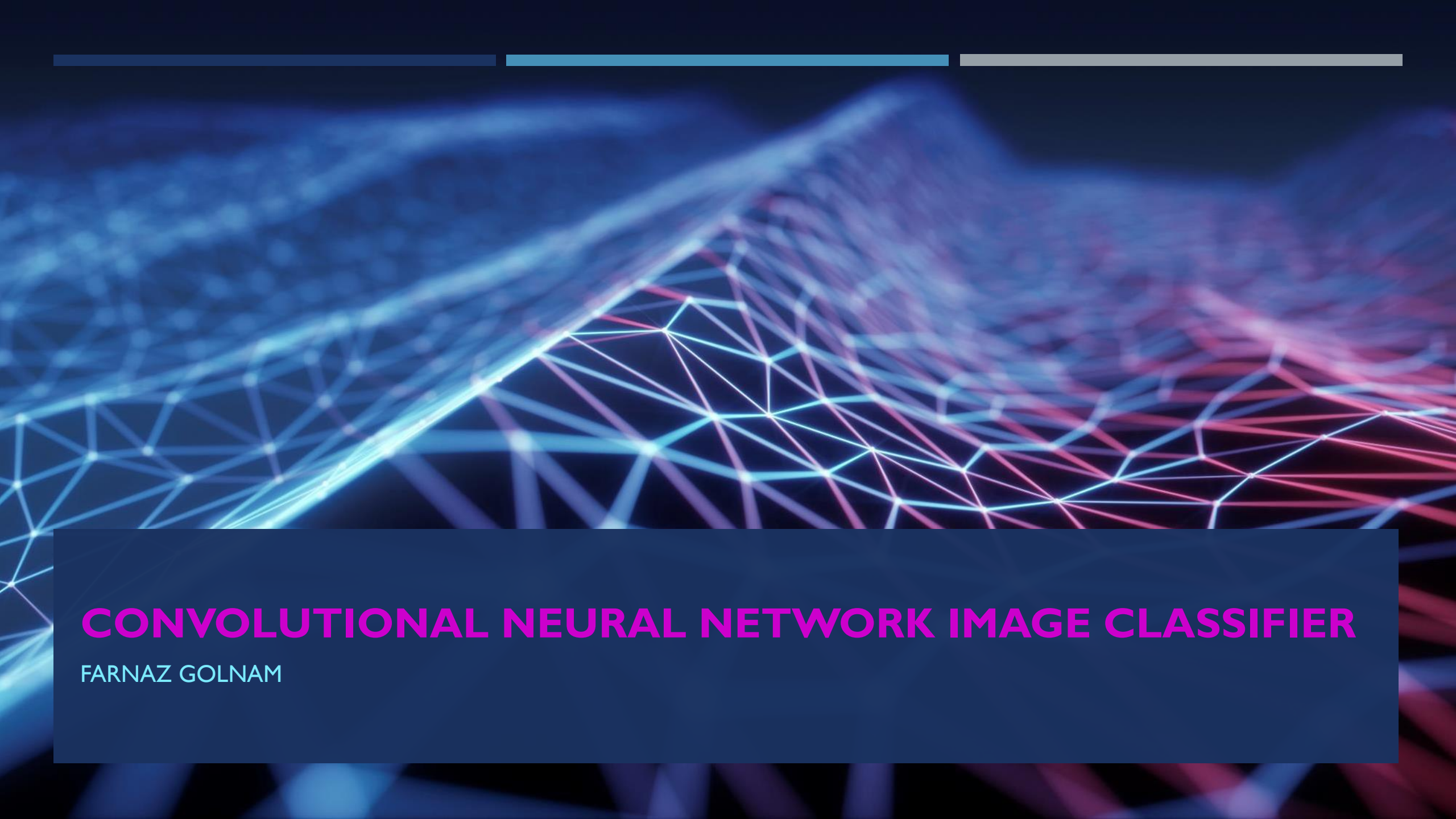
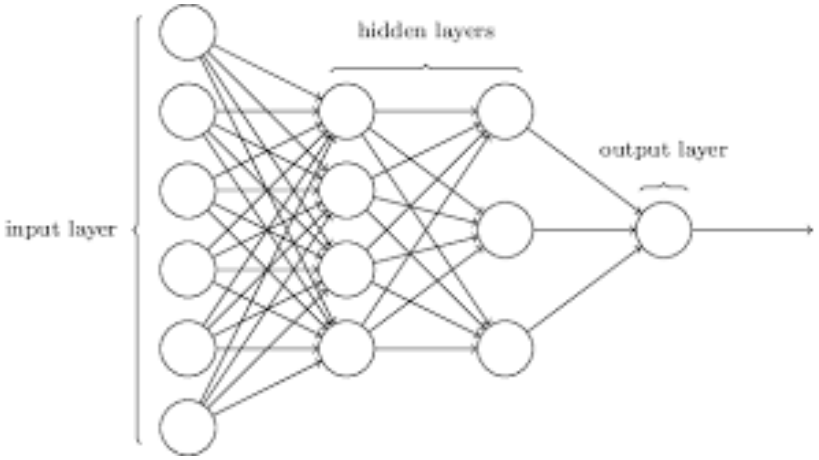


