

Clothing Classification Study

A Capstone Project
Daniel Schlant, Data Scientist
Sustainable Apparel Coalition



pixabay.com

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



pixabay.com

How might Image Classification help?

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

Redirect consumers to second-hand, thrift sites.

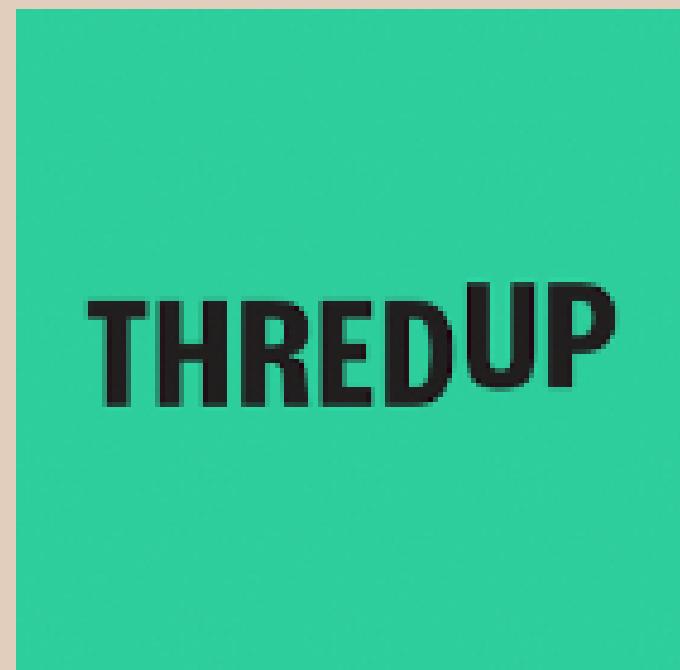
Increase exposure to second-hand market,
reduce demand for newly manufactured clothing.



pixabay.com



pixabay.com

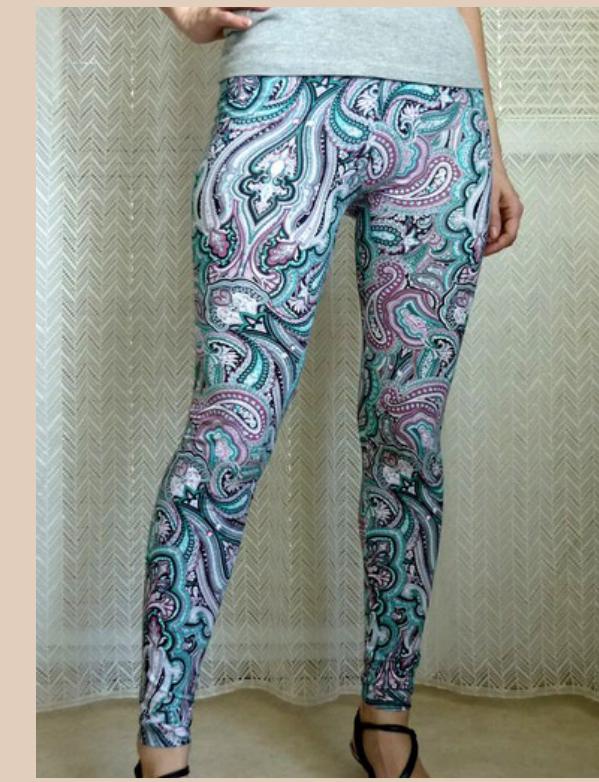
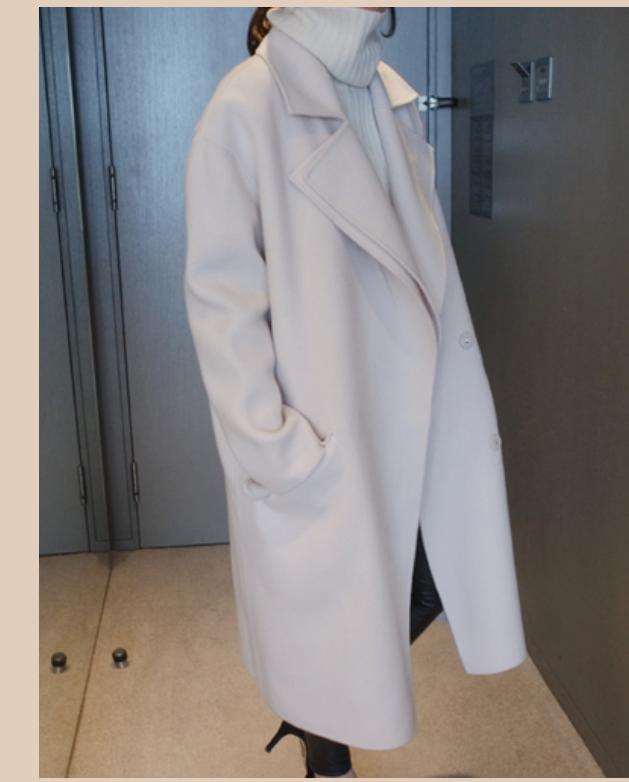


