Multi-genre classification of movies

Natural computation methods for machine learning

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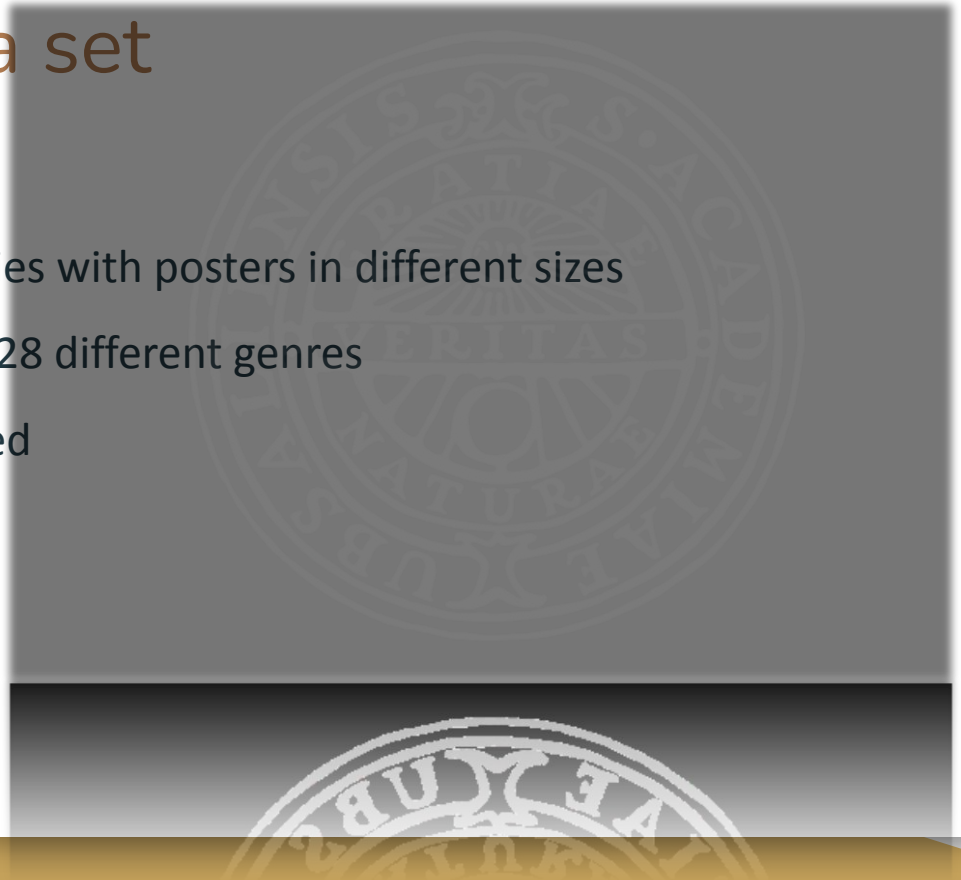
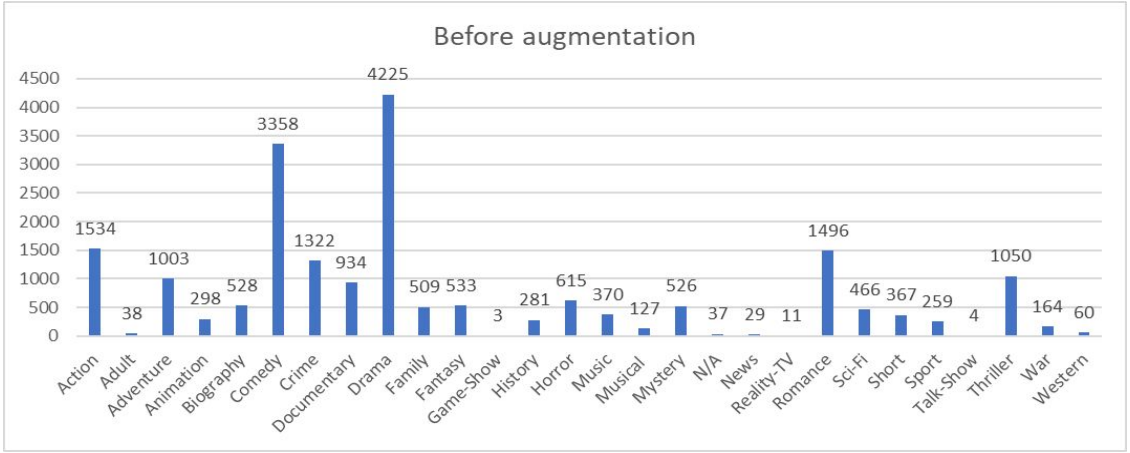
Our problem

