AMENDED Exhibit 868

PLAINTIFFS' OMNIBUS OPPOSITION TO DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

DOCUMENT SLIPSHEET

Bates Number: SNAP4954875-SNAP4954886

Custodian: ANDREOU_JACOB; APANOVYCH_MARIIA; BONIAKOWSKI_JEB; BOYD_NATHAN; BRODY_JACK; [redacted] HAMMERSTROM_MORGAN; LEVENSON_DAVID; L[redacted] LUE_DAVID; MURPHY_BOBBY; OSBORNE_ALEX; PATEL_IMRAN; SCHRAEDLY_LAURYL; [redacted] SIEGEL_JOSH; SPIEGEL_EVAN; SUNDARAM_SENTHIL; TRAN_ABBY; VOSS_JEREMY; [redacted] ZICAFOOSE_KALE

Author: JOSH SIEGEL

Filename: AGE INFERENCE FOR AD TARGETING.HTML

Create Date:

Last Modified Date:

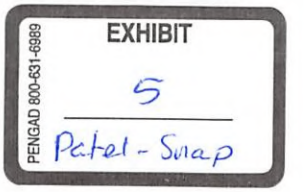
TNAG BEGBATES:

TNAG ENDBATES:

MAAG BEGBATES:

MAAG ENDBATES:

File Path: /AGE INFERENCE FOR AD TARGETING.HTML



Age Inference for Ad Targeting

7/21/2015, 12:37 AM UTC
type: document

Age Inference for Ad Targeting

This document describes the feature that will estimate a users' age based on their friends' ages.

Feature overview

We do not know the age of approximately 25 million daily Snapchat users who were not required to submit their age when they signed up for the service. These ageless users are mostly early users in the US, our most valuable source of advertising revenue. By estimating the age of these users based on the age of their friends, we can more broadly offer age-based targeting to advertisers.

Table2

A	B	C	D

Age can be inferred into buckets (planned), or used to infer a DOB with a confidence interval (not planned).

Design owner(s)

Table1

	A	B
1	Biz Owner	Josh Siegel
2	Eng Owner	[redacted]

Privacy & Security Review

Does the new product, application, feature, or initiative involve a new use of User Data?

Table1_2_2

A	B	C
[redacted]	Approved	~~9/30/2015~~ 11/12/2015
[redacted]	Approved	11/16/2015

Status

n/a = not applicable

needs review

pending

approved

[No|Yes], privacy & security review necessary

- What User Data is needed for this feature?
  - We will need a user's user_id, user_age, best_friends_list, friends_list
- How will the User Data be used?

    - To infer users' ages based on the ages of their friends. We will run a couple of ML model towards the friend's age data
- Who outside of Snapchat will the User Data be disclosed to?
    - This information will not be shared outside of snapchat. C
- If a copy of the User Data will be saved and stored in a separate repository, when and how will that copy be deleted?
    - N/A

Product Specific Review *Please only answer the questions that are specific to your feature

3V/Geofilters

- Will this feature include a form of advertising other than 3V or Geofilter? If yes, please explain.
    - No
- Will this feature present ads in new parts of our App or in/on a different platform?
    - No
- Will this require presenting ads in a new geographic area?
    - No

Content (Includes Live Stories and Discover)

- Will the feature include Discover content (including Snap Channel content)?
    - No
- Will the feature use images, likenesses, videos, photos, quoted text, brand names, or other art?
    - No
- How long will the content be available?
    - N/A
- Will the feature include any music or sound effects?
    - No

Spec

All features are intended to ship with **v1** unless noted otherwise.

- The inferred age should be calculated weekly or monthly for each user
- This field should be added to the entity "UserInferredDemographics" in feelinsonice datastore. This entity is currently being used to store the inferred gender information. The inferred age will be another field at the entity. This information will be passed back to the clients from the all_updates calls.
- Data access restrictions:
    - Operate at the once week lease model
    -
- Histogram Construction
    - **Generate Features**
        - BQ Friend List - Sizing could creep into 1T rows scanned
            - Big Query Join to get user to friend mapping (one row per user friend pait)
            - Join in age on friend (one row to user to friend age
            - Group by to get one row per user to friend age hist)
            - Join in to get one row per user to age inference feature set (two features are best freind hist and friend hist)
        - BQ - Conversation List ***[Not privacy approved by [redacted] Ask her first!!!!]***
            - One time import from [redacted] for friend IDs from conversations in last 30 days
        - Mapper option
    - **Learn the model**
        - Sampled
            - Start by generating feature vectors for only 1% of users to learn the model
        - Unsampled
            - Run each user row through a ML model to infer age (trained on users where we have age provided by the user)
    - **Apply the prediction**
        - If algorithm is really basic (like mean)
            - Apply prediction in BQ
        - If the algorithm is complex like decision trees
            - Need to map (python or the like)
    - **Store the prediction**
        - Make this information available in the all_update targeting blob
        - Put this back into Datastore (Snapads or Feelinsonice)
            - Feelinsonice has a user inferred demo already. Try to reuse this
- Mapper

