

AdBarn - Let's make Advertisements fun

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ABSTRACT

People have a lot of choices for buying a product of their interest. There are lot of websites that compares each product. Yet, all the major companies allocate lot of budget towards advertising their product on television, social media etc. People often feel very differently about the ads on social media and any streaming service as they hinder the flow of any video they are watching. Yet, companies don't stop advertising the product. So the service Adbard is created just for advertising where people who really needs to look at the demos of products and performance testing can navigate to Adbarn and checkout. This paper discusses about the AdBarn website created, the functionalities added, argues the need of such website and our additional plan of work to be designed and developed to increase the impact of Adbarn on the streaming platform.

Keywords

Web Application; Advertising; paper; Software Engineering;

1. INTRODUCTION

Before buying a product, one always tries to trade off between cost and quality. People spends a lot of time web pages that compares the products and then decide which one to buy. If they have no exposure to the features, they consult the experts or close ones to buy. But the same people do not like to be interfered with the advertisements pertaining to a single product while they were in the middle of watching a video, though they want the product. Adbarn was started to make the corporate companies stop advertising on Youtube or other streaming websites, but post it on AdBarn. AdBarn expects to impress the companies to start investing in them through increasing their user base by introducing a lot of deals to the users who are watching the advertisements and at the same time attract companies to post their ads at a very lower cost.

AdBarn is an online portal where enterprises can post their advertisements, demos, performance videos, reviews, stats, prices etc and allows user to search and browse them and at the same time maintain a user profile which helps

AdBarn to show recommended ads. The users also get rewarded for investing their time in watching those advertisements and will be provided with some offers if the user decides to buy from the link provided by the entrepreneur. Rewarding for watching is always debatable. AdBarn tries to balance the finance between the rewards given to the people and the enterprises invested money which might discourage people from watching too many videos for rewards. People can view the advertisements at their convenience, read comments and views on the products and decide on what to buy. Additionally we are thinking of adding a feedback option for a user to rate or provide feedback to help advertisers assess the reach of the advertisement. It's a win win for both viewers as they get rewards, watch advertisements based on their interest and need and on the other side for the enterprises in terms of budget plans, reviews and feedback about their newly posted advertisement.

2. LITERATURE SURVEY

2.1 Content Delivery Service and Streaming

Each advertisement doesn't have an equal demand to be streamed. Therefore having replicas in the database for each video would be a costly inefficient design. Thanks to content delivery network or content distribution network (CDN) which is a geographically distributed network of proxy servers and their data centers. The goal is to distribute service spatially relative to end-users to provide high availability and high performance.

There are two modes of transmission of a video to the end users where they can either download or stream the video[1]. AdBarn will be a streaming portal. Users are expected to stream always instead of download as it helps us to give rewards and at the same time make sure users stay on AdBarn all the time instead of downloading.

2.2 Advertisements

Profile or shared interest based behavioral targeted advertising has been found effective plan to increase the reach of online advertising. Streaming websites boasts that more than 85% of traffic on the network is due to video on de-

mand. Enterprises have a lot of options in the current market to post their ads. But are they any statistics that are provided back to them such as number of people who actually navigated to the website after seeing the ad, do people want to check out more details about the video or even be looking for a demo to see the functioning of the product etc. Also AdBarn tries to be cost effective in forming the bridge between the enterprises and people through minimizing the costs and effort and maximizing the rewards and benefits. Advertisement completion rate is the percentage of ads that the viewer watched completely without abandoning in the video abruptly in between. Completion rates are perhaps the most tracked metric in an ad campaign since a viewer watching an advertisement to completion is more likely to be influenced by it. A related metric is advertisement abandonment rate that measures what fraction of viewers watched what fraction of the advertisement. The goal in any advertising campaign is to maximize video completion rates and minimize abandonment rates and to attract as many users as possible to increase their viewership and expand their brand value throughout the globe.

2.3 Recommendation Service

Recommendations always help users to navigate easily to the products they like or want to see. AdBarn would be incomplete without a recommendation service, as the website mainly aims at attracting huge number of users and there will be a problem if the user is prompted to watch all irrelevant ads. Planning ahead, recommendations in real time puts in a lot of latency to retrieve all the relevant ads. Also usage of Adbarn is expected to be low when compared to other streaming channels and Ecommerce websites, as it is intuitive that people do not sit all the day watching advertisements. Therefore the information required to build up a user profile is very low and therefore effective machine learning algorithms can not be applied on this very sparse data.