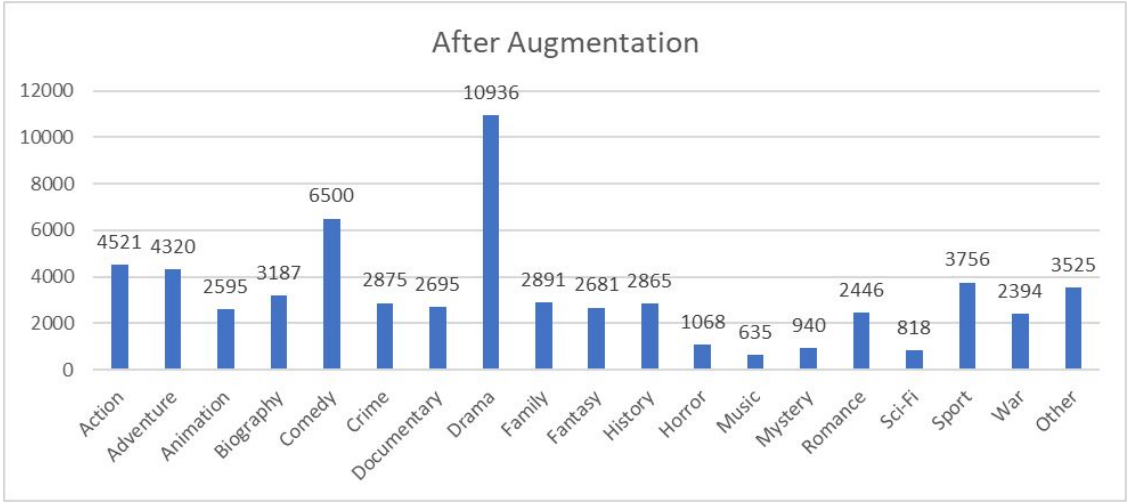
- Image classification of movie posters
- Multi-label
- Many different ways to solve the problem

The data set

- 8052 movies with posters in different sizes
- Originally 28 different genres
- Unbalanced

