



Classification of Movie Posters to Movie Genres

<https://www.youtube.com/watch?v=x32Y-HjwYQA>

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ABSTRACT

The poster of a movie is an essential tool in the film industry and a well designed poster can be crucial towards the success of a movie. To ensure that a movie poster is designed to attract the correct audience, we designed a deep learning model that identifies the movie genre conveyed by a movie poster. To find an optimum model, we implemented customised versions of three standard deep learning architectures for image classification: ResNet-50, VGG-16, and DenseNet-169. DenseNet-169 gave us the best results, outperforming the other two models and models designed in previous attempts at the problem.

INTRODUCTION



Genre classification has been a deeply explored subject in deep learning with good reason. The genre of a piece of art encodes a great deal of information about the piece within a single word. It is a concise and effective way to highlight the similarities and dissimilarities between different works. When it comes to movies, the genre is often the deciding factor for a viewer to make a selection between various options [2].

The motivation behind our project is to provide a tool that ensures that a movie poster is designed to stimulate the correct audience. A well designed poster is able to convey the genre of the movie to a human observer, with no prior knowledge of the movie, at a glance.

References

- [1] Neha. (2018). Movie Genre from its Poster. *Kaggle*.
- [2] Ivacic-Kos, M., Pobar, M., & Ipsic, I. (2014). Automatic movie posters classification into genres. *In International Conference on ICT Innovations*(pp. 319-328). Springer, Cham.

DATASET AND FEATURES

Dataset: Kaggle-Movie Genre from its Poster [1].

- 36898 256X256 resolution RGB posters.
- Each poster is labeled with types of genres.
- 29887 train set, 3321 val set, 3690 test set.

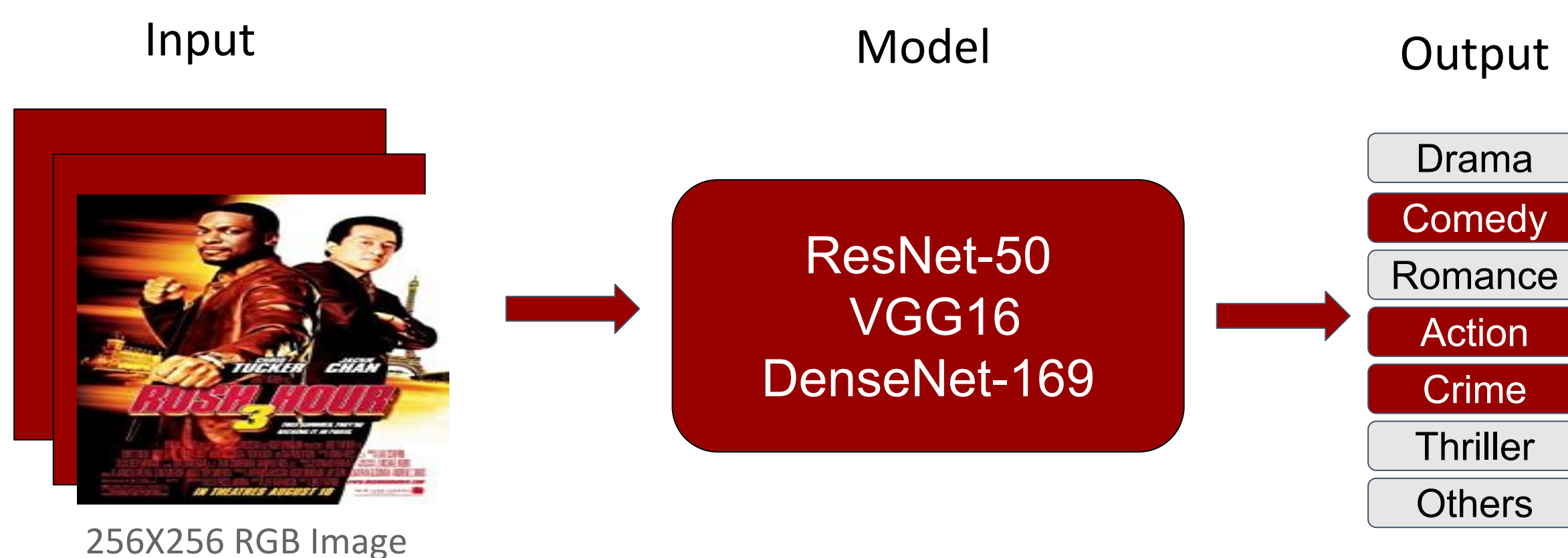
Data Preprocessing

1. Removed movies with missing genres or image link to the posters.
2. Resized posters in to the resolution of 256X256.
3. Reduced 28 different genres to top 6 most popular genres.
4. Added a column, 'Others', to label movies that aren't in top 6 genres.
5. Preprocessed input data



Action|Adv|Comedy Drama|Horror|Sci-Fi Animation|Action|Adv Drama|Romance Adv|Comedy|Family