We can use collaborative filtering that works on sparse data to recommend ads to the users even they do not have a strong profile built. The algorithm works on finding some hidden latent factors between people that collaboratively share their interests to suggest their liked videos to other people with similar kind of interests. The algorithms are already implemented in Python and also Big Data frameworks such as Spark. This service would be run every now and then and accordingly cached to suggest users new advertisements and updates about the products they would like to know.

2.4 Similar Applications

There are multiple such applications which provide users virtual money based on the watching videos. Based on our survey of these applications we found a few things which are missing in these applications and can make adBarn a better viewing experience for its users. Below is a comparison between AdBarns and the other such portals considering the future enhancements to the application.

	1	2	3	4	5	6
SwagBucks [2]	No	Yes	Fast	Yes	No	No
InboxDollars [3]	No	No	Slow	No	No	No
Perk.com [4]	No	Yes	Very Slow	No	No	No
QuickRewards [5]	No	Yes	Fast	Yes	No	Yes
CreationsRewards [6]	No	Yes	Fast	Yes	No	No
AdBarn	Yes	Yes	Fast	Yes	Yes	Yes

1. Disabled Fast Forwarding
2. Full Screen View
3. Video Load Time
4. Automatic Pause when tab loses focus
5. Share Coins with other viewers
6. Recommendations

Figure 1: Comparison Between Similar Applications

2.5 D3.js vs Google Charts as the charting service

Google Charts is an interactive Web service that creates graphical charts from user supplied information. Google servers will create a PNG image of a chart from the data and formatting parameters specified by a users request. It supports a variety of charts ranging from the simplest line graph to complex hierarchical treemap. It has a rich gallery with lots of customizing options and is easy to use with lot of community support and in depth documentation.

D3.js is a JavaScript library for manipulating documents based on data. It allows to bind the data to DOM and then apply data-driven transformations to the document. It is not a core charting tool and is used more for manipulating DOM objects using the data.

Google charts can probably not have as much variety as D3.js as D3.js provides the users full flexibility of implementing any creative thoughts and visualizations a developer has. But this can turn out to be more error prone as well. On the other hands, google charts does the things perfectly. Moreover Google Charts is a very easy-to-use API as compared to D3.js as D3.js asks developers to build every axes, lines and bars from scratch.

3. SURVEY RESULTS

The survey was divided in the following three parts to understand the user perspectives from both the types of users:

1. Viewer's perspective
2. Enterprise perspective
3. General

3.1 AdBarn from Viewer's Perspective

3.1.1 Currently AdBarn does not provide recommendations to the users. How important are the recommendations to narrow down the search for getting the best advertisement for you to view?

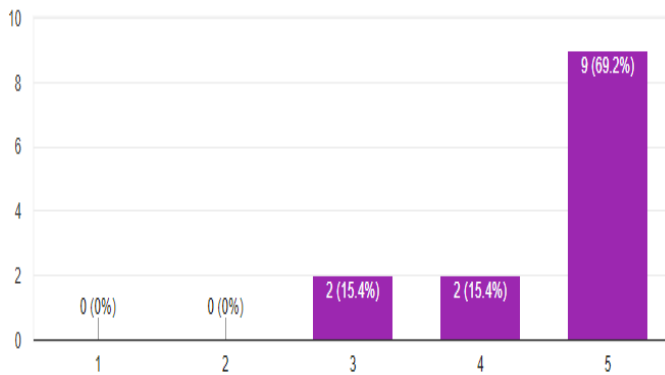


Figure 2: Importance of Recommendations

Personalized recommendations to the viewers is an important enhancement as per the survey conducted which showed that about 84.6% users wanted recommendations to be provided to reduce their time consumption of searching through the videos to find the ones they like. Thus, adding a recommendation advertisements section becomes an integral part of the enhancements which can be added to the current AdBarn application. This will make use of clustering algorithms like K-Means to cluster videos of and based on the viewing history of the user, the videos will be recommended.

3.1.2 What kind of notifications will be preferable if a new video has been uploaded which is recommended for you based on your view history and preferable tags?