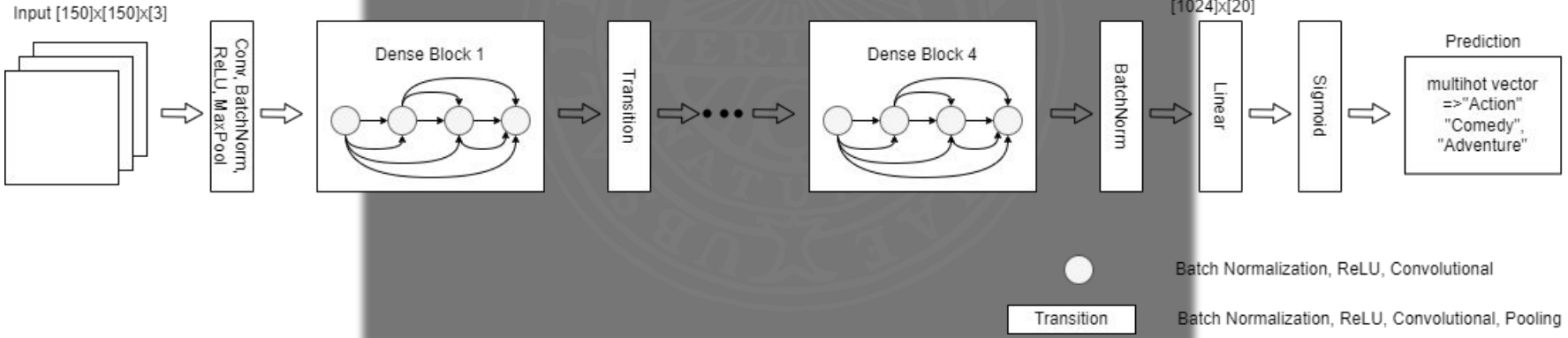



Before augmentation
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1534
38
1003
298
528
3358
1322
934
4225
509
533
3
281
615
370
127
526
37
29
11
1496
466
367
259
4
1050
164
60
Action
Adult
Adventure
Animation
Biography
Comedy
Crime
Documentary
Drama
Family
Fantasy
Game-Show
History
Horror
Music
Musical
Mystery
N/A
News
Reality-TV
Romance
Sci-Fi
Short
Sport
Talk-Show
Thriller
War
Western


After Augmentation
12000
10000
8000
6000
4000
2000
0
4521
4320
2595
3187
6500
2875
2695
10936
2891
2681
2865
1068
635
940
2446
818
3756
2394
3525
Action
Adventure
Animation
Biography
Comedy
Crime
Documentary
Drama
Family
Fantasy
History
Horror
Music
Mystery
Romance
Sci-Fi
Sport
War
Other