Approach to access data (Updated on Nov 20)

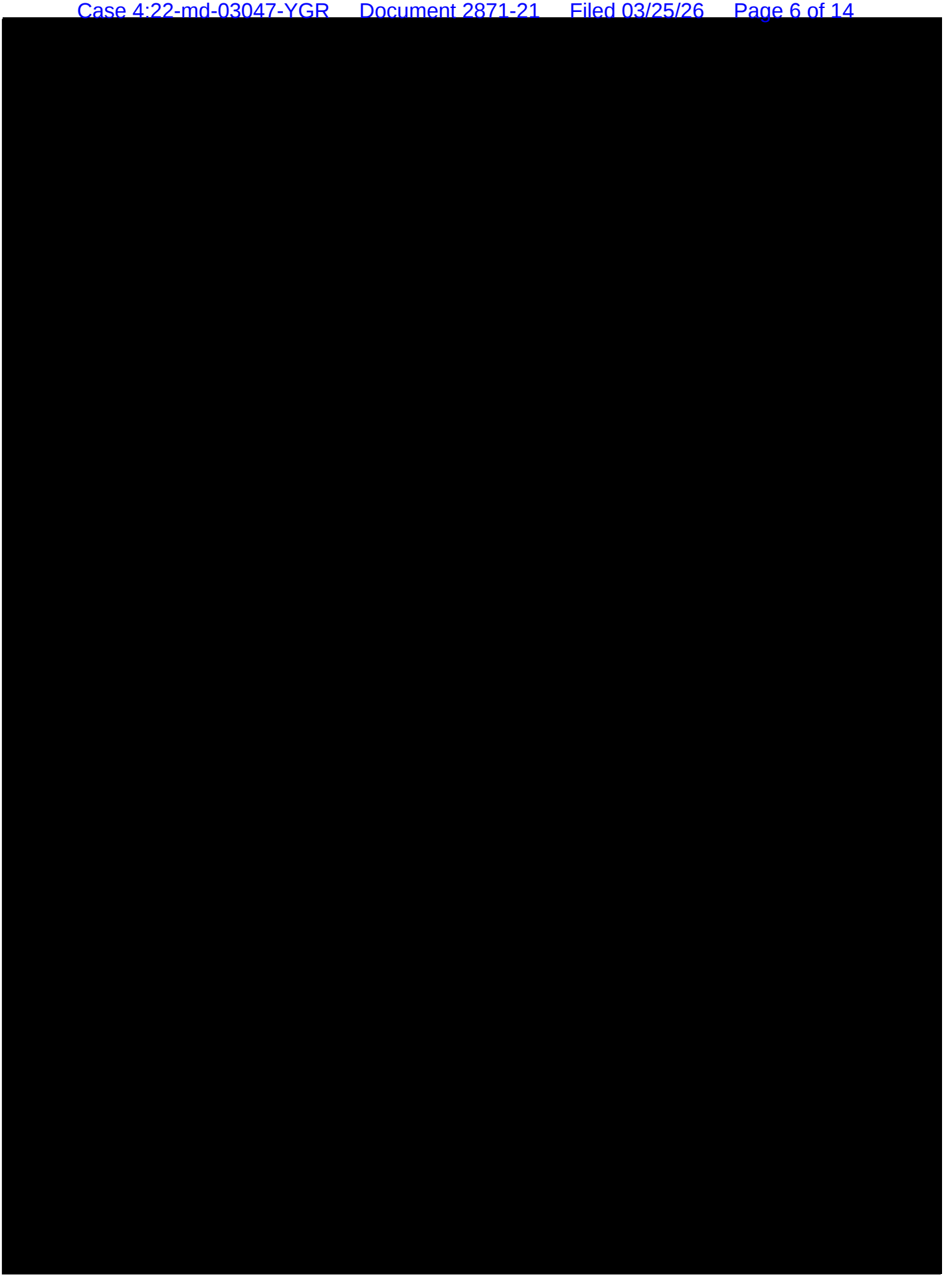
We are going to use Google Datalab to access the data and do some machine learning analysis. All of the data will be left in the protected Bigquery dataset and