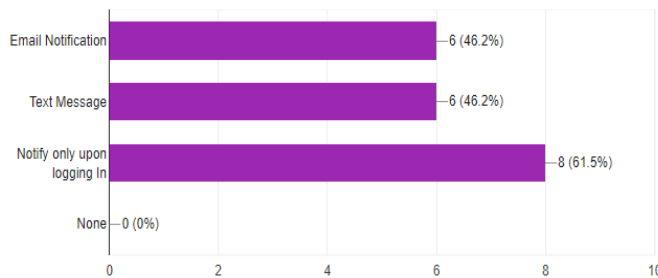


Figure 3: Kind of notification

Even though it is pretty even, the majority of users prefer getting notifications when they log in to the system and avoid spam messages and emails. But looking at nearly even distribution of results, the user profile can have a selection for the user to be notified.

3.1.3 If given a scenario where you view videos and earn original price by sharing your details with the associated Enterprise of the video or earn half the amount and remain anonymous. Which one are willing to go with?

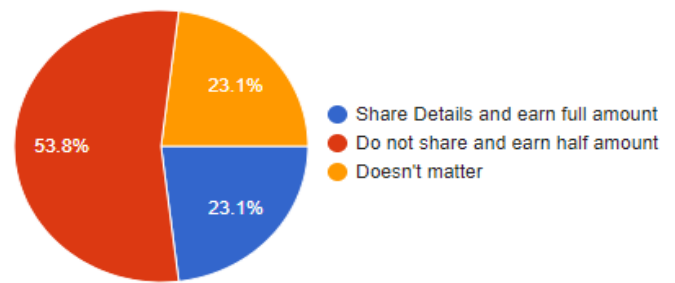


Figure 4: Anonymity

More than 50% users prefer anonymity over money earned. As anonymity is an important aspect and as there might be users who are more inclined to earn money rather than being anonymous to the enterprise, the users profile can also have an option where the users can select their preference.

3.1.4 How likely are you to share the coins you earned with other users?

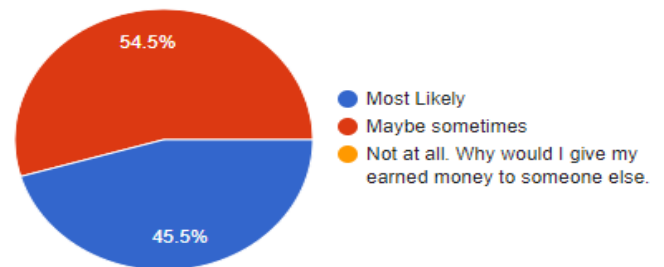


Figure 5: Anonymity

Sharing of coins between users is also an important aspect which will act as a huge difference between AdBarn and the similar applications. As per the survey, many users will want to share coins with other users and hence it will be an important enhancement to the application.

3.2 AdBarn from Enterprise Prospective

3.2.1 If given a scenario where you pay full amount and get viewer information or pay less than the actual amount keeping the viewer anonymous, which one is more preferable?

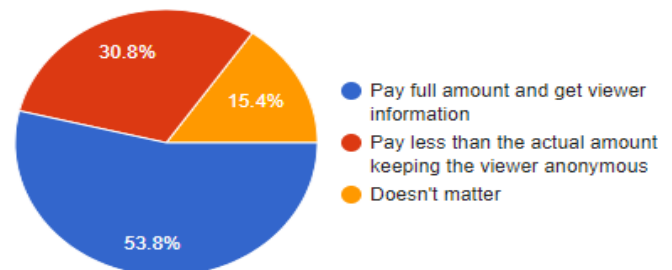


Figure 6: Importance of Recommendations

As per the survey, more than 50% enterprise users will

not want to receive viewers information and will be ready to provide more money for the same. The results here almost collides to the results of the users perspective and hence it will be beneficial for the users to select on their own about their preference.

3.2.2 *If your answer above is "Pay less than the actual amount keeping the viewer anonymous" for the above question, How much less are you willing to pay ? (Enter the percentage 0-100)*

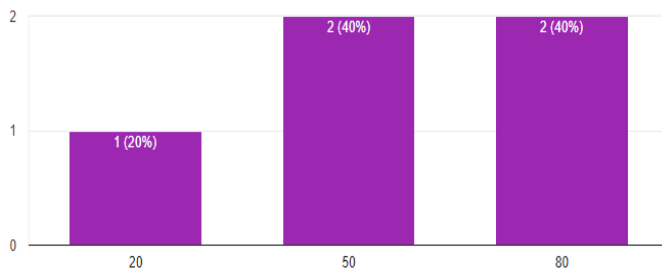


Figure 7: Importance of Recommendations

About 30% of enterprise users are happy with providing about 40% less money than the original amount when they do not get the viewer information but the viewer still views the advertisement anonymously. This will be a win-win situation for both as the viewers can decide to remain anonymous and the enterprise too does not require to pay full amount to such viewers as they gain less from such viewers as compared to the non anonymous users.

