6th INTERNATIONAL MARDIN ARTUKLU SCIENTIFIC RESEARCHES CONFERENCE
June 25-27, 2021

COMPUTING TURKISH MOVIE STARS SCREEN TIME USING DEEP CONVOLUTIONAL NETWORKS

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Motivation

Potential to be used in a wide variety of areas, such as:

- adjusting the **salary policy** according to the screening times of the **actors** in commercials,
- calculating how often the **players** appear in sports events (race,football),
- or how long the **politicians** speak in the discussion program.

For Movie Stars

- cinema products reach the **whole-world**
- taking part in such **world-famous productions** is important for movie stars.
- the **fees** can be calculated according to the time they stay on the screen.

Datasets - Türkan Şoray's Movies

1- Kara Gözlüm

a. Year : 1970
b. Genre : Romance/Drama/Musical
c. Duration: 116 Mins.
d. Total number of frames: 5474
e. Three-channel structures: RGB

2- Selvi Boylum Al Yazmalım

a. Year : 1977
b. Genre : Romance/Drama
c. Duration: 95 Mins.
d. Total number of frames: 5044
e. Three-channel structures: RGB

** RGB: red-green-blue*

Datasets - Kemal Sunal's Movies

1- Hababam Sınıfı

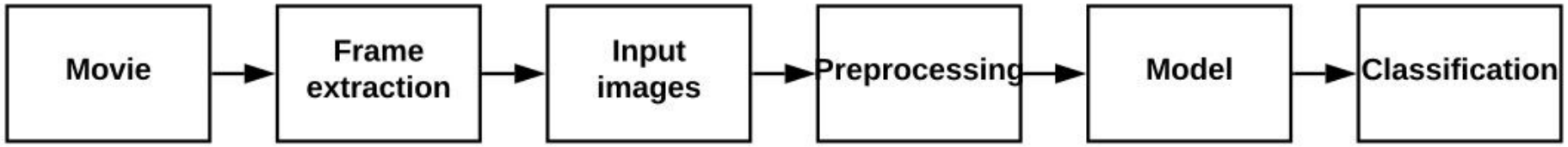
a. Year : 1975
b. Genre : Comedy/Adventure/Drama
c. Duration: 90 Mins.
d. Total number of frames: 5141
e. Three-channel structures: RGB

2- Çöpçüler Kralı

a. Year : 1978
b. Genre : Comedy
c. Duration: 90 Mins.
d. Total number of frames: 4677
e. Three-channel structures: RGB

Processes

Resize: 224×224 pixel 3-channel (RGB),
Denoise: FastNlMeansDenoisingColored
- To remove the Gaussian noise from RGB images
Normalization: To transform the model quickly



Performed process steps

Deep Convolutional Neural Networks

Keras applications use pre-trained and weighted deep application models. The trained model consists of model architecture and model weights. Model weights are downloaded and features are extracted from the ImageNet database.

We have used five different Keras Applications :

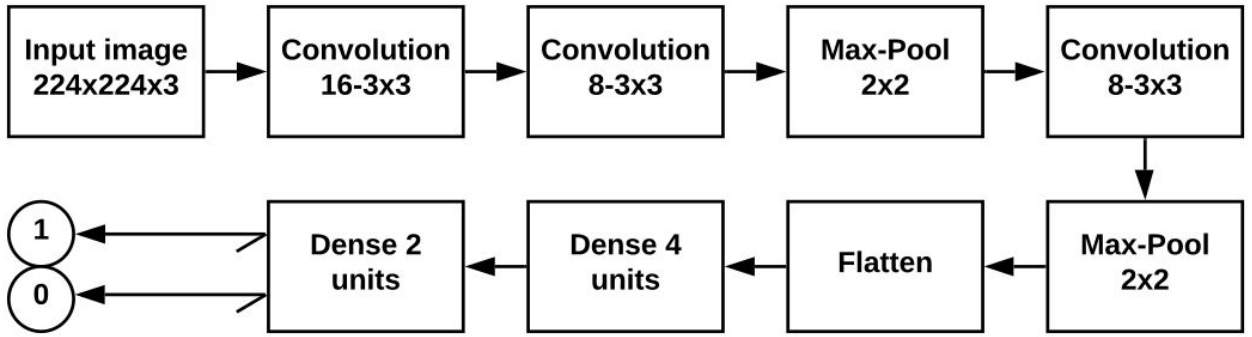
1. VGG16
2. InceptionV3
3. Xception
4. MobileNet
5. DenseNet