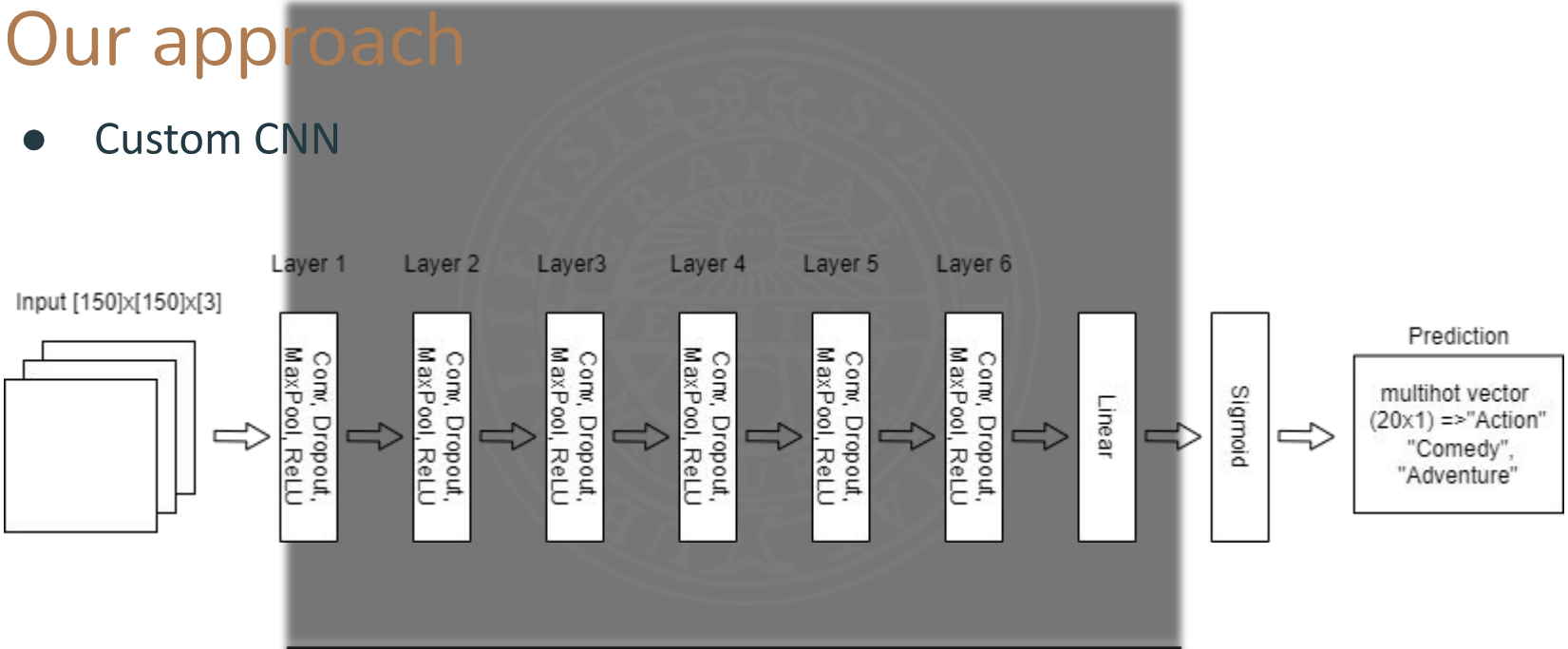
Our approach

- DenseNet



Our approach

- Custom CNN



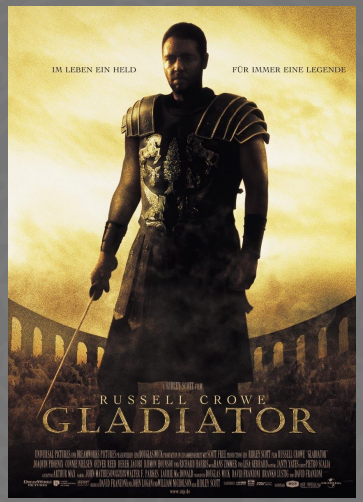
Model	Accuracy
Custom CNN	4.1%
DenseNet-121	26.41%

Performance matic:
Check accuracy by picking top k genres from the output vector, where k is no. of genres in the ground truth.

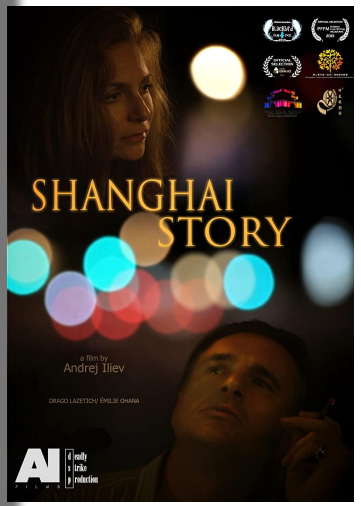
prediction=> tensor([1,0,0,0,1,0,1])
ground_truth => tensor([1,0,1,0,1,0,0])
Accuracy =>2/3 = 66.67%

Results

Predicted genres: Action, Comedy, Adventure
Ground Truth: Action, Comedy, Adventure



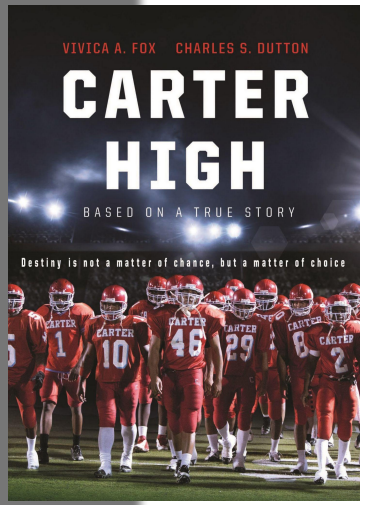
Predicted genres: Action
Ground Truth: Action



Predicted genres: Crime, Drama
Ground Truth: Comedy, Drama

Challenges

- Genre is an abstract concept
- Many classes wrt to dataset size
- Unbalanced dataset



Predicted genres: Crime, Drama
Ground Truth: Crime, Drama

Related Work

- Object detection
- Attention methods
- Other architectures

Conclusion/Future Work

- Use more metadata
- Balance out the dataset
- Object detection
- Better performance metric

Thank You!

Questions?