thredup.com

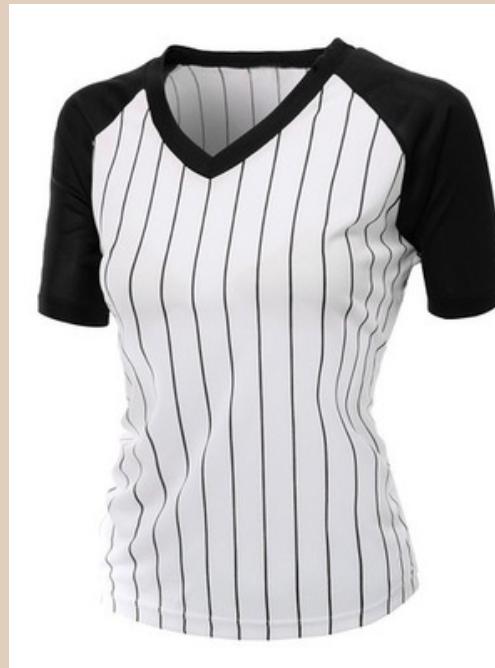


etsy.com

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

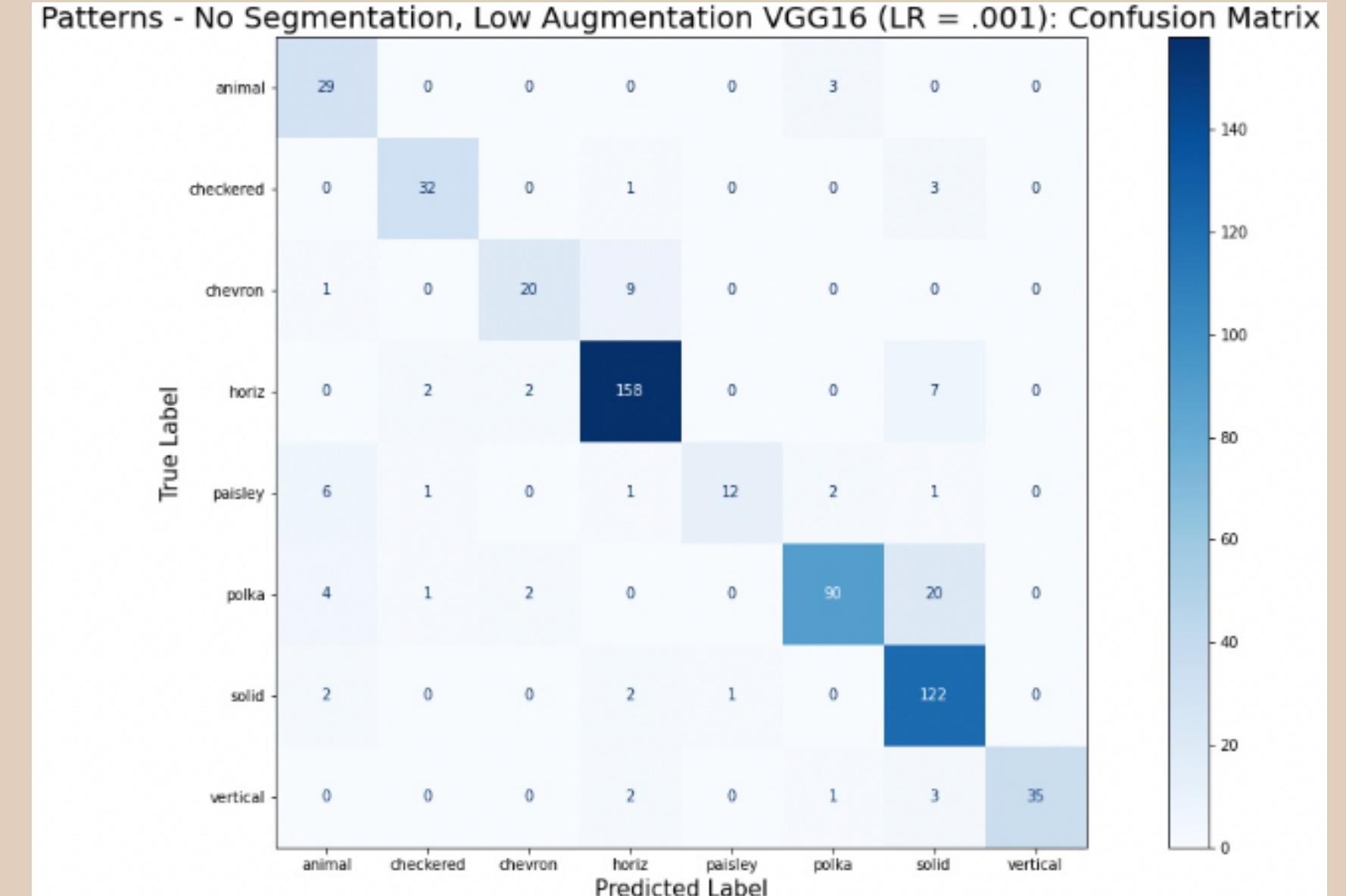
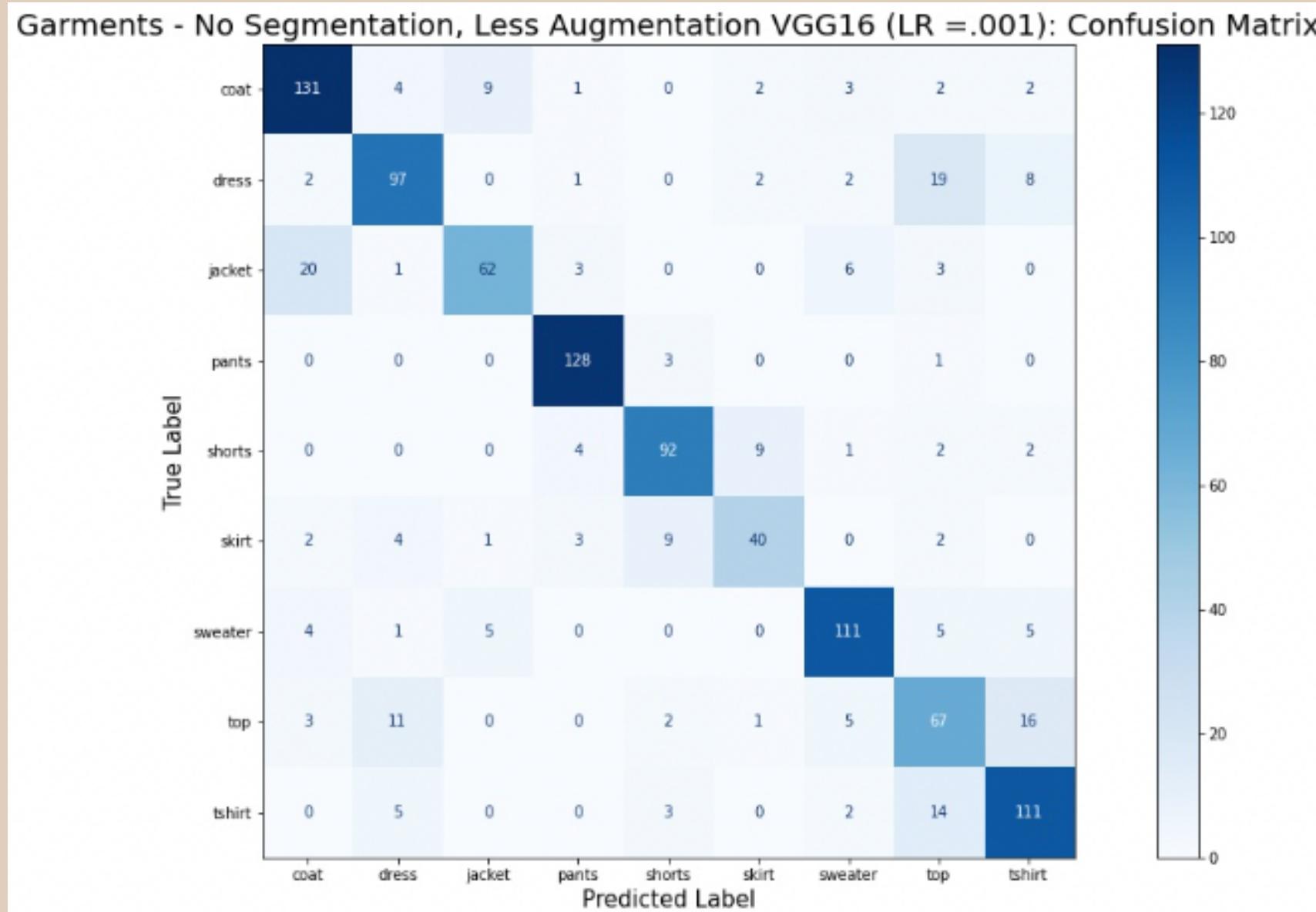
Top Models:

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



pixabay.com

Misclassifications



Further Research

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



**Thank you,
any questions?**



pixabay.com