CONVOLUTIONAL NEURAL NETWORK IMAGE CLASSIFIER

FARNAZ GOLNAM

Data Preparation



Deep Learning Model

Prediction Accuracy

GOAL: Given a garment image, our deep neural networks will identify the brand name among five high-end brands, e.g. Chanel, Dolce & Gabbana, Prada, Saint Laurent, Gucci, and estimate its corresponding price

APPLICATIONS

- Help retailers identify the most on-demand brands and their costs
- Help retailers to control surplus inventory
- Help fashion production lines to balance supply and demands
- Limit the production waste and environmental pollutions

DATA WILL BE GIVEN TO THE MODEL IN FORM OF AN IMAGE

- We use `Farfetch Listings` as the training dataset, which is publicly available in Kaggle website
- We train two separate networks with RGB and gray scale input images

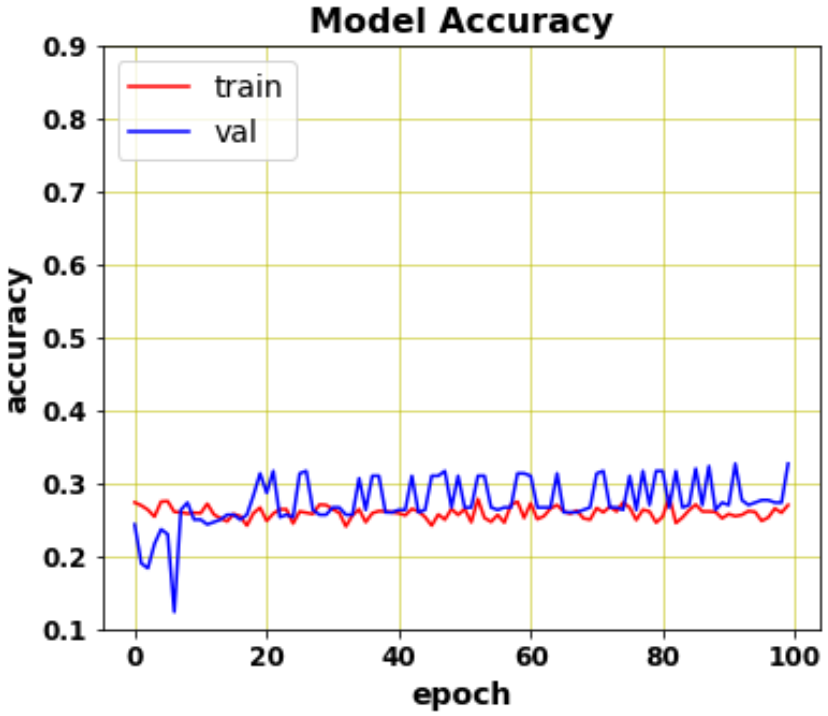
RGB Input Image

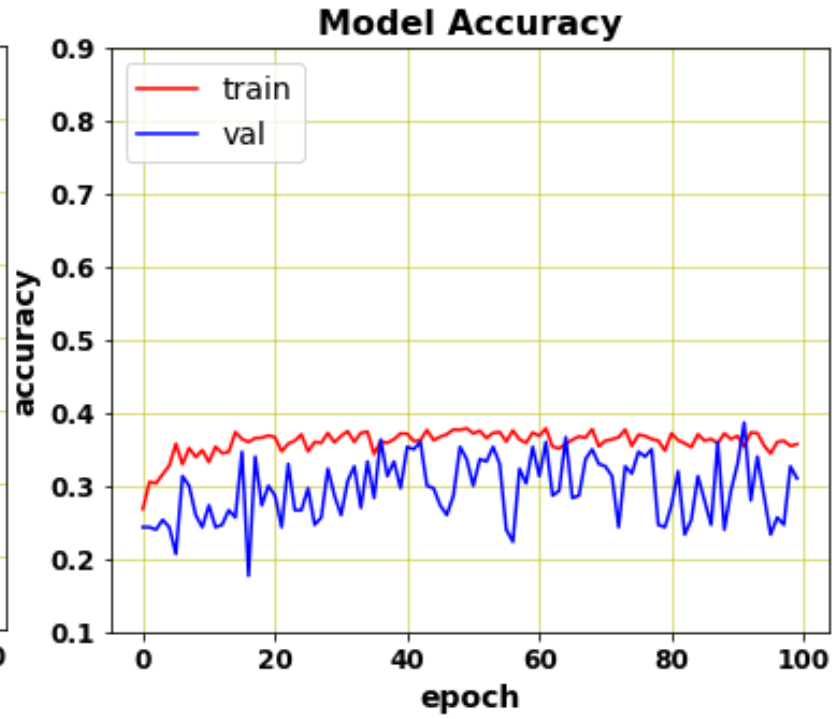
Gray Scale Input Image

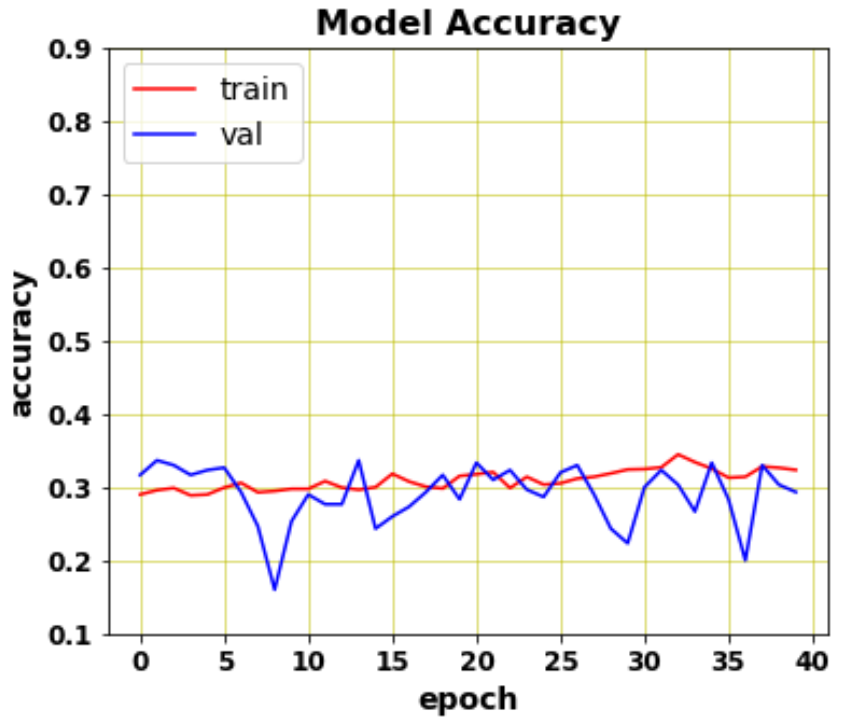
CNN MODELS

- Multi-class CNN Classifier
- Transfer Learning
- One-vs-all Strategy
- One-vs-all & Transfer Learning