3.2.3 *What Information from the non-anonymous user is more helpful?*

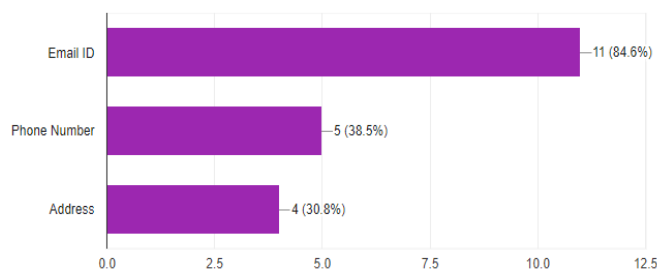


Figure 8: Importance of Recommendations

About 85% users feel that email id is the key information which they will want to be shared for the non anonymous users. This will allow the enterprise to send them promotional offers and even personalized deals.

3.2.4 *If a User watches the same video multiple time, How much are you willing to pay?*

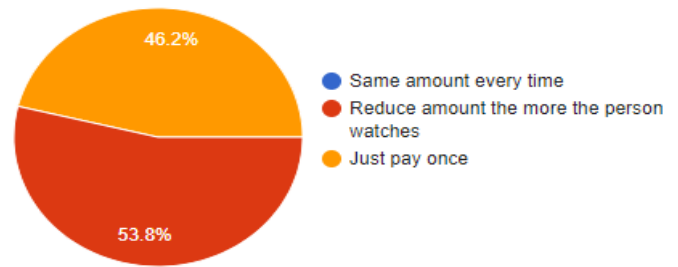


Figure 9: Importance of Recommendations

Most of the users want reduction in the coins when a viewer watches the advertisement multiple times. Even the majority wants to keep providing coins but just reduce the number of coins everytime, there are also a lot of users who will want to pay just once. This can be a part of the enterprise profile where they can select on what their preference is at a per video level or even globally at the user level too.

4. PROJECT GOALS

4.1 Anonymity or Profile Building

Currently AdBarn provides viewers to login and start watching advertisements posted on the website. There is no profile maintenance or any option to select 'Wish to remain Anonymous' to the enterprise as we are trying to incorporate a feature of showing users data to the enterprise who might need it to contact them, to further promote or provide benefits.

Profile maintenance is different from being anonymous. Being anonymous is to make sure enterprises don't get any details about the viewers. Some wish not to be contacted by the representatives after they watch a products videos. They can select this option and watch the videos anonymously.

Profile maintenance on the other hand lets AdBarn develop and run Machine Learning algorithms at the back end that can help in recommending the videos or demos or performance reviews of the products that users might like. Currently AdBard incorporated tags for every video that would be posted by the enterprise. These tags work in correlation with the likes of the users and accordingly recommend them or update them about new videos posted. We will be discussing about the notification service and recommendation service in the next sections. Therefore for the two services to work, AdBarn expects its users to provide some details about their interests and likes and at the same time make it more convenient for the users by not needing to update the search criteria every time they log in. We just want the right to track the user history, their selection of videos, the search history to start building up their profile. This would help AdBarn to start building communities that share common interests and in future can make groups to start discussing about the products either anonymously again or with enterprises directly.

4.2 Notification service

All the ecommerce websites, streaming websites do have the notification service to make sure users are notified of all the new releases, benefits, offers, coupons etc. Therefore we also felt AdBarn has to have this feature to maintain tight connection with the users. In the survey we asked users if

they prefer notifications via email or a text message or just to notify them when they log in to AdBarn. We received a balanced view on the notifications and therefore we will go ahead and add the option in the user profile where the users can select their preference.

