

Classification of Apparel Fit Using CNNs

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Thinkful Data Science Program

Key concept: Apparel Fit

Apparel fit can be interpreted as how loose or tight clothing is on a person, or the relative size of the garment compared to the person wearing it.

Waste in the apparel Industry

Every second, the equivalent of one garbage truck of textiles is landfilled or incinerated, which includes unsold merchandise being destroyed by retailers.

Waste in the apparel Industry

Unsold merchandise, i.e. *deadstock*, causes manufacturers to incur large warehousing fees and eventually leads to the destruction of merchandise.

Why don't they donate it?

- Some actually do.
- Most feel that the risk of damaging the brand value outweighs any benefit of donating their deadstock.



What can be done to decrease apparel waste?

- A lot.
- Improve design.
- Improve merchandising.



Design

- Designing is done on one size - i.e. the sample size.
- Deciding the overall scale and fit of the garment is a major design decision, and often integral to the identity of a brand.



How can this be improved?

- Gaining a better understanding of current trends pertaining to fit will assist designers in making those decisions.
- Better understanding of trend direction leads to increased sales and less waste.



Merchandising

- Merchants determine the size assortments to be produced.
- Size assortments typically follow a predetermined distribution that doesn't account for trends in garment fit.



How can this be improved?

- Understanding how the customer is wearing the clothes will allow flexibility of the size assortment.
- Example: a portion of the customers who would normally purchase a medium are now purchasing a large, and wearing a slightly looser fit.



Deployment

- Integrated into website features where users are encouraged to upload photos of themselves in the products.
- Deployed in web crawlers that collect data from Ecommerce sites, street style blogs, runway coverage, etc.



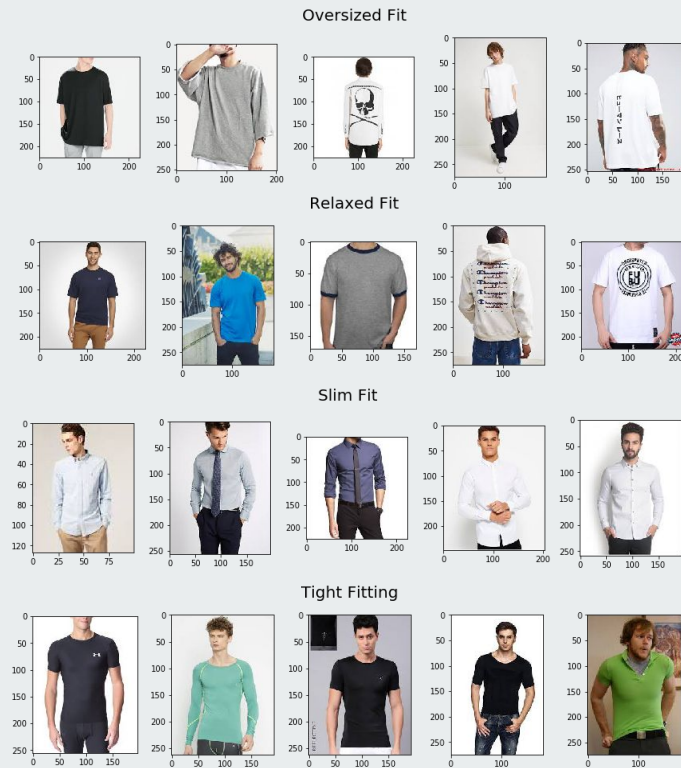
Modeling



Dataset

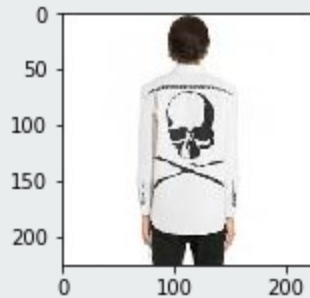
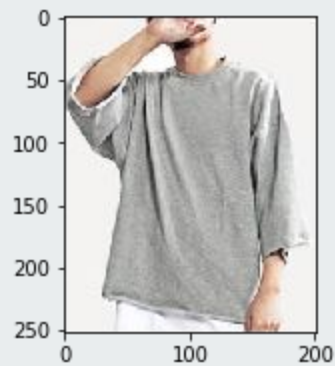
520 fashion images of men's tops with one of four labels:

- Tight Fitting
- Slim Fit
- Relaxed Fit
- Oversized



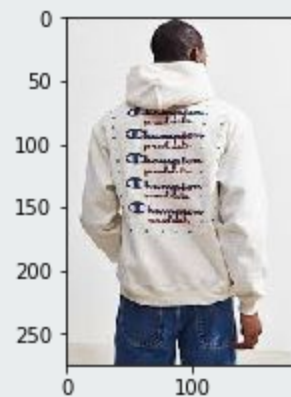
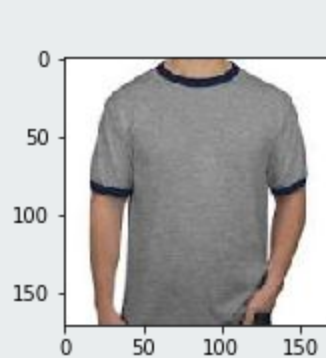
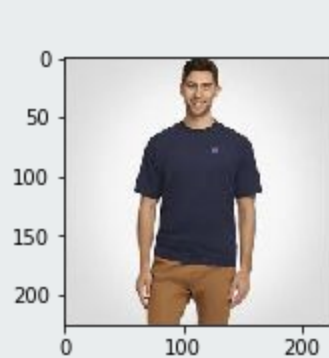
Dataset

Oversized Fit



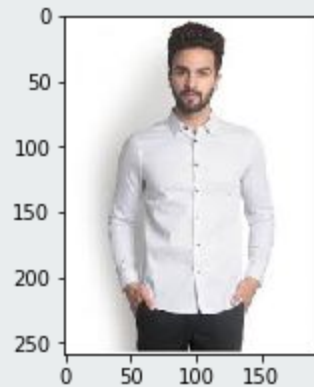
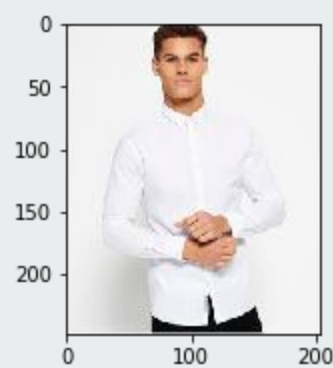
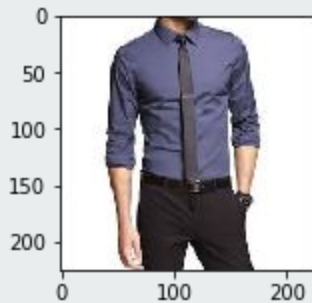
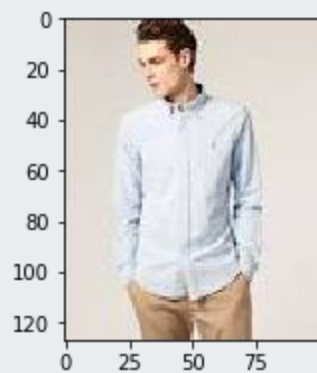
Dataset

Relaxed Fit



Dataset

Slim Fit

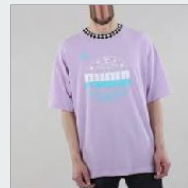
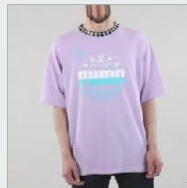
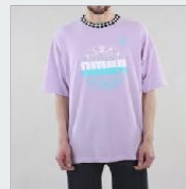
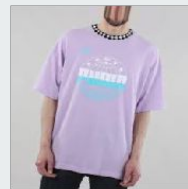
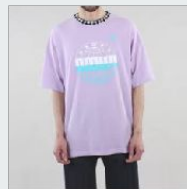
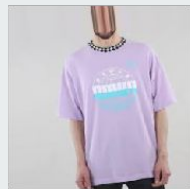


Dataset

Tight Fitting



Augmentation



Transfer Learning

1

Take a model that was trained for one task, and apply it to a different task. Most common uses are in computer vision, and NLP.

2

Allows you to exploit the knowledge gained in a previous model, and use that as a starting point.

3

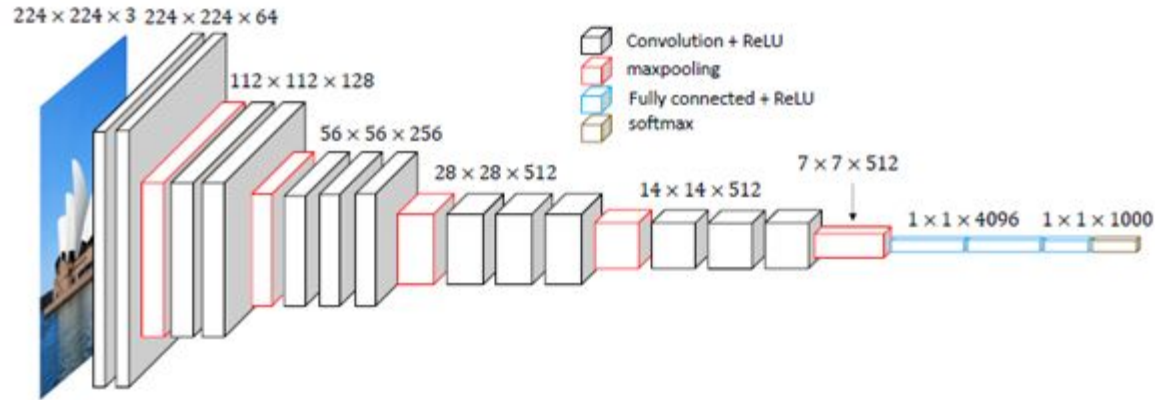
Makes it possible to train a deep learning model in a short amount of time with relatively little data.

4

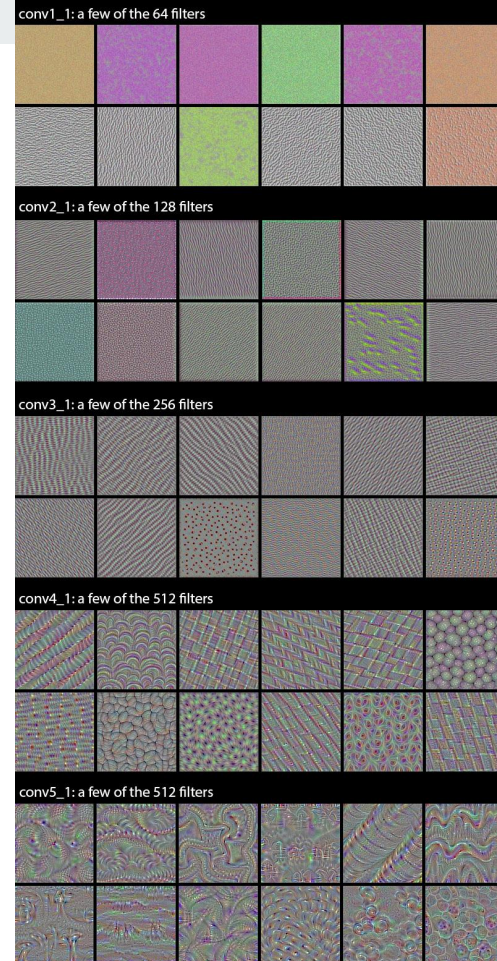
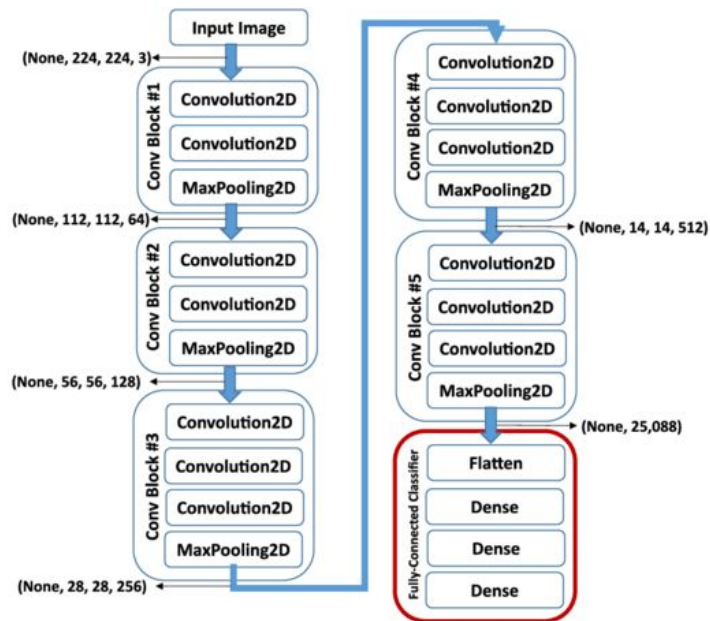
In computer vision, the model typically detects textures and edges in the earlier layers and these weights can be applied to a different problem.

VGG-16

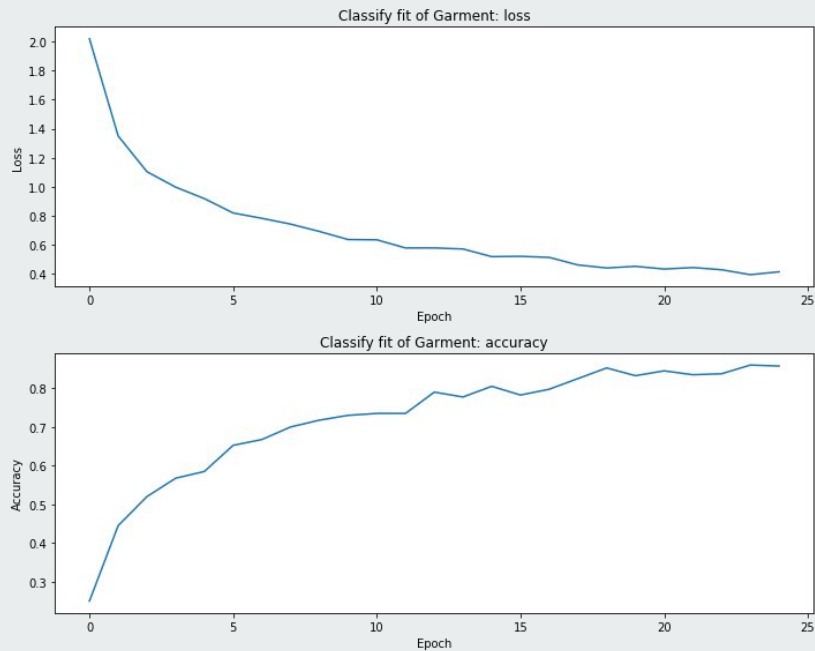
- Deep convolutional neural network.
- Used to win the ImageNet competition in 2014.
- ImageNet is a dataset of over 14 million images, and 1000 classes.
- VGG-16, as well as others, can be accessed through keras.



VGG-16



Training

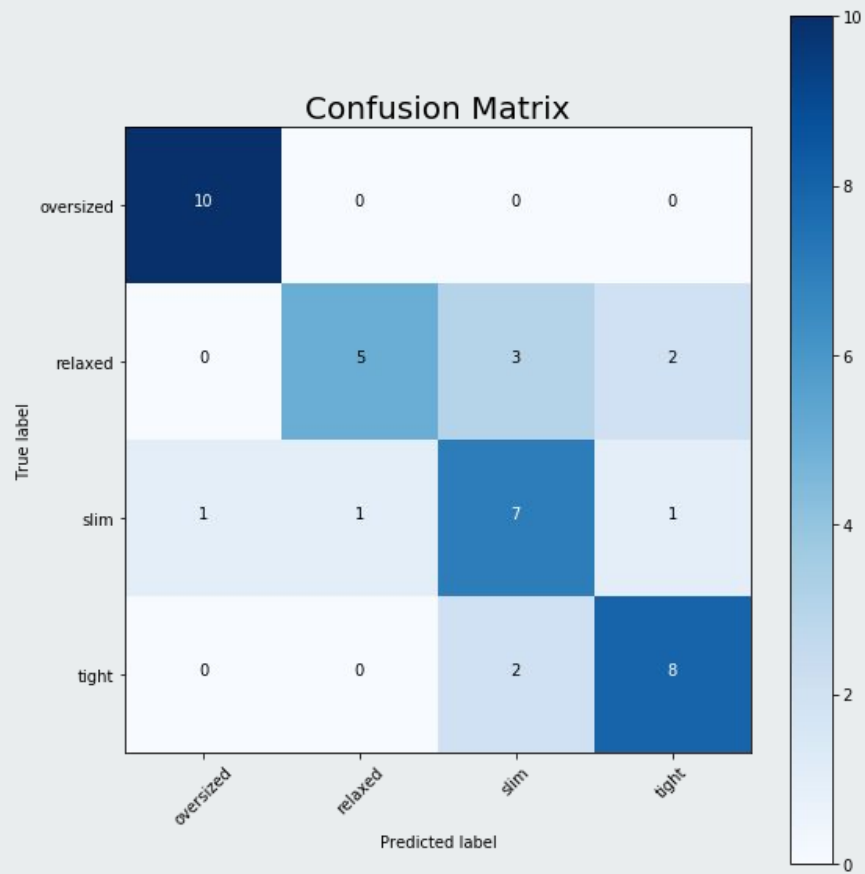


Performance

- Test loss: 0.866
- Test accuracy: 0.75

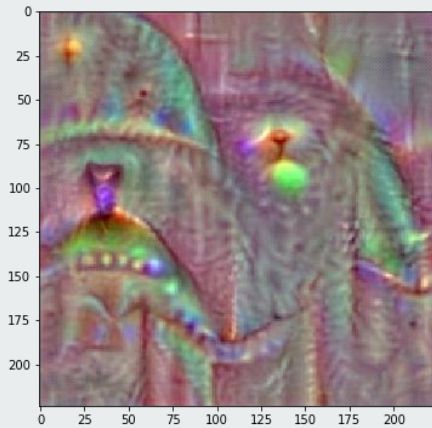


Performance

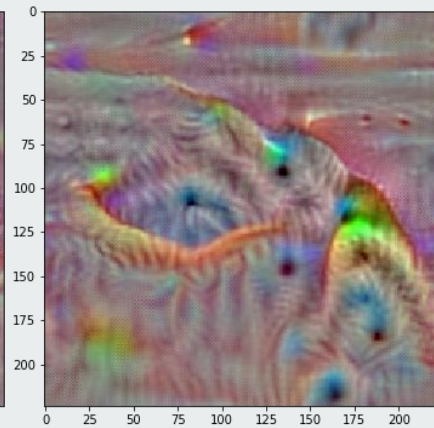


Activation map

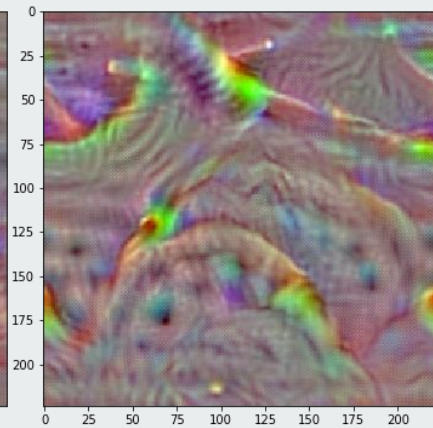
Oversized



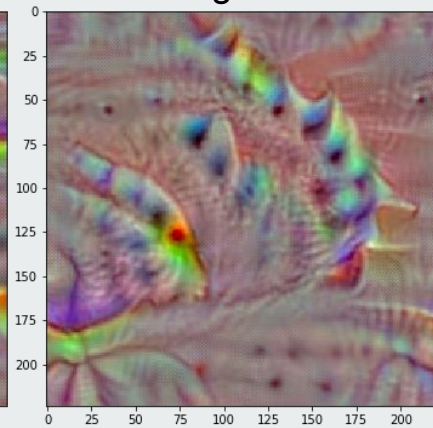
Relaxed



Slim Fit



Tight



Demo



Thank you.

