

Introduction to Web Science

Assignment 11

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This assignment focuses on **Online Advertisement**. As discussed in the class, teams with exact similar answers that give an indication of copying will receive null points for those questions. If you are taking answers from some source, please cite your sources.

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1 Online advertisement (10 points)

In the videos about online advertisement, you learned about the three different payment methods for online advertisement.

1. Name all three methods.
2. Mention the advantages and disadvantages, for publisher and advertiser, of all the payment methods and explain them in your own words.
3. Provide real world examples for the three payment methods.

Answer We provide the answers in Table 1 for all methods.

Cost per	Adantages	Disadvantages	Examples
<i>mille</i>	Easy to implement and track for a publisher	No information for ad agency or advertiser if ad is successful	TV ads based on Nielsen ratings and estimated viewership
<i>click</i>	Middle ground between CPM and CPA, easier to track than CPA	Payment can be abused by click-fraud	Search engine advertisement, e.g. AdWords or Yahoo Search Marketing
<i>acquisition</i>	Ad guaranteed to be effective, if not, no payment	Publishers take a big risk when advertising	Advertisements using a dedicated phone number per ad to track customer origin

Table 1: Different advertising methods with advantages, disadvantages and examples.

2 Payments in Online Advertisement(15 points)

Provide the complete calculation with your solutions for the following questions.

1. An online advertisement company offers you to advertise your website on a cost-per-click base (CPC) with a cost of 0.70€ per click. Assuming that in average three out of ten visitors of your website are buying a product from which you are earning 20€, would you accept this offer? What is your average profit/loss per visitor?
2. What would be the minimal conversion rate (CR) to guarantee your profit?
3. Two online advertisement companies A and B are making you offers to advertise your website. Company A follows a cost-per-mille (CPM) model with a cost of 2,40€ for displaying your banner advertisement thousand times. Company B follows a cost-per-action (CPA) model charging a commission of 6% from every profit generated on your website through clicks on the banner ad. Assuming a click-through-rate (CTR) of 0.5%, a conversion rate (CR) of 20% and an average profit of 40€ for every transaction on your website, which offer is the best?
4. Assuming an online advertisement campaign for a website has obviously a high click-through-rate (CTR), but the earnings from the website are still very poor. What do you think could be the problem (please provide your answer in one or two paragraphs)?

Answers

1.

$$\begin{aligned}cpc &= \frac{7}{10} \frac{\text{€}}{\text{click}} \\cr &= \frac{3}{10} \frac{\text{goal}}{\text{click}} \\ \text{profit-per-goal} &= 20 \frac{\text{€}}{\text{goal}} \\ \text{profit-per-click} &= cr \cdot \text{earning-per-goal} - cpc \\ &= \frac{3}{10} \frac{\text{goal}}{\text{click}} \cdot 20 \frac{\text{€}}{\text{goal}} - \frac{7}{10} \frac{\text{€}}{\text{click}} \\ &= 6 \frac{\text{€}}{\text{click}} - \frac{7}{10} \frac{\text{€}}{\text{click}} \\ &= 5.30 \frac{\text{€}}{\text{click}}\end{aligned}$$

2.

$$cpc = \frac{7}{10} \frac{\text{€}}{\text{click}}$$

$$\text{profit-per-goal} = 20 \frac{\text{€}}{\text{goal}}$$

$$cr * \text{profit-per-goal} > cpc$$

$$cr > \frac{cpc}{\text{profit-per-goal}}$$

$$> \frac{\frac{7}{10} \frac{\text{€}}{\text{click}}}{20 \frac{\text{€}}{\text{goal}}}$$

$$> \frac{7}{200} \frac{\text{goal}}{\text{visitor}}$$

3.

