CS 498: Computational Advertising	**Fall 2019**
Homework 6	
Handed Out: November 19, 2019	*Due: December* 13, 2019 *11:59 pm*

1 General Instructions

- This assignment is due at 11:59 PM on the due date. We will be using Gradescope for collecting this assignment. The homework MUST be submitted in pdf format on gradescope Contact TAs if you face technical difficulties in submitting the assignment. We shall NOT accept any late submission!
- Please make sure to appropriately map/assign the pages of your submitted pdf to each sub-question listed in the homework outline. Handwritten answers are not acceptable. Name your pdf file as YourNetid-HW6.pdf
- For all questions, you need to explain the logic of your answer/result for every subpart. A result/answer without any explanation will not receive any points.
- It is OK to discuss with your classmates and your TAs regarding the methods, but it is NOT OK to work together or share code. Plagiarism is an academic violation to copy, to include text from other sources, including online sources, without proper citation. To get a better idea of what constitutes plagiarism, consult the CS Honor code (http://cs.illinois.edu/academics/honor-code) on academic integrity violations, including examples, and recommended penalties.There is a zero tolerance policy on academic integrity violations; Any student found to be violating this code will be subject to disciplinary action.
- Please use Piazza if you have questions about the homework. Also feel free to send TAs emails and come to office hours.
- Please find the link to the Ribeiro-Neto paper pdf below [1].

2 Question 1 (2 points)

What are the similarities and differences between identifying ads in the contextual ads case and for web search case?

3 Question 2 (2 points)

What is the difference in click-through rates between contextual ads and web-search ads? Explain!

[1] http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.904.4260&rep=rep1&type=pdf

4 Question 3 (6 points)

Please answer the following questions based on the Ribeiro-Neto paper [1] which was discussed in class.

1. What is the impedance mismatch problem discussed in the paper? Explain!
2. How do you solve the impedance mismatch problem?
3. Consider Figure 8 in the paper. Let us look at the line for **AAK_EXP_H**. We can see that for all values of recall, this method gives the higher precision. From the paper, AAK_EXP_H stands for *match ads and keywords with expanded triggering page, also considering the page pointed by the ad.* Explain why this method gives the highest precision.

5 Question 4 - Behavioral Targeting Exercise using Facebook Ad Manager (10 points)

This is a two step exercise. In the first step, you will look at the **Ad Preferences Profile** that Facebook has created for you and discuss/analyze the accuracy of the profile. In the second step, you will use the **Facebook Ad Manager** to create a simple Ad. You will build an audience for that ad keeping a specific friend in mind. In other words, try to form the audience for the ad in a way that it includes your friend. Now given your observed accuracy of a Facebook Ad profile in the first step and the potential size of the audience that you created, discuss about the probability that your friend will actually see that ad. Specifically, you need the answer the following two parts.

Part 1: Report on the accuracy of your Facebook Ad Preferences Profile. To answer this question, you need to do the following steps:

1. Login to your facebook account and then go to the following URL **https://www.facebook.com/ads/preferences**
2. Under the tab **Your interests**, click on any three categories of your choice like *News and Entertainment, Business and Industry, People* etc. Look at the top 20 entries for each category and report on what fraction of them are accurate i.e. correctly reflect your interests. *Note please do not report the actual entries that Facebook inferred for you, rather we are only asking you to quantitatively state what percentage of those entries were accurate.*
3. Under the tab **Your information**, go to **Your categories**. Look at all the categories or tags that Facebook inferred for you. Report on what fraction of them are accurate.

4. Discuss qualitatively about the accuracy of your Facebook Ad profile that you observed in the last two steps. Try to generate insights about the correct and wrong entries in your profile and what might have triggered these entries.

Part 2: Report what you think the probability is that your target friend will see the ad. To answer this question, you need to do the following steps:

1. Go to **https://www.facebook.com/ads/manager** and follow these steps.
   - Click **Create** and choose **Select guided creations**.
   - Click on *Create New Campaign*
   - Select a *marketing objective* randomly. You can just choose *Brand Awareness*. This selection is important when you are running an actual campaign, but not for this exercise.
   - You can keep the default entries for *Campaign Budget optimization*. Since we will not be actually launching the campaign, setting this is not required.
   - Then click on *Set up Ad Account.* Here also, just go with the default entries.
   - Now we need to specify the *Audience*.
   - Under the tab *Create New Audience*, we will work specifically with these few options—**Locations, Age, Gender, Languages, Detailed Targeting**. Under **Detailed Targeting**, you can browse to find three options **Demographics, Interests, Behaviors** which further have many sub-options.
   - As we specify the different features for the audience, Facebook gives an estimate of **Potential Reach** on the right.
2. Now suppose you want to target your ad towards a specific friend. Build an audience using the features listed above such that there is a high chance that the audience includes your friend. For example, using the location that your friend lives in can be a great way to narrow down your audience. As you experiment with different features, your goal should be to decrease the size of the audience i.e. the value of *Potential Reach*, but also ensure that there is a high probability that the audience includes your friend. Based on your first exercise, you must have noticed that Facebook often makes wrong inferences for a person. So some feature that you know about your friend and may have included in your audience, can be missing in the Facebook ad profile of your friend. In such a case, the audience will exclude your friend. Report on the minimum potential reach you achieved. Discuss qualitatively whether certain types of feature were more helpful than others in narrowing down the audience.
3. Now given the accuracy of a Facebook Ad profile that you observed in the first step and the current audience size that you have, report how likely is it do you think that the ad will be actually seen by your friend. Explain either way i.e. if you think it is highly likely, why do you think so? Also, if you think that your friend will probably not see the ad, give reasons to support that.

References

[1] Berthier Ribeiro-Neto et al. “Impedance coupling in content-targeted advertising”. In: *Proceedings of the 28th annual international ACM SIGIR conference on Research and development in information retrieval*. ACM. 2005, pp. 496–503.