

Fribourg, 8. November 2017

### Trend prediction using fashion datasets

BSc/MSc Thesis (in collaboration with Zalando research):

#### Work overview:

Fashion is a fascinating domain that gained a lot of attention during the last decade due the emergence of online shopping, social media and mobile computing. A challenging task in the fashion domain is to answer this query: *What is the future of fashion?*. Figure 1 graphically illustrates the prediction in fashion datasets.

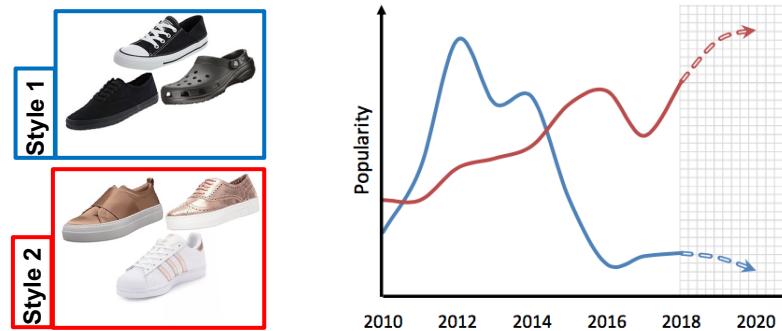


Figure 1: Example of fashion prediction<sup>1</sup>

In order to tackle the fashion prediction problem from a data-driven perspective, a new European project called FashionBrain (<https://fashionbrain-project.eu>) has been recently launched. The FashionBrain project aims to help Zalando (the first European online fashion retailer) to gain a deep understanding of customer needs and to predict next trends. In the context of this thesis, we propose to implement some state-of-the-art rating-based prediction techniques to predict the upcoming fashion trends for Zalando.

The outcome of this thesis will be a graphical tool that visualizes the result of the prediction using fashion data sets. Some of the features offered by the implemented tool are the following:

- Browse and visualize the fashion datasets.

<sup>1</sup>Fashion Forward: Forecasting Visual Style in Fashion, 2017

- Select items from the dataset and visualize their related taxonomy.
- Perform prediction using the implemented techniques and visualize the results.

The prediction algorithms that will be implemented in the context of this thesis are the following:

- TimeSVD++ [1]: This method is used to improve quality of prediction for Netflix rating dataset. This method models the temporal dynamics along the whole time period.
- TVBPR+ [2]: This method is used in order to recommend fashion items to users based on their past feedback with Amazon dataset. TVBPR+ models visual dimensions and captures visual and non-visual temporal dynamics.
- FARIMA [3]: This model tackles the year-long seasonal period of purchasing data to achieve daily-aware preference predictions. It is used on real-world cosmetic purchasing data from a major e-commerce website (JD.com) in China.

#### Work tasks:

1. Familiarize yourself with timeSVD++, TVBPR+ and FARIMA algorithms.
2. Implement the three algorithms.
3. Evaluate the efficiency and the accuracy of the implemented techniques for fashion prediction.
4. Implement a graphical tool that illustrates the implemented techniques.
5. Write a thesis that describes the implemented algorithms and the tool.
6. Make a presentation of 20 minutes.

#### Literature:

1. R. He and J. McAuley: *Ups and Downs: Modeling the Visual Evolution of Fashion Trends with One-Class Collaborative Filtering*, in WWW, 2016.
2. Y. Koren: *Collaborative Filtering with Temporal Dynamics*, Communications of the ACM, 2010.
3. Yongfeng Zhang, Min Zhang, Yi Zhang, Guokun Lai, Yiqun Liu, Honghui Zhan, Shaoping Ma: *Daily-Aware Personalized Recommendation based on Feature-Level Time Series Analysis*, in WWW, 2015.
4. [https://github.com/GraphChi/graphchi-cpp/blob/master/toolkits/collaborative\\_filtering/timesvdpp.cpp](https://github.com/GraphChi/graphchi-cpp/blob/master/toolkits/collaborative_filtering/timesvdpp.cpp)
5. <https://sites.google.com/a/eng.ucsd.edu/ruining-he/>
6. Al-Halah Z. et al: *Fashion Forward: Forecasting Visual Style in Fashion*, 2017

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