Advertisement Recommendation Using Social Media

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Abstract: Social media advertising is a multibillion dollar market and has become the major revenue source for Facebook and Twitter. To deliver ads to potentially interested users, these social network platforms learn a prediction model for every user based on their interests. However, as user interests often evolve slowly, the user may end up receiving repetitive advertise. We propose a context aware advertising framework it takes in account the relatively static personal interests and the dynamic news feed from friends to drive growth in the ad click-through rate. To meet the real-time requirement, we propose an online retrieval strategy that finds thousands most relevant ads matching the dynamic context when a read operation is performed. To avoid frequent retrieval when the context small, we propose a safe region method to quickly determine whether the top-k ads of a user are changed. Finally, we propose a hybrid model to integrate the merits of both methods by analyzing the dynamism news feed to determine an appropriate retrieval strategy.

1. Introduction

To deliver ads to potentially users, these social network platforms learn a prediction model for every user based on their interests. In this paper a context-aware advertising framework that takes into account the relatively static personal interests and dynamic news feed from friends to drive increase in the ad click-through rate. To meet the real-time requirement, we propose an online retrieval strategy that finds thousands most relevant ads matching the dynamic context when a read operation is performed. To avoid frequent retrieval when the context small, we propose a safe region method to quickly determine whether the top-k ads of a user are changed. Finally, we propose a hybrid model to integrate the merits of both methods by analyzing the dynamism news feed to determine an appropriate retrieval strategy.

Social media ad spending has been increasing dramatically in recent years and is expected to reach 24 billion in 2015. As the dominator in the market, Facebook made ad revenue of 12.47 billion dollars in 2014, an increase of 58% year over-year. With the pay-per-click advertising methodology assess the cost effectiveness, existing network platforms place great emphasis on delivering matching ads to potentially interested users. They learn a prediction model for every user based on the personal interests and historical activities. When user logins his/her account, the most relevant ads matching the learned model are embedded in the news feed and presented to the user. However, the model only captures the slowly evolving interests of a user, resulting in repetitious ad recommendation. In addition, research has shown that, people find targeted advertising to be intrusive since the ads are too relevant to their specific space of interest.

2. Methodology

A. Invest, invent and innovate

No idea can become reality unless you invest time, resources and money to it. For your idea to expand you require to create an environment in which it can flourish and awesome. This is an environment where you brainstorm with others on the idea or where you can study on the idea. Investing time and resources to the idea is key to being able to invent the idea. To invent is simply to create and produce something. Invention leads to innovation – the introduction of changes or new things in society. The idea has to become a dominant force in your life through the investing of time and resources towards it.

B. Discover, document and define

Once the idea has been developed, it provides you with the opportunity to discover and really define what the idea’s purpose is. When concept becomes reality, we begin to discover the full potential of our dreams. This should be carefully documented because it is the key to innovation. As long as the idea remains concept, we cannot be able to discover its full potential and not to clearly define it. When Alexander Graham Bell invented the telephone, he could not define it as we know it today at first. He knew that he had a device for transmitting speech. In his application filed on February 18, 2006, he mentioned “major improvements in telegraphy”. It was not until much later that his invention was defined clearly. Through the many processes of this idea matrix, his concept has continued to be improved in so many ways.
C. Experiment, experience and evaluate

Ideas need to be experimented on a lot of times at the early stages. Ideas need to be implemented so that we can build on them. If ideas forever remain concepts, we cannot be able to experience them. We need to have historical evidence of the ideas so that we can evaluate them and implement on them. It is the process of constant and continuous evaluation and re-evaluation that results in winning ideas. It is through the process of experimentation and evaluation that we really learn about our ideas. When we become students of our ideas, we set in process a mechanism that allows us to the ideas.

D. Actualize, advance and advertise

Once the ideas have been experimented evaluated, they allow us to go to the next level of actualizing them. By this time we have tangible goods and services that can be advanced to others. The key to the idea reaching its full potential is in your ability to advertise it. Advertising is simply bringing your idea to the masses so that others can experience its power and purpose. Your idea could be the solution to so much hurt and difficulty that others have experienced. Use the idea matrix to bring them to the forefront of world.

3. Mathematical Module

Where

S: is a System.
PO: is an Input Post
PP: Preprocessing.
FE: Feature Extraction.
SA: Safe Region Algorithm.
MM: Compute Min Max.
RR: Retrieve Recommendation.

D= \{d1, d2, ……, dn\}
F= \{f1, f2, ……, fn\}
Y= \{ PO, PP, FE, SA, MM, RR\}

D: is an Input Image
F is the Set of Functions.
Y is a set of techniques use for Recommendation System.

Watermarking is advocated to enforce ownership rights over shared relational data and for providing a means for tackling data tampering.

1) Preprocessing.
2) Feature Extraction

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4. Implementation

User in the social network considered as both a subscriber and publisher. When a user composed, shares and likes a post, we can say the user, as a publisher, triggers a write operation. The new post is first sent for topic analysis, stored in the posts database and later may be retrieved to appear in the news feed of his social friends. When a user logins and refresh his/her news feed, we say the user, as a subscriber, triggers a read operation. Then, the posts from friends are retrieved and sorted chronologically are returned. The topic distributions in profile vector as in the ranking function in Eqn. 3 to query the database.
Architecture Diagram

However, it is a rather difficult task to support social ad recommendation in a highly dynamic context. First, the posting rate and login frequency in Facebook and Twitter are very high. A new post will appear in all the friends’ news feed and may cause their top-k relevant ads to be changed. Second, the ad repository is huge user seen, e.g., Facebook has over 1 million advertisers, making the top-thousands query processing rather expensive when the read frequency is very high. The real-time requirement, we first propose an online retrieval strategy that adopts existing top-thousands aggregation algorithms, to find the most related ads matching the dynamic context when a read operation is triggered. However, when the context varies little, the online retrieval may get the same set of top-thousands ads repetitively, which is a waste of CPU resources. Thus, we further propose a safe region method to quickly determine whether the top-thousands ads of a user are changed. We guarantee that as long as the dynamic context is located within the safe region, the top-thousands results remain the same and the cost of repetitive retrieval is saved. Finally, we observed that when the dynamic contexts vary dramatically, online retrieval is preferred because the safe region can guarantee the safeness for a short period of time and requires frequent reconstruction. Otherwise, safe region technique is a suitable choice. To integrate the merits of both retrieval strategies, we propose a hybrid model that analyzes the dynamism of news feed for every user to determine which strategy should be applied.

5. Conclusion

In this work, we studied the context-aware advertisement recommendation problem for high speed social news feeding. We first formulated a general ranking function of ads against each user in the social network by combing his/her interests and dynamic contents in the news feed. Main idea is that on the e-commerce websites, users and products can be represented the same latent feature space through feature learning with recurrent neural networks. Using a set of linked users across both e-commerce web and social networking sites as a bridge, we can learn feature mapping functions using modified gradient boosting trees method, which maps users attributes extracted from social networking sites onto feature representations learned from e-commerce websites.

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