

BUSINESS ANALYTICS: EXERCISE SHEET No.7 (WiSe2018-19)

**13TH OF DECEMBER (DUE 19TH OF DECEMBER AT
23:59:59)**

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QUESTION 14 - PREVIEW FOR NEXT CLASS: COLLABORATIVE FILTERING - 5 POINTS

Read sections 1 and 2 and the abstract of the paper presented in:

<https://arxiv.org/pdf/1708.05031.pdf>

a) (2 points) Based on what you read, explain with a MAXIMUM of 3 phrases what is collaborative filtering?

b) (3 points) Answer the following questions with a MAXIMUM of 2 phrases each.

- What is the big advantage of collaborative filtering?
- What is the big limitation of traditional Matrix Factorization?
- How do the authors promise to solve this problem?

QUESTION 15 - ITEM-/USER- BASED RECOMMENDER SYSTEMS - 15 POINTS

(Type B) For this exercise we will use the rating matrix presented in Table 1. Use for the following tasks the cosine similarity as a similarity metric.

$$\cos(u, v) = \frac{u^T v}{\|u\| \|v\|}$$

a) Predict the ratings for the tuples (u_3, i_2) and (u_4, i_4) using the user-based approach with neighborhood size $k = 1$.

b) Predict the ratings for the tuples (u_3, i_2) and (u_4, i_4) using the item-based approach with neighborhood size $k = 1$.

c) What is the problem with new users or items? How can we predict the rating for item i_6 for the users u_1, \dots, u_5 ? How can we predict the ratings for user u_6 for items i_1, \dots, i_5 ? Finally, how to predict the rating for (u_6, i_6) ?

Table 1

-	i_1	i_2	i_3	i_4	i_5	i_6
u_1	1		3		5	
u_2		2	3	4		
u_3		?	3	3	5	
u_4	5	4	3	?		
u_5	1	2	3		5	
u_6						

WARNING!

If we detect **Plagiarism** on your solution, you will receive no points for it. If a second plagiarism attempt is detected, you might fail the class or be expelled from your program.

You are allowed to discuss solutions, but if you work on a group, you must indicate on your sheet with whom are you working with.

Group submissions earn 0 points.

BONUS POINTS!

Submission grades represent 100% of this bonus. For each 11% of your total grade you will earn 0.5 bonus points on the final exam up to a maximum of 4 points.

HOW TO SUBMIT?

Inside the Samelzonplatz Campus, there is a post-box cluster to the right corridor from the entrance. Look for the "Business Analytics Post-Box" (we will set it up on Monday). For security you must also submit on our learnweb page: <https://www.uni-hildesheim.de/learnweb2018/course/search.php?search=3108> (password: 3108). If you submit your physical version you will get it back with correction markings. Submitting on learnweb will

guarantee that you will receive your grade (in case you forget to post it or it goes missing).

Keep in mind that your solution sheets are important documents, so make sure they are clean and organized. Non-readable sheets will not be graded.

WRITE YOUR NAME, ID, AND TUTORIAL GROUP.

REMEMBER TO KEEP A COPY OF YOUR SOLUTION FOR YOURSELF!