https://keras.io/api/applications/

Deep Convolutional Neural Networks

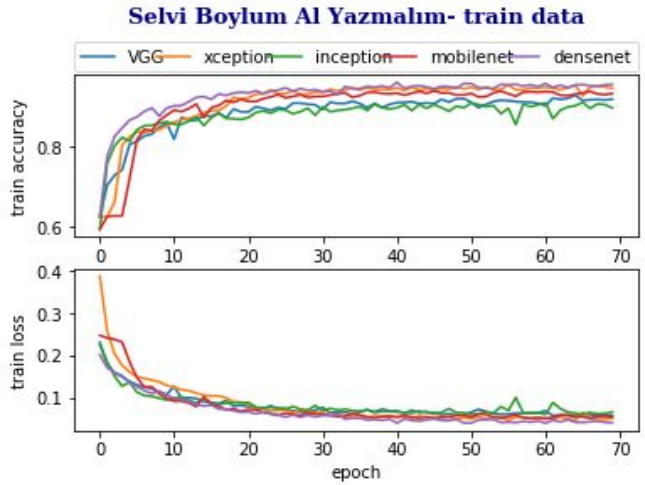
Two methods were used to reduce **overfitting**:

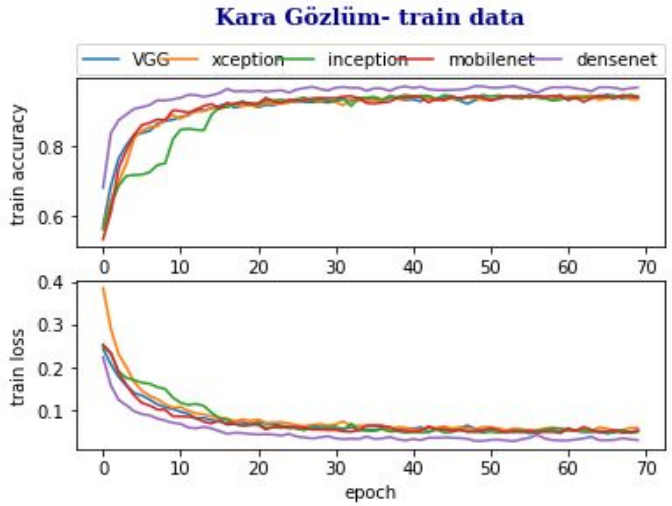
- **Dropout**
- **L2 regularization:** The weights of features handled by L2 regularization. The complexity of a feature is proportional to the absolute value of its weight.

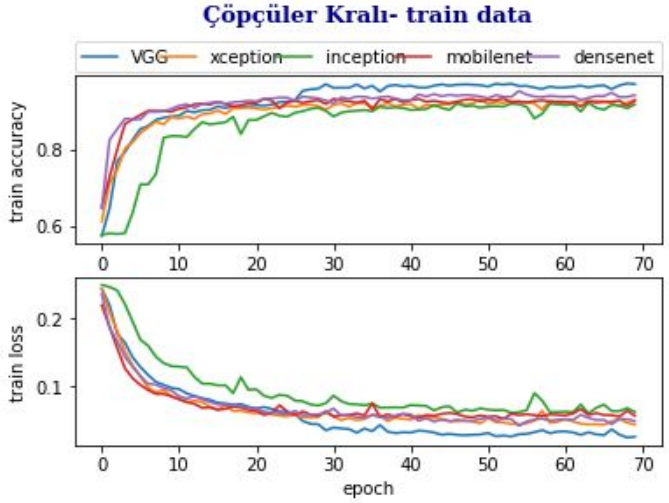


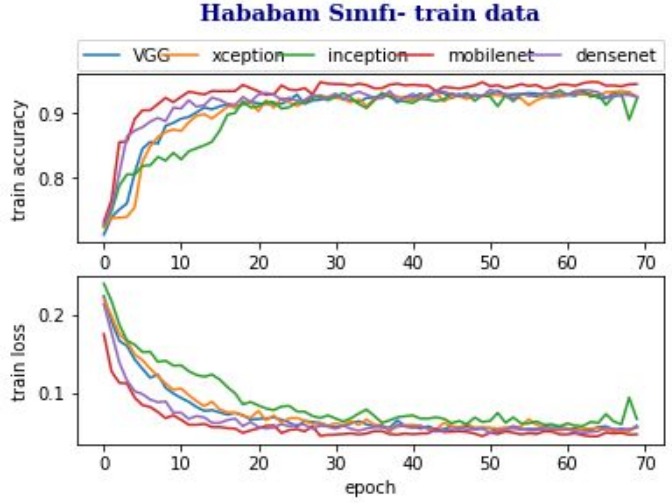
Architecture of the convolutional network model