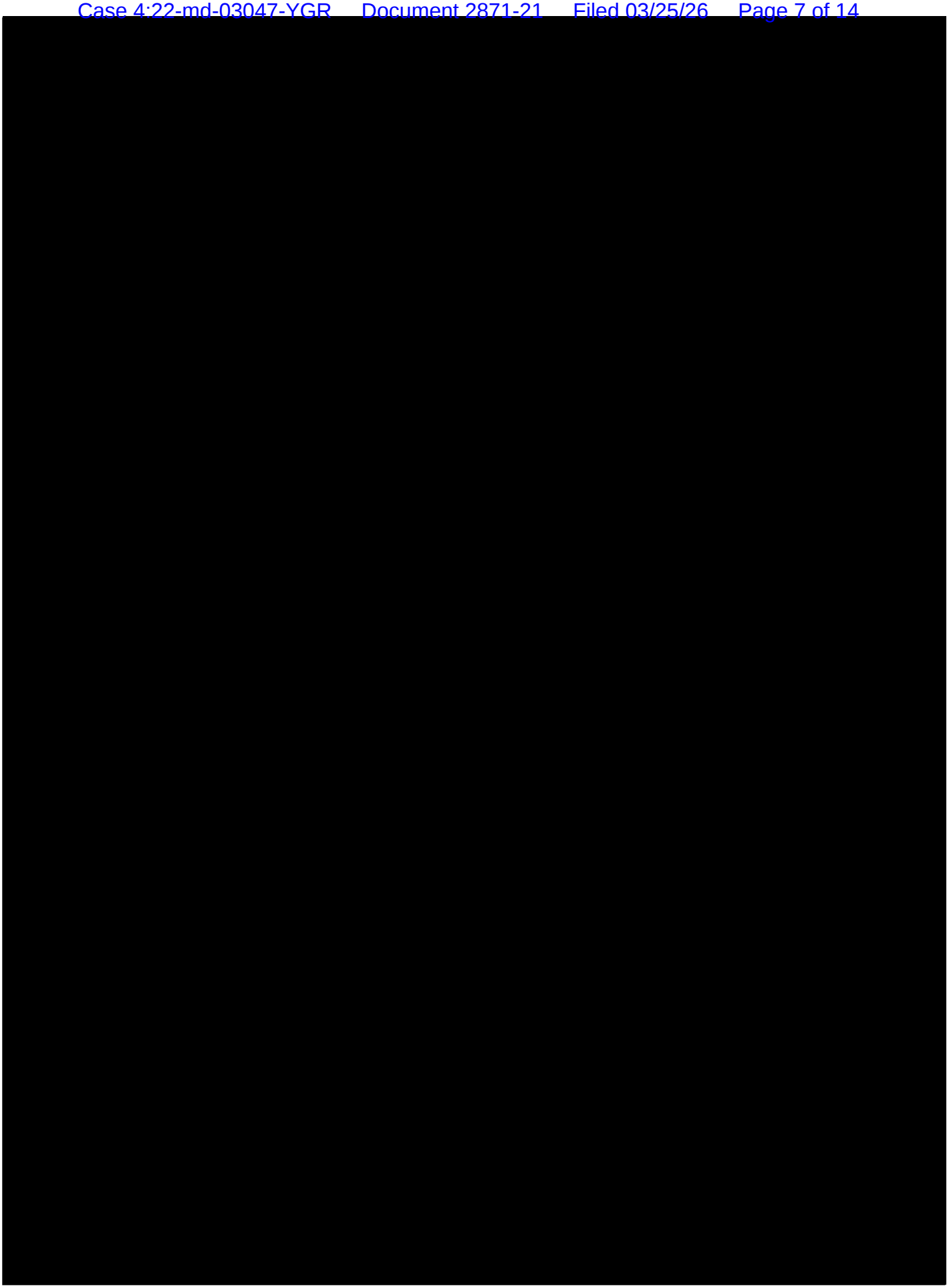
won't be copied into any other storage. However, since the datalab instance is running on appengine environment, it uses the app engine service account to access Bigquery. For better guard on protecting the data, and building the proper process for future monetization ads targeting projects to access the user data, the identity team and the ads team have created a new appengine project. The project name is "monetization-targeting".

Identity team will give Bigquery access permission to this new appengine service account. So only the new appengine service account will be able to access the data at Bigquery. Identity team will be managing the permission at this project. We will open a request to formally request the permission from them and lease the permission based on lease term of one week each time until we finish the project.

Here is the first identity data use request from ads.

Thread class
document
Created
2015-07-21T00:37:48+00:00
Updated
2017-04-16T06:02:27+00:00
Link
https://snapchat.quip.com/zrH5Arp2T6O1
Shared folders
Business Product
Expanded users





[redacted]

Users

[redacted]

Urls

- https://cloud.google.com/datalab/
- https://snapchat.quip.com/gmFQAx1br6hQ

- [redacted]

We will use Nielsen and/or Millward Brown to validate accuracy of this inferrence.
8/5/2015, 6:56 PM UTC
From what I understand, the research team has an algorithm to predict the Snapchatter's age based on selfies taken and they have an accuracy of +/- 3 years. We might want to consider leveraging this to refine the prediction model in v2?
8/5/2015, 6:57 PM UTC

- Josh Siegel JS

I think we can get something just as accurate and minimally invasive by