WHEN MACHINE LEARNING MEET FASHION

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H&M Group

1947
Founder Erling Persson opens our first store, with the ambition to “make fashion available to everyone.”

2004
H&M pioneers designer collaborations.

2013
Launch of the Garment Collecting Initiatives, the first fashion company to collect and reuse old textiles.

2020
H&M Group lands No. 1 on the Fashion Transparency Index.

Business Tech

150+ MEL/DS/DE

30+ ML products

6+ Scaled globally

200% Growth
The conflicts between Fashion and Machine learning

The limitations in current image recognition

Future development of machine learning directions in personal style area
The conflicts between Fashion and Machine learning
THE ESSENCE OF FASHION

Fashion is a form of **self-expression** and **community belonging**.

The term implies a **look** defined by the **fashion industry** as that which is **trending**.

‘Ready to ware’ Garment fashion
Machine learning: a **statistic model** based on **sample data**, in order to make predictions or support decisions.

Assumption that **history will happen again** under a certain context.

Bias on **sample data**
FASHION V.S. MACHINE LEARNING

FASHION

Fashion is about change and uncertainty. It is arts, innovate something not exist

Fashion styles are vague about feeling, and subjective to individual at certain time

Fashion trends defined by small group of people

MACHINE LEARNING

ML learns unchanged, calculate certainty

ML needs a quantifiable way to model a concepts, apply same logic for prediction

ML reveal the common rules from a big samples
THE QUESTIONS YOU MAY WANT TO ASK IF DO FASHION FORECASTING BY ML

• Where you get your data sources to train the model?

• How image data be labeled? Who labels the data?

• Can you do something after you knowing the forecasting?

• Do we need machine to do the forecast? accuracy, cost
• Use ML for classifying **which communities** the people belongs to and want to belong to

• Use ML to summaries **the common features** of a periods, and find out what **trends** will **come back** at what time

• Look at the **right place** at the **right time** for **right purpose**
The limitations in current image recognition
**Public Information**

Pixels are the smallest elements presented on a screen and the lowest level of analysis in computer vision.

**Image Differences** = the 'Distance' between 2 Image vector representations

**Feature Extraction**

Image vector representations

Convolution + ReLU

Pooling

Convolution + ReLU

Pooling

Convolution + ReLU

Pooling

[0.022, 0.882, 0.674, 0.002, 0.531, ……]
MACHINE RECOGNIZE AS DIFFERENT GARMENTS

- Same dress under different lights
- Same dress with different backgrounds
- Same dress with different poses
- Same dress different sizes
- Same dress different angles
- Same dress can be worn differently for different styles
THE IR CAPABILITY FOR EACH FASHION FEATURE

REALITY

<table>
<thead>
<tr>
<th>COLOR</th>
<th>TEXTILES</th>
<th>PATTERN</th>
<th>SILHOUETTE</th>
<th>QUALITY</th>
</tr>
</thead>
</table>

TAGGING OUTPUTS

- 6-12 colors
- 4-6 types, with limited accuracy
- Best but tag in simple way
- Unlimited and continuously change
- Unlimited and continuously change
- No detail detect had to classify
- NaN

EXTRA REQUIREMENT

- Same background/lights, same size, full image, same angle, same camera; Only 2D, no movements
Another way of thinking – Avoid identify ‘feature’

It is not about objects matching or accuracy
Future development of Machine learning focus in personal style area?
SAME ITEM CAN HAVE MULTIPLE STYLES

It is about combination!
IMAGE RECOGNITION SHOULD FOCUS ON

Multiple fashion object identification on same picture

Finding the combinations relationship with Styles
SAME PERSON CAN HAVE MULTIPLE STYLES

Focus on better supporting on search rather than recommending style
Encourage try out multiple/new styles
TAKE AWAYS

- Use machine learning to predict **customer social belonging** rather than fashion trends.

- Be aware of the **limitations** of image recognition. Focus on identifying **multiple objects** in the same picture, and mapping out the **relationship** between **combinations** and **styles**.

- Do not limit a customer to a single ‘Fashion style’. **Encourage** them to try different styles and **support** them with **professional guidance**.
RECOMMENDED READING!

https://towardsdatascience.com/machine-learning-from-scratch-part-3-ed572330367d
https://www.fritz.ai/image-recognition/
https://github.com/spotify/annoy
https://viso.ai/deep-learning/pattern-recognition/
https://multithreaded.stitchfix.com/blog/2020/09/02/what-color-is-this/
Thank you

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