## Recommender Systems

Quiz, 5 questions

nt	1.	Suppose you run a bookstore, and have ratings (1 to 5 stars)
it		of books. Your collaborative filtering algorithm has learned
		a parameter vector $ heta^{(j)}$ for user $j$ , and a feature
		vector $\boldsymbol{x}^{(i)}$ for each book. You would like to compute the
		"training error", meaning the average squared error of your
		system's predictions on all the ratings that you have gotten

from your users. Which of these are correct ways of doing so (check all that apply)?

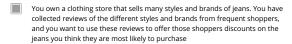
For this problem, let m be the total number of ratings you

have gotten from your users. (Another way of saying this is

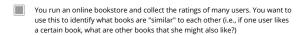
that  $m=\sum_{i=1}^{n_m}\sum_{j=1}^{n_u}r(i,j)$ ). [Hint: Two of the four options below are correct.]

$$rac{1}{m}\sum_{i=1}^{n_m}\sum_{j:r(i,j)=1}(\sum_{k=1}^n( heta^{(j)})_kx_k^{(i)}-y^{(i,j)})^2$$

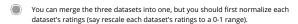
1 point 2. In which of the following situations will a collaborative filtering system be the most appropriate learning algorithm (compared to linear or logistic regression)?



	You're an artist and hand-paint portraits for your clients. Each client gets a
	different portrait (of themselves) and gives you 1-5 star rating feedback, and
	each client purchases at most 1 portrait. You'd like to predict what rating your
	next customer will give you



1 point You run a movie empire, and want to build a movie recommendation system based on collaborative filtering. There were three popular review websites (which we'll call A, B and C) which users to go to rate movies, and you have just acquired all three companies that run these websites. You'd like to merge the three companies' datasets together to build a single/unified system. On website A, users rank a movie as having 1 through 5 stars. On website B, users rank on a scale of 1 - 10, and decimal values (e.g., 7.5) are allowed. On website C, the ratings are from 1 to 100. You also have enough information to identify users/movies on one website with users/movies on a different website. Which of the following statements is true?



It is not possible to combine these websites' data. You must build three separate recommendation systems.

Assuming that there is at least one movie/user in one database that doesn't also appear in a second database, there is no sound way to merge the datasets, because of the missing data.

You can combine all three training sets into one as long as your perform mean normalization and feature scaling **after** you merge the data.

1 point  $\textbf{4.} \quad \text{Which of the following are true of collaborative filtering systems? Check all that apply.}$ 

Even if each user has rated only a small fraction of all of your products (so r(i,j)=0 for the vast majority of (i,j) pairs), you can still build a recommender system by using collaborative filtering.

Coursera | Online Courses From Top Universities. Join for Free For collaborative filtering, the optimization algorithm you should use is gradient descent. In particular, you cannot use more advanced optimization Recommender Systems (L-BFGS/conjugate gradient/etc.) for collaborative filtering, since you have to solve for both the  $x^{(i)}$ 's and  $\theta^{(j)}$ 's simultaneously. For collaborative filtering, it is possible to use one of the advanced optimization algoirthms (L-BFGS/conjugate gradient/etc.) to solve for both the  $\boldsymbol{x}^{(i)}$ 's and  $\theta^{(j)}$ 's simultaneously. Suppose you are writing a recommender system to predict a user's book  $\leftarrow$ preferences. In order to build such a system, you need that user to rate all the other books in your training set. Suppose you have two matrices A and B, where A is 5x3 and B is 3x5. Their product is C=AB, a 5x5 matrix. Furthermore, you have a 5x5 matrix R where every entry is 0 or point 1. You want to find the sum of all elements  ${\cal C}(i,j)$  for which the corresponding  ${\cal R}(i,j)$  is 1, and ignore all elements C(i,j) where R(i,j)=0. One way to do so is the following code: C = A \* B;total = 0; for i = 1:5for j = 1:5if (R(i,j) == 1)total = total + C(i,j);end end Which of the following pieces of Octave code will also correctly compute this total? Check all that apply. Assume all options are in code. total = sum(sum((A \* B) .\* R))C = (A \* B) .\* R; total = sum(C(:)); total = sum(sum((A \* B) \* R)); C = (A \* B) \* R; total = sum(C(:));I, Mark R. Lytell, understand that submitting work that isn't my own may result in permanent failure of this course or deactivation of my Coursera account. Learn more about Coursera's Honor Code

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