This process is labor-intensive, time-consuming, and adds to operational overhead...

Business Recommendations

If adopted and enhanced by companies such as:
- Netflix
- Amazon Prime Video
- Disney+
- HBO Max
- Hulu

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Project Storytelling

In an era where visual appeal drives engagement, thumbnails serve as digital storefronts on platforms like Netflix.
This project tackled a real-world challenge: Can we accurately classify thumbnails by genre using a CNN-based model?
A large dataset of 1,201 Netflix posters was processed through a DenseNet-based classifier and analyzed using Tableau.
The Streamlit app provided real-time prediction access, while the Tableau dashboard translated model outputs into business-readable insights.
The dashboard revealed a critical flaw: the model over-predicts Drama with 91% of outputs falling into a single top-3 pattern — a major bias.
However, this discovery is itself a business advantage: it exposes genre imbalance and enables targeted retraining strategies.
If Netflix or its peers apply this feedback loop — combining AI prediction + business visualization — they can turn flawed AI into a powerful feedback-driven automation engine...