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基于概率图模型的互联网广告点击率预测

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Click-through rate prediction of online advertisements based on probabilistic graphical model

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全文: PDF (1294 KB) HTML (1 KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 点击率预测可以提高用户对所展示互联网广告的满意度, 支持广告的有效投放, 是针对用户进行广告的个性化推荐的重要依据. 对于没有历史点击记录的用户, 仍需对其推荐广告, 预测所推荐广告的点击率. 针对这类用户, 以贝叶斯网这一重要的概率图模型, 作为不同用户之间广告搜索行为的相似性及其不确定性的表示和推理框架, 通过对用户搜索广告的历史记录进行统计计算, 构建反映用户间相似关系的贝叶斯网, 进而基于概率推理机制, 定量度量没有历史点击记录的用户与存在历史点击记录的用户之间的相似性, 从而预测没有历史点击记录的用户对广告的点击率, 为广告推荐提供依据. 通过建立在KDD Cup 2012-Track 2的Tencent CA训练数据集上的实验, 测试了方法的有效性.

关键词: 计算广告 点击率 个性化推荐 贝叶斯网 概率推理

Abstract: CTR (Click-Through Rate) prediction can be used to improve users' satisfaction with respect to the presented online advertisements (ads) and support effective advertising. CTR prediction is the basis for personalized recommendation of online ads. It is also necessary to re-recommend ads and predict their CTRs for the users that have no historical click-through records. In this paper, we adopted BN (Bayesian network), an important probabilistic graphical model, as the framework for representing and inferring the similarity and the corresponding uncertainty of the behaviors in ad search of different users. First, we constructed the BN to reflect the similarity between users by means of statistic computations on the historical records of user' s ad search. Then, we measured the behavior similarity between the users with click-through records and those without records quantitatively based on the mechanism of BN' s probabilistic inferences. Consequently, we predicted the CTRs of ads with respect to the users without historical click-through records, in order to provide a metric for ad recommendation. We made experiments on the training data of Tencent CA from KDD Cup 2012-Track 2 and tested the effectiveness of our methods.

Key words: computing advertising click-through rate personalized recommendation Bayesian network probabilistic inference

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