$$cpm = \frac{2.40}{1000} \frac{\text{€}}{\text{impression}}$$

$$cpa = \frac{3}{50}$$

$$ctr = \frac{1}{200} \frac{\text{click}}{\text{impression}}$$

$$cr = \frac{1 \text{ goal}}{5 \text{ click}}$$

$$\text{profit-per-goal} = 40 \frac{\text{€}}{\text{goal}}$$

$$\begin{aligned} \text{profit-per-impression} &= ctr \cdot cr \cdot \text{profit-per-goal} \\ &= \frac{1}{200} \frac{\text{click}}{\text{impression}} \cdot \frac{1 \text{ goal}}{5 \text{ click}} \cdot 40 \frac{\text{€}}{\text{goal}} \\ &= \frac{1}{25} \frac{\text{€}}{\text{impression}} \\ &= 0.04 \frac{\text{€}}{\text{impression}} \end{aligned}$$

$$\begin{aligned} \text{COMPANY A profit-per-impression} &= \text{profit-per-impression} - \frac{cpm}{1000} \\ &= 0.04 - 0.0024 \frac{\text{€}}{\text{impression}} \\ &= 0.0376 \frac{\text{€}}{\text{impression}} \end{aligned}$$

$$\begin{aligned} \text{COMPANY B profit-per-impression} &= \text{profit-per-impression} \cdot (1 - cpa) \\ &= 0.04 \frac{\text{€}}{\text{impression}} \cdot 0.94 \\ &= 0.0376 \frac{\text{€}}{\text{impression}} \end{aligned}$$

As the cost per impression is the same for both companies, it doesn't matter which company we choose.

4.

The problem could be that the advertised product/s is/are not easily reachable for the visitor. This could be due to a complicated sign up process, UI/UX, etc.

3 Online vs. TV Advertisement (10 points)

1. Which of the three payment models is most similar to advertisement on TV (*explain your choice and also why you think other models are not similar*)?
2. What do you think are the most important advantages of online advertisement compared to advertisement on TV (*highlight 5 advantages and explain each of them*)?

Answer

1.

Cost per mille can and is used for measurement of advertising via radio, television, newspapers and online advertising. CPM is a price for showing the video to one thousand users. CPM is often used for comparing the relative efficiency of various advertising opportunities (TV and online). Cost per click (CPC) and Cost per Acquisition (CPA) both require tracking of user activity (click, action or buying) which is impossible in TV-advertisement (possible only by questioning each customer about the source from which he discovered the advertiser).

2.

- 1) Range - online advertising gives the marketer cross-regional global coverage, which helps to reach more audiences and higher sales.
- 2) Targeting of advertisement - using the information about the internet-users the marketer gets to the customers, for whom the advertised product will be more relevant. The advertiser can also geo-target his ads, ensuring that they are only viewed, and clicked, by his intended geographic and niche audience.
- 3) Analysis of advertisement - mechanism of the online ad and web traffic analysis gives automatic feedback on the ads and evaluate their efficiency and cost more precisely.
- 4) Interactivity - online ads allow the viewer to react instantly and even buy the product right after seeing the ad. Customer service, social interaction with the advertisers, are also more accessible online.
- 5) Cost Efficiency - online ads provide many pricing models which can be easily controlled, evaluated and changed. There are many methods of free online advertisement (social networks).

Important Notes

Submission

- Solutions have to be checked into the github repository. Use the directory name `groupname/assignment11/` in your group's repository.
- The name of the group and the names of all participating students must be listed on each submission.
- Solution format: all solutions as *one* PDF document. Programming code has to be submitted as Python code to the github repository. Upload *all* `.py` files of your program! Use **UTF-8** as the file encoding. *Other encodings will not be taken into account!*
- Check that your code compiles without errors.
- Make sure your code is formatted to be easy to read.
 - Make sure you code has consistent **indentation**.
 - Make sure you comment and document your code adequately in English.
 - Choose consistent and intuitive names for your identifiers.
- Do *not* use any accents, spaces or special characters in your filenames.

Acknowledgment

This latex template was created by Lukas Schmelzeisen for the tutorials of "Web Information Retrieval".

LA_TE_X

Currently the code can only be build using **LuaLaTeX**, so make sure you have that installed. If on Overleaf, there's an error, go to settings and change the **L**A_TE_Xengine to **LuaLaTeX**.