DEEP LEARNING APPROACH



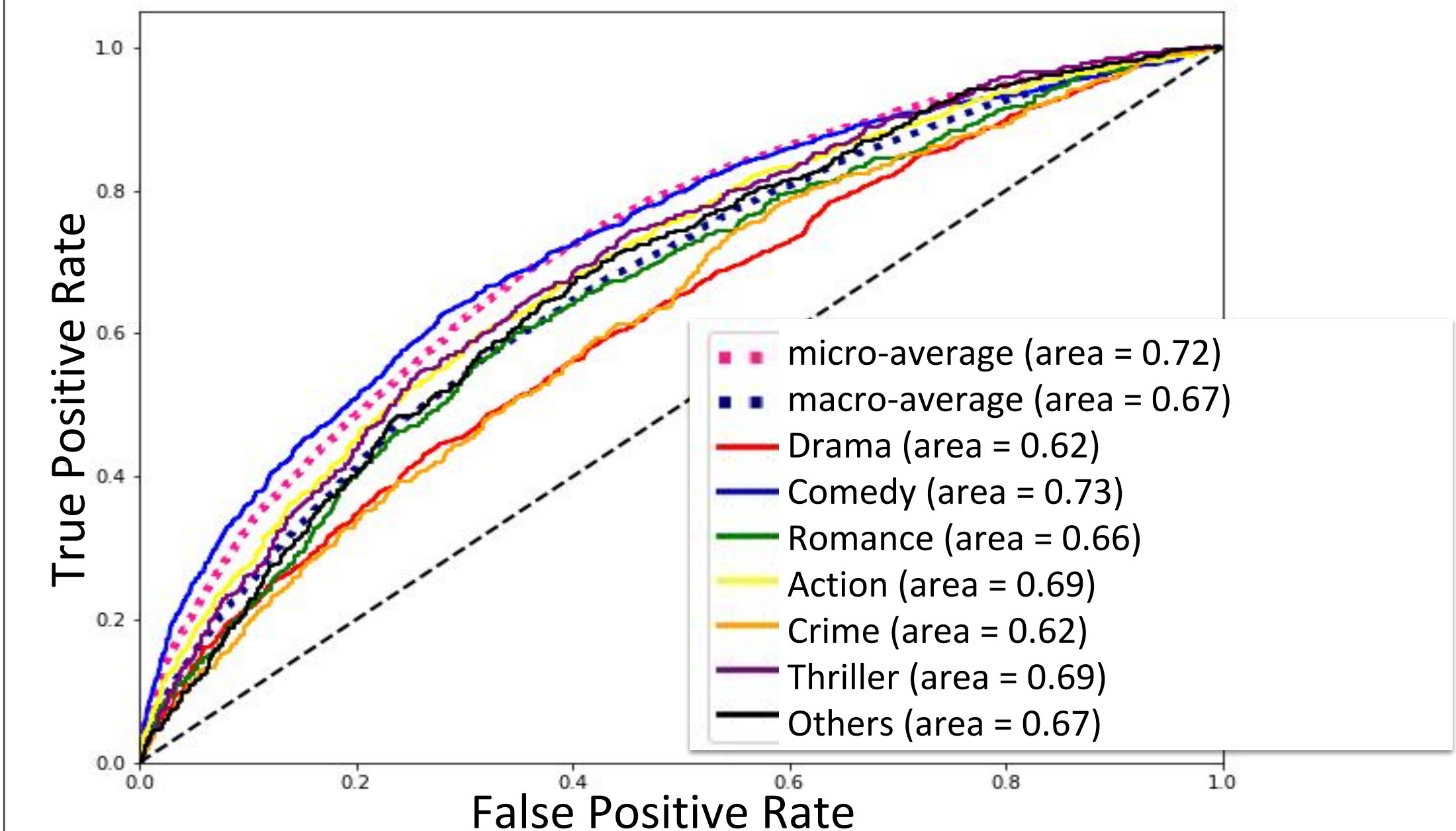
Fully connected layer was not included for each model. Instead, max pooling and three dense layers (1024 -> 128 -> 7) were added. Last layer used sigmoid as an activation. Also, class weights were implemented to deal with an imbalanced dataset.

Model	Epoch	Transfer Learning	Initial Assigned Weights	Class Weights	Threshold
ResNet-50	20	No	Random	Yes	0.3
VGG-16	10	No	ImageNet	Yes	0.3
DenseNet-169	10	No	Random	Yes	0.35

RESULTS

	ResNet-50		VGG16		DenseNet-169	
	F1	ROC-AUC	F1	ROC-AUC	F1	ROC-AUC
Drama	0.59	0.63	0.55	0.57	0.57	0.62
Comedy	0.71	0.71	0.65	0.69	0.69	0.73
Romance	0.82	0.65	0.84	0.62	0.82	0.66
Action	0.83	0.69	0.86	0.58	0.86	0.69
Crime	0.87	0.63	0.87	0.58	0.87	0.62
Thriller	0.85	0.71	0.83	0.66	0.87	0.69
Others	0.54	0.66	0.80	0.61	0.74	0.67
AVERAGE	0.74	0.67	0.77	0.62	0.77	0.67

ROC Curve of Multiclass Genres - DenseNet-169



DISCUSSIONS

- **DenseNet-169** shows the best performance among the three models. It has the highest AUC score on comedy, romance, and action.
- **Resnet-50** performs the best on drama, crime, and thriller.
- **Comedy** is the most distinguishable genre.
- **Drama and Crime** are the least distinguishable genres.
- The performance of the model is lower than initially expected. This could be due to an imbalanced dataset.

Future Work

- Implement YOLO algorithm to detect objects on the poster.
- Balance out the data.
- Try different models, such as inception, Xception, and MobileNet.