Notifications can be of different type based on the profile the users are building. They may reflect the recent history of the users or any preselected enterprises that the user selected or any previous demos that user watched that they likely want to be notified of next version released. Also it can notify users about the benefits they can select with the current coins they earned. Currently there is no feature that talks to user in any way. So notification service would be the first one to start establishing a contact between AdBarn and the users.

4.3 Recommendation Service

Streaming websites has a lot of traffic and is always crowded with millions of posts, messages, comments, reviews, notifications etc. But a single user consumes only a very tiny amount of that. How does one can achieve to show users what they might like next to watch among the huge number of posts and updates on the website. A good recommendation service is needed for such a feature to be added. Amazon reported that 38% of its sales are from recommendations. Netflix reported that $\frac{2}{3}$ of its rented movies are from recommendations. Therefore AdBarn would be incomplete without having a recommendation service.

4.4 Different services for enterprises

Currently AdBard provides a login page for enterprises, upload option to post an advertisement, add coins that can be added into account of the users who watches the ads. We would like to divide the services into two tiers at different cost. Service 1 offers enterprises to view the user details who watched their posts and videos which they can benefit by contacting them to offer discounts or explain them or schedule a demo to accomplish selling their product. Service 1 also offers more demographics data in the form of graphs or raw data that enterprises can use in their business meetings to change their strategies to concentrate more on the community where they have less reach or concentrate on a specific group where they have more confidence to sell their product. Service 2 wouldn't be having all these features and therefore will be the cheapest option to the enterprises. Service 2 expects the enterprises to just add coins for attracting the users to watch their advertisements.

4.5 Better graphical representations for enterprises

Currently AdBarn shows one Pie chart that showcases the number of views to a single video posted by the enterprise. Based on the service chosen by the enterprise, we would like to improve the UI to display more graphs that can help enterprise to target the viewers to contact easily. Providing raw data would attract less enterprises to subscribe to the service. Therefore our goal is to add more UI options to view different type of graphs that can help in targeting specific group of people.

4.6 Sharing Coins with other viewers

Currently the viewers can earn coins by watching the videos and those coins remain with them. There might be

cases when a particular viewer might want to share a part of his coins to other viewer who is a friend. There might also be cases when a particular viewer decides to upload advertisements and use his earned coins as a source to give the coins to other viewers who watches his advertisement. For such cases, sharing of the coins becomes a very important feature for the application. Moreover, as seen in the literature survey, none of the other similar applications provide this feature and hence it can help adBarn get an upper hand as compared to these applications.

5. PROJECT IMPLEMENTATION

5.1 Notification Service

We are planning to aggregate notifications at the back-end and while the user login, retrieve the notifications that are not viewed before. It would be a simple REST API call to the notification service that we create. The service at the back end runs as a thread that captures all the activity of posts, videos, channels that the user liked or selected to be notified of them, and stores in a temporary cache. When retrieved and viewed, they are removed from the temporary cache. If not viewed, they remain in the cache.

5.2 Recommendation Service

We believe the data is very sparse to start recommending videos to the users because relative amount of advertisements posted on AdBarn is very high compared to the videos watched by a single user. But collaborative filtering with ALS tuning of the parameters can help recommending even if the user watches 10-20 videos in the pool of millions of advertisements. It simply works on the assumption that you may like this video because there are a group of users that share same history or preferences with you. But simply matching the history or preferences doesn't scale the system as it requires to find K nearest neighbours in the pool of millions of users all the time and finding the similarity measures.

Therefore Collaborative filtering helps to scale this issue by finding out latent hidden factors between the users and the items that actually made them watch the video or like the video or rate the video etc. Simple click on the thumbnail can be of use to start recommending.

5.3 Charts and UI

We would like to explore more plots provided by d3.js. There are thousands of templates that d3.js provide for visualization of the data. Bar plots would be added first to get to know the distribution of views among different groups and also views for each video posted which could give easy analysis of comparison between different versions of the product ads.

5.4 Trending and Quality of service

Implementation of this service could be as naive as showing the videos that achieved most number of views in recent days or a specific period of time. More sophisticated algorithms that takes in parameters like place, demographic data can narrow the videos to be shown as trending to the user once they login can be pursued once the recommendation engine is set properly.

Also some videos just posted need to be boosted i.e. have to be shown as trending even if they have minimal views.

Enterprises can be provided with a quality of service where they can pay some extra amount to boost their videos which will be shown along with the trending videos.

6. REFERENCES

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