Train Data Graphics

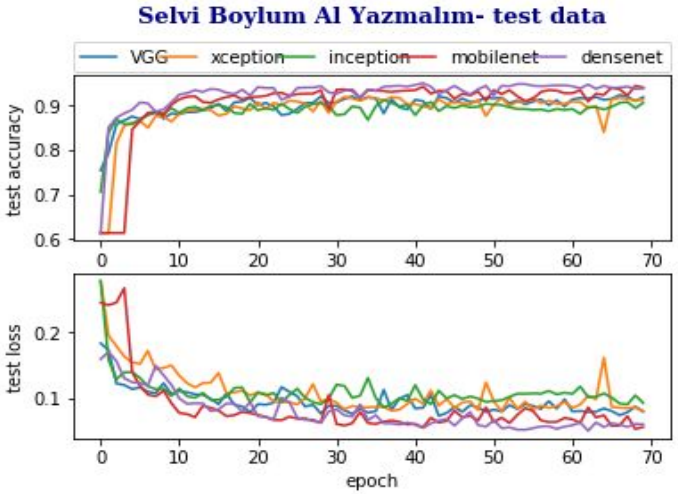


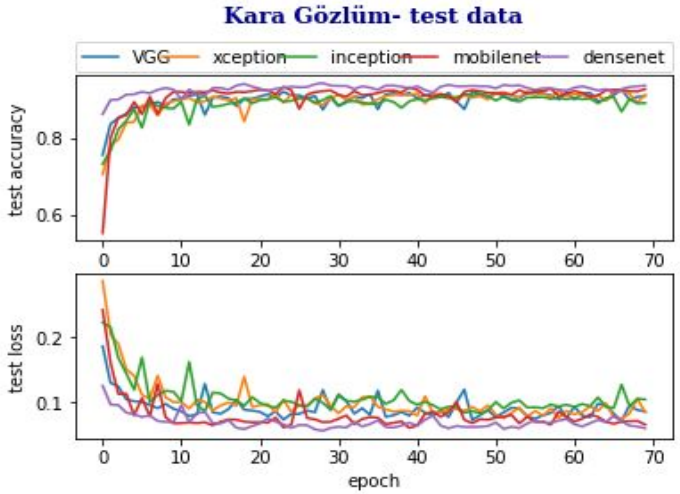


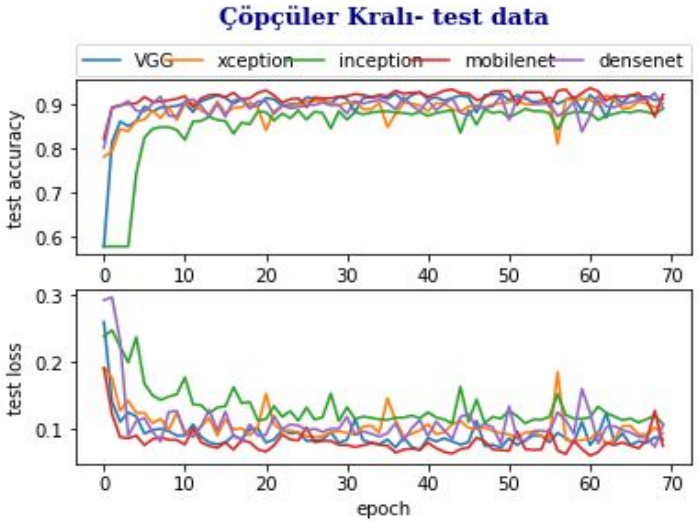


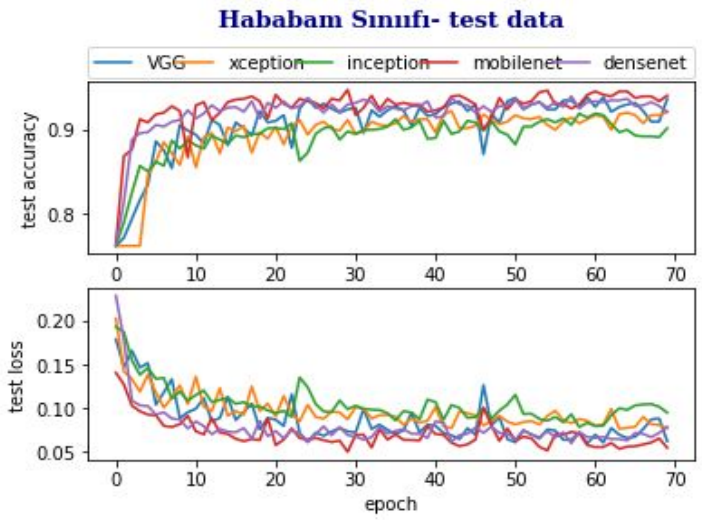


Test Data Graphics



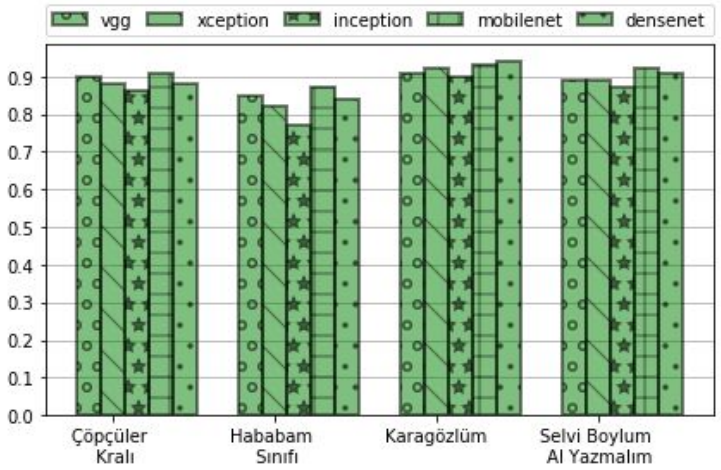




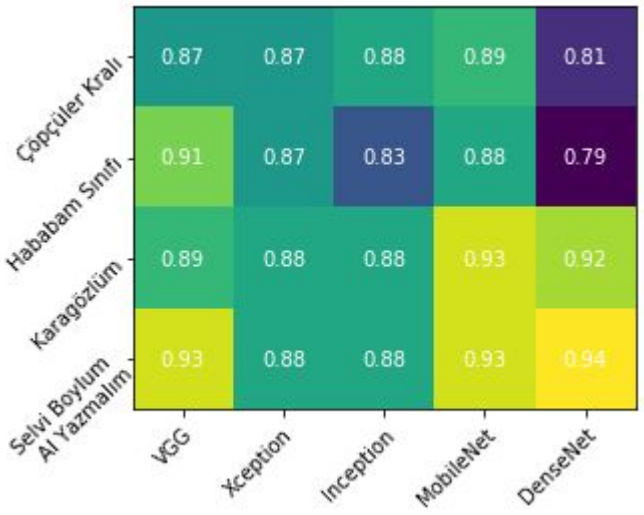


Performance Evaluations

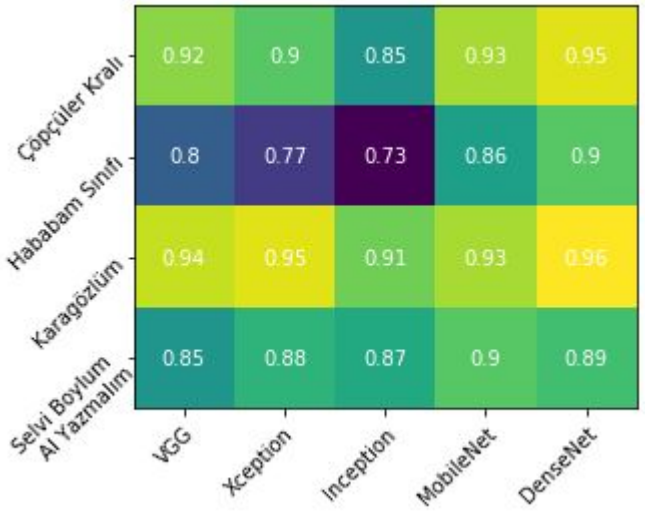
- Using these models, we got the highest F1 scores of 94% and the lowest 77% on the test data.



f1-scores for test datasets



a) precision test data



b) recall test data

Results

Movie	VGG16	Xception	Inception	MobileNet	DenseNet
Çöpçüler Kralı	1983	1960*	1946	1978	2022
Hababam Sınıfı	1276	1276	1257	1325*	1383
Kara Gözlüm	3093	3152	3090	3074*	3108
Selvi Boylum Al Yazmalım	1864	1938	1894*	1875	1882

Table 1: Prediction Screen Time(s) - (train + test data)

** : The best prediction for each movie*

Movie	Total Screen Time	The Screen Time of Movie Star
Çöpçüler Kralı	4677	1961
Hababam Sınıfı	5141	1315
Kara Gözlüm	5474	3060
Selvi Boylum Al Yazmalım	5044	1896

Table 2: Real Screen Time(s)

Conclusion

- Since these films are made over 40 years ago, the **image quality** was lower.
- But with different deep learning methods are compared to achieve **very well result**.

Future Work

- Calculation/estimation in **real-time** streams
- Using new techniques to **improve image quality**
- Creation of models with **different network structures** (outside of CNN)

Thanks For Your Attention

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