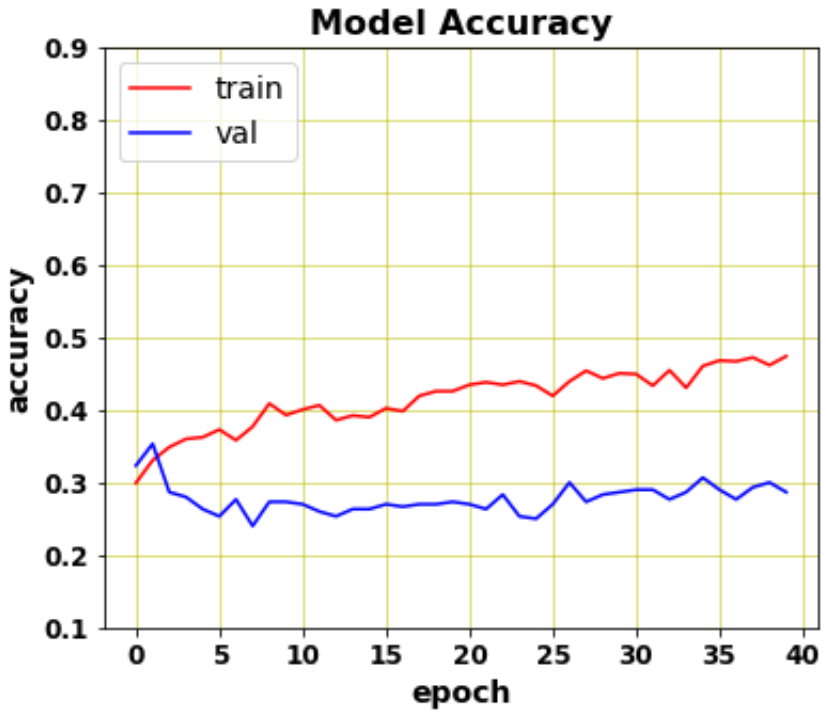
MULTI-CLASS CNN CLASSIFIER RESULTS

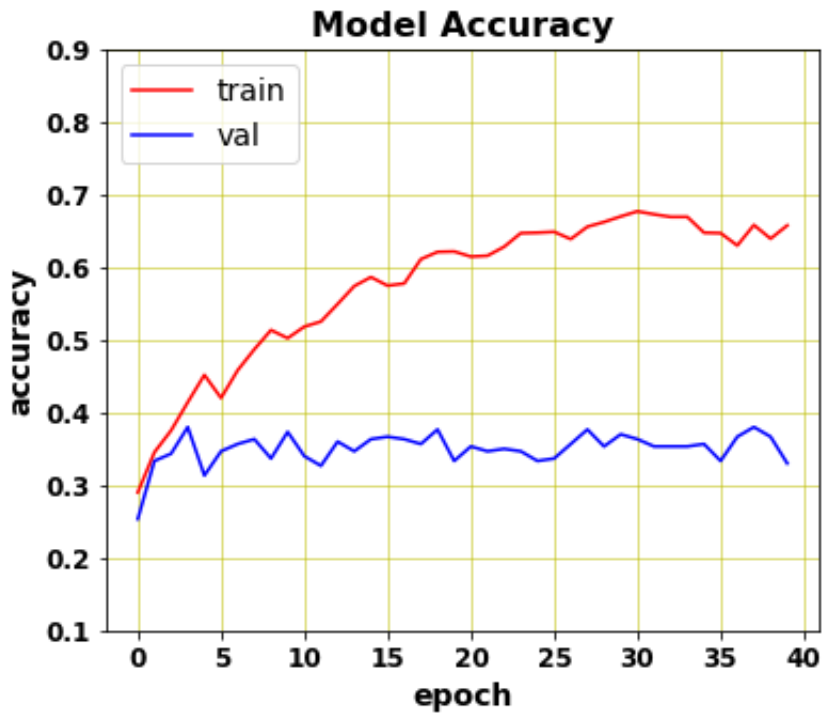


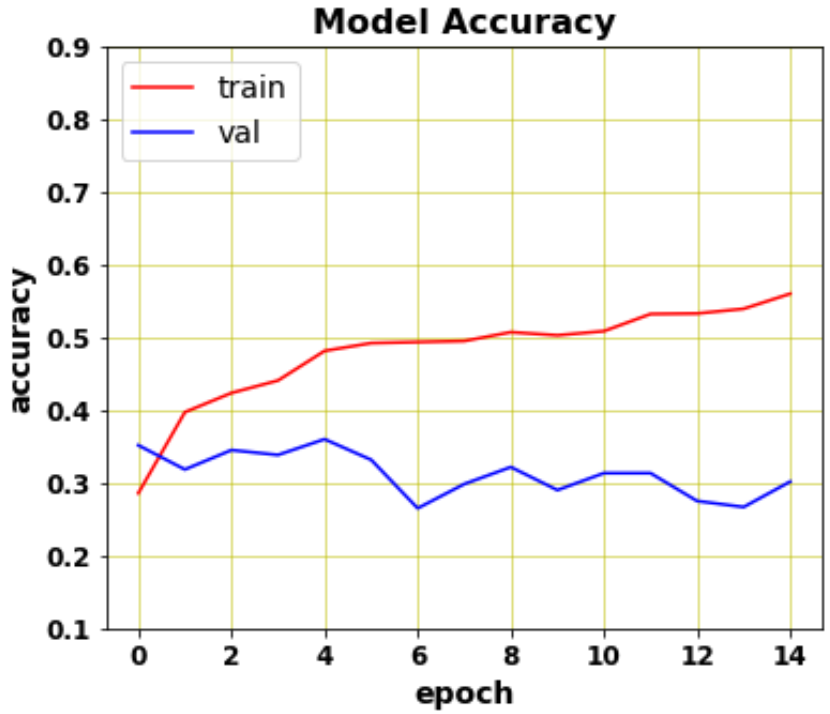




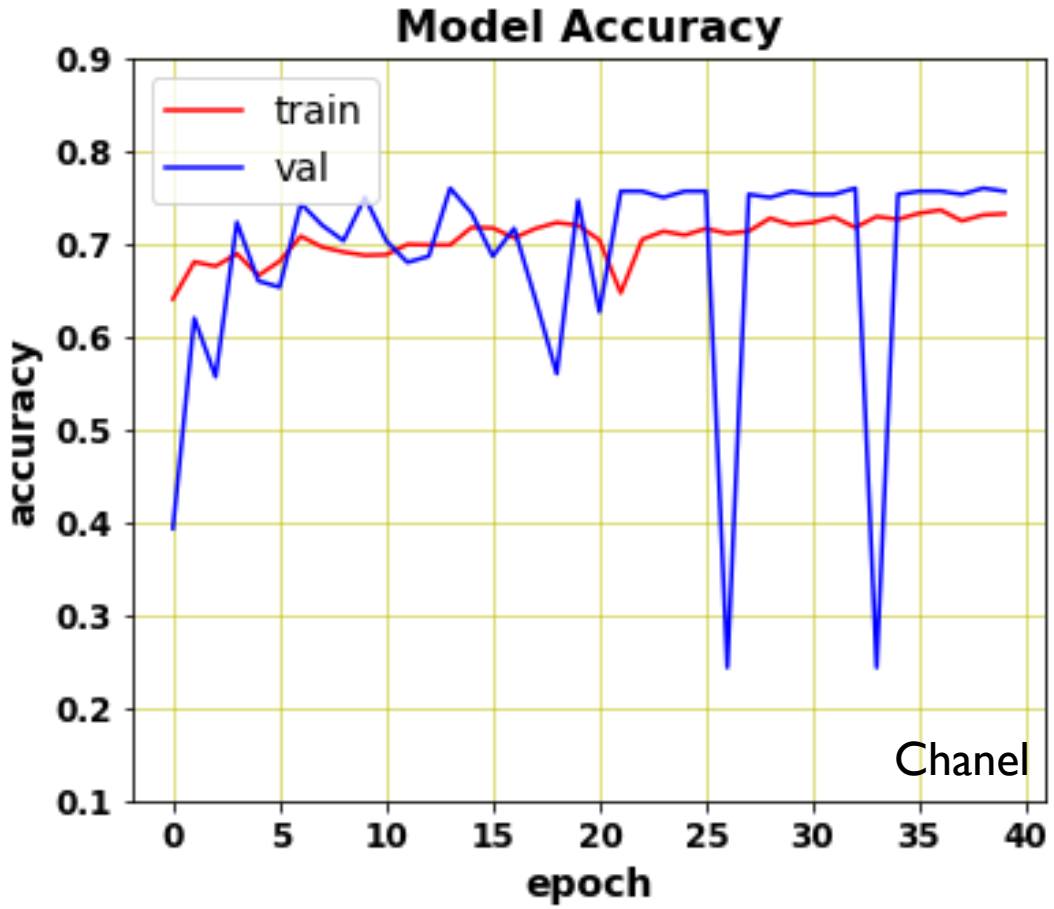
TRANSFER LEARNING RESULTS



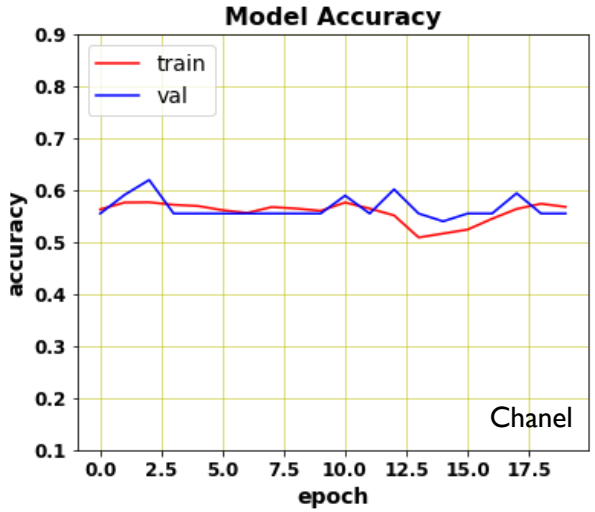


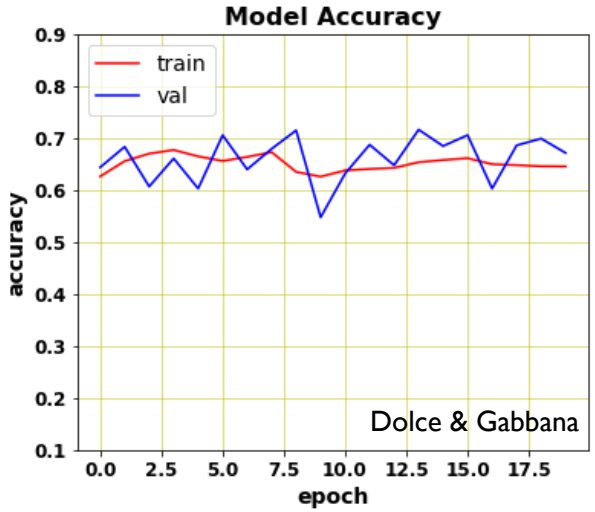


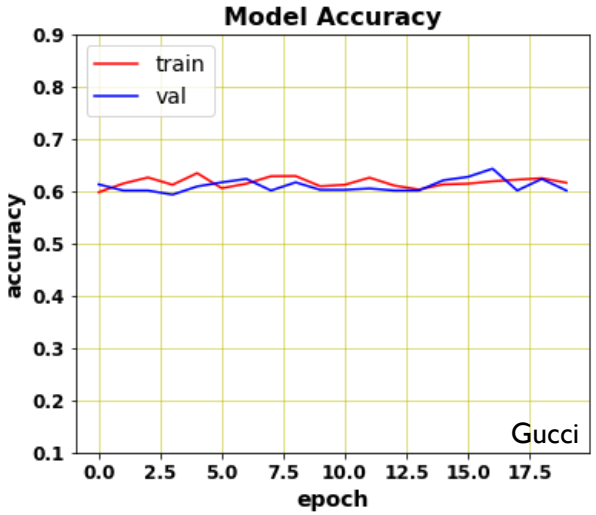
ONE-VS-ALL RESULT FOR ONE BRAND (CHANEL)

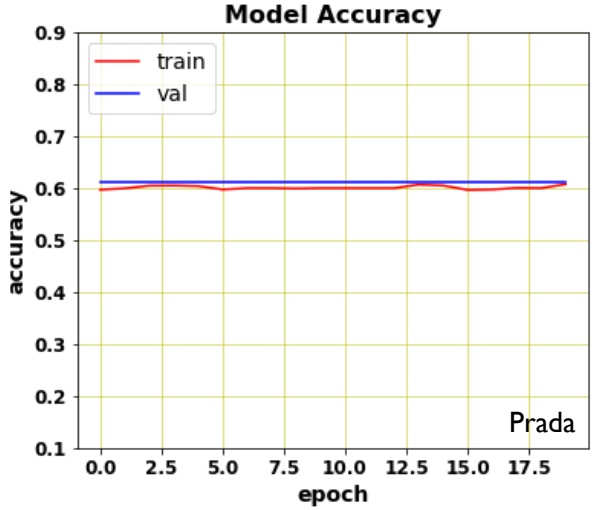


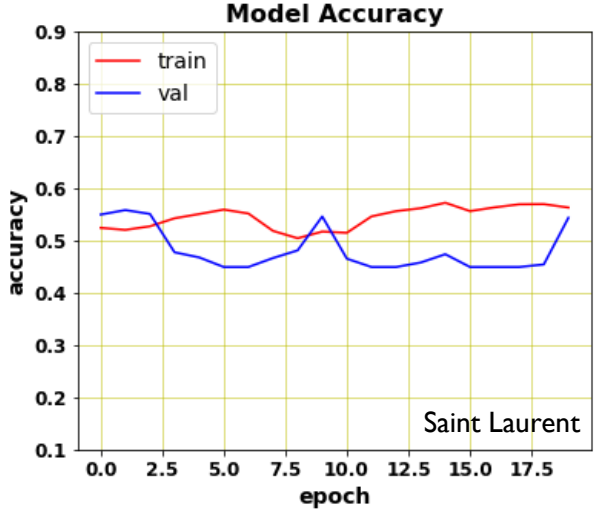
COMBINATION OF ONE-VS-ALL & TRANSFER LEARNING RESULTS











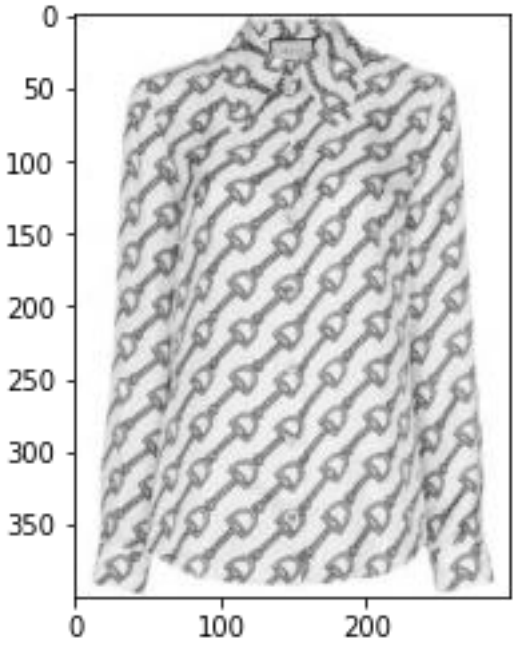
CONCLUSION

As seen from the results of different CNN models, **combination of one-vs-all and Transfer learning model** will give the higher accuracy and reduces the overfitting for our predictor.

```
0.6632024634334103
```

The model shows %66 success rate at predicting the brand name.

TEST RESULTS



Gray scale input image

Prediction probabilities of all five different brands on the given input image. As seen, the second brand shows the highest probability which shows the garment brand is Prada

```
array([[0.45435014, 0.53038216, 0.47213387, 0.48691028, 0.39303905],
       [0.47070956, 0.54318458, 0.47315717, 0.48334154, 0.4093228 ],
       [0.40710756, 0.54258221, 0.47362041, 0.47098854, 0.43427089],
       ...,
       [0.49515277, 0.51363307, 0.46997619, 0.48616055, 0.36795363],
       [0.50423247, 0.41027048, 0.47095218, 0.50672543, 0.48109525],
       [0.50371027, 0.4454788 , 0.47006199, 0.50176436, 0.38924783]])
```

FUTURE WORK

- A similar procedure will be conducted with a regression classifier for the price estimation
- Other features such as item description, gender and demographics, can be added to our CNN-based classifier.
- An online deployment of the predictive model will be delivered as a web service for fine apparel retailers

THANK YOU

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