

Ten-million-order Human Database for World-wide Fashion Culture Analysis

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http://xpaperchallenge.org/cv

Dynamic Fashion Cultures in the world cities?

What kind of FashionDB do we need?

- Huge-scale fashion database
- GPS/time stamp are corresponded in a fashion snap
- Less noise with data refinement



The concept of dynamic fashion cultures



Fashion Culture DataBase (FCDB)

25M Fashion DB w/ geo-tagged and time-stamp

Based on YFCC100M* YFCC100M* =Yahoo Flickr Creative Commons 100M database [Thomee ACM2016]

> On of the largest DB in context of fashion analysis (to our knowledge)





Contributions

Discovering world-wide fashion trends w/ FCDB

- (1) Fashion Culture DataBase (FCDB), which contains and is refined 25M images on Flickr
 - Semi-automatic dataset collection with existing detector
 - Data refinement with binary classification

(2) As the perspective of huge DB, we conduct inter-city similarity and temporal fashion trends in a simple way

- Bag-of-words (BoF) + StyleNet Vec (128-dim)
- Temporal subtraction between two consecutive BoF vectors



How to construct FCDB (1st step)

1) Collect images

1)-1: Collect images on YFCC100M

1)-2: Images are taken around 16 cities by GPS

2) Put bboxes on street fashion snaps

2)-1: Human detection by Faster R-CNN

2)-2: Crop the detected human regions

Result in the first step:

8,504,037 original images 76,532,519 clothing images





FCDB Refinement (2nd step)

Human (fashion snap) or noise with binary classifier

1) Training configuration

- Classifier by StyleNet feature and SVM
- Train / Test : 2,886 / 2,886 (Total 5,772 images annotated by humans)

2) Refinement-by-Classification

2)-1: Apply to all images in FCDB2)-2: Noise images are removed

Result in the second step:

8,504,037 original images 76,532,519 fashion snaps 1,981,812 original images 25,707,690 fashion snaps



(Non human / miss detection)



FCDB Refinement (2nd step)



Related fashion-oriented databases

- Ten-million-order images on SNS
- More diverse
 - Geo-tagged + Time-stamped images
 - Taken from daily life, rather than nobackground





					Time
Database	#images	#cate.	GPS?	Box?	Stamp?
HipsterWars	1,893	5			
Fashionista	158,235	53		✓	
Fashion144k	144,169	N/A	\checkmark		
Fashion14	13,126	14			
DeepFashoin	800,000	1,050		\checkmark	
FCDB (ours)	25,707,690	16	\checkmark	1	1

Against to the previous databases, our database contains street snaps



City-scale fashion representation (1/2)

Fashion Style Distribution (FSD): aggregated fashion distribution at each city

- 1) Extracting StyleNet [Simo-Serra+, 2016] which has 128-dim vector
- 2) Feature quantization by Bag-of-Words (BoW)

Step2-1: *k*-means clustering: the centroids define pseudo fashion style

Step2-2: Vote for the most similar fashion style by distance from representative vectors of fashion styles



[Simo-Serra+, 2016] E. Simo-Serra, S. Fidler, F. Moreno-Noguer, and R. Urtasun. Neuroaesthetics in fashion: Modeling the perception of fashionability. CVPR, 2015.



City-scale fashion representation (2/2)

Fashion Style Distribution (FSD): aggregated fashion distribution at each city

- Extracting StyleNet [Simo-Serra+, 2016] which has 128-dim vector
- Feature quantization by Bag-of-Words (BoW) 2)

Step2-1: *k*-means clustering: the centroids define pseudo fashion style

Step2-2: Vote for the most similar fashion style by distance from representative vectors of fashion styles



the perception of fashionability. CVPR. 2015.

Nodes/edges show how much similar between cities

- > A thick line indicates high similarity
- > The fashion-based city similarity is affected by culture



The graph shows how much similar between 2 cities

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Randomly sampled images in Tokyo



Randomly sampled images in Tokyo





Time series representation

• Fashion Trends Descriptor (FTD): temporal fashion trends detector

Subtraction of temporally consecutive FSDs

Increased/stable/decreased fashions can be detected





- Analysis of dynamic fashion cultures
- Yearly analysis in 2000 2015
- Visualizing appeared fashion styles Boston
 - Sportswear keeps increasing since 2010
 - \rightarrow High interest in sports
 - ✓ Hockey team won the Stanley Cup in 2011
 - Tokyo
 - Costumes show increase since 2011
 - \rightarrow High interest in Japanese subculture

Ice hockey team, Boston Bruins won the Stanley Cup in 2011







Boston (2011)







Boston (2012)

The result suggests that user's interest in the area, to detect a hot event



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Ice hockey team, Boston Bruins won the Stanley Cup in 2011



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Summary

Proposal of large-scale database contributing to fashion trends analysis

- 1. **Proposal of Fashion Culture Database**
- 2. fashion trends analysis method
 - Representation of fashion trends
 - Time series representation of fashion trends
- 3. Spatiotemporal analysis of fashion trends
 - Regionality of fashion trends
 - Temporal change in clothing prevalence







Toward release database!?

We're struggling to release the data!

- Commercial-free images are being collected
- Building a set focused on clear images



