Clothing Classification Study

A Capstone Project
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Clothing is a major source of waste, emissions.

The fashion industry produces 10% of all humanity's carbon emissions and is the second-largest consumer of the world's water supply by industry.

Between 2000 and 2020, global clothing production doubled.

While people bought 60% more garments in 2014 than in 2000, they kept the clothes for half as long.

-World Economic Forum, 2020

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https://www.weforum.org/agenda/2020/01/fashion-industry-carbon-unsustainable-environment-pollution/

How might image classification help?

Identify clothing characteristics in selected images: patterns, colors, garments, styles, textures.

Assign labels or identify similar images from a pool of images.

Redirect consumers to second-hand, thrift sites.

thredup.com

etsy.com

Classification Exercise

9 Types of Garment

8 Types of Patterns

Data

DeepFashion database

- The Chinese University of Hong Kong
- 800,000 images
- Professionally staged to real-life
- Cross-pose

Manually tagged 5,200 images

- Pattern
- Garment type

http://mmlab.ie.cuhk.edu.hk/projects/DeepFashion.html

Modeling

VGG16 Transfer Learning

- ~15MM total params

Adam Optimizer, Learning Rate= .001

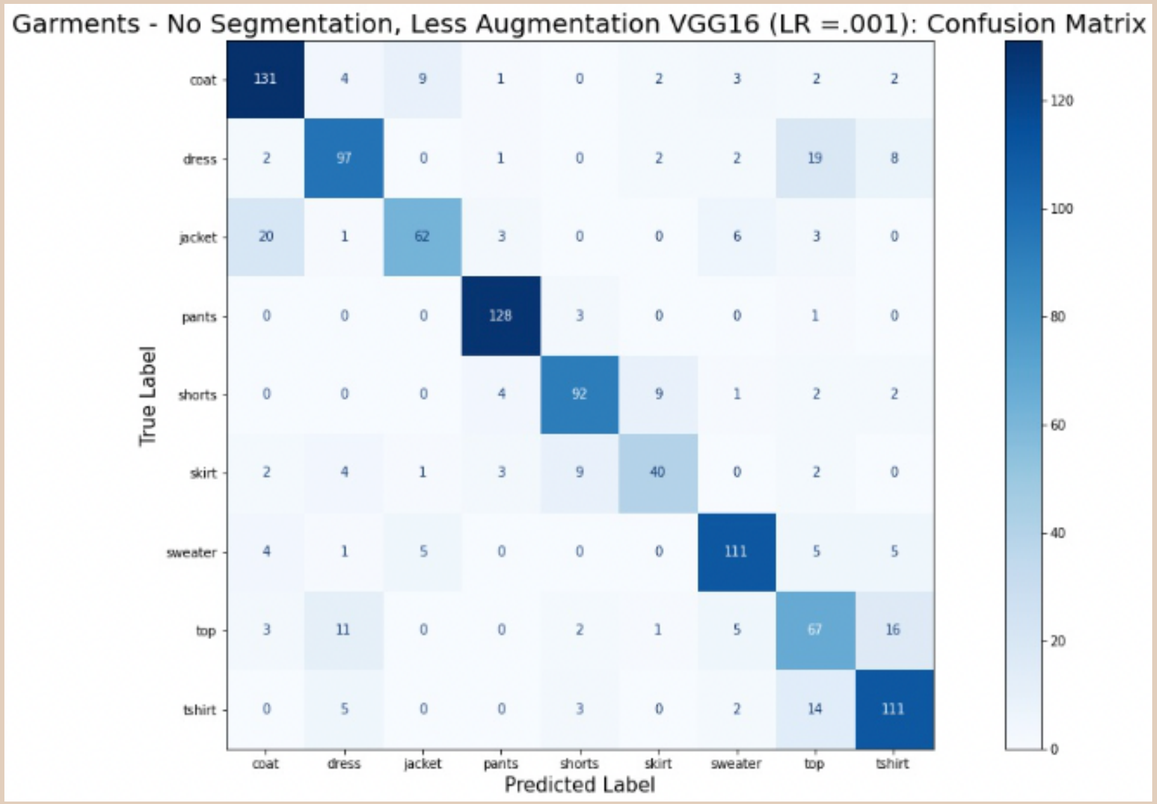
Image Augmentation

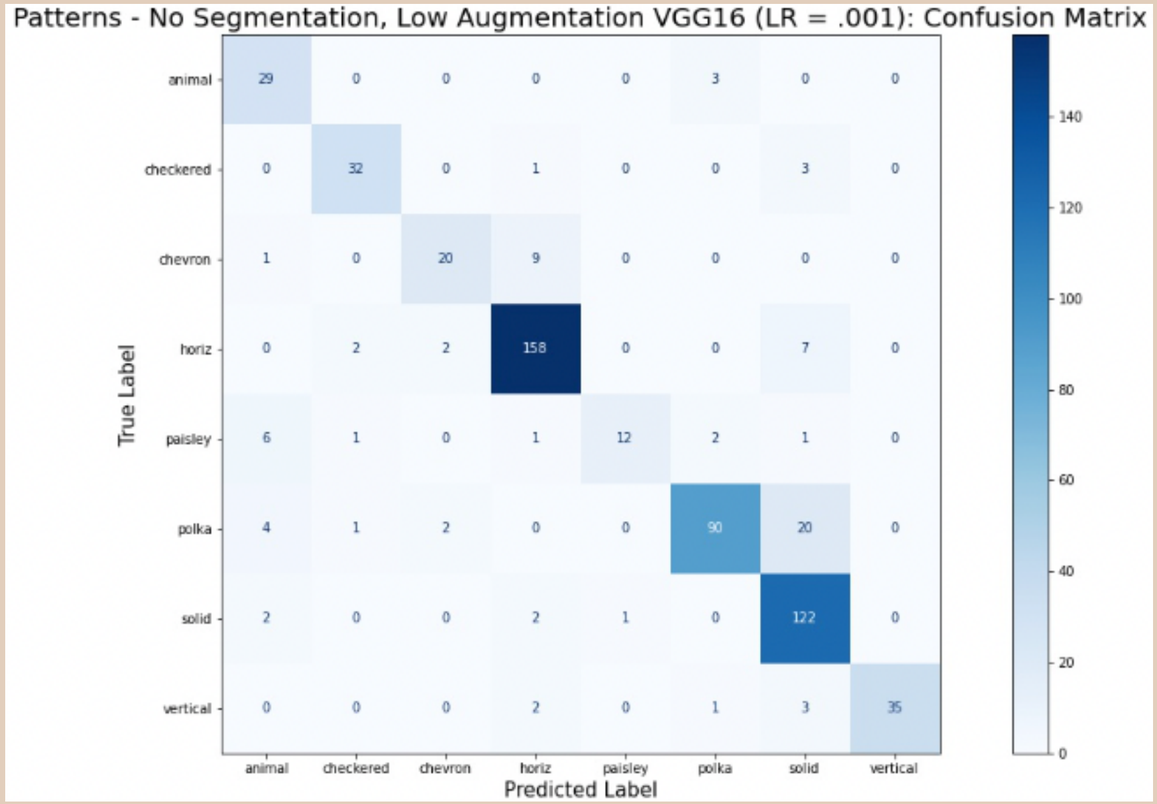
- Horizontal Flip
- Rotation

Top Models:

- 86.61% Validation Accuracy, Pattern Classification
- 79.60% Validation Accuracy, Garment Classification

Misclassifications





Conclusions, Further Research

Using neural networks, it is possible identify garments, patterns using quality data

Add more images to database:

- Improve accuracy
- Expand scope of tags

Integrate model into image recommender system

Integrate model into system for directing consumers to second-hand sites

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Thank you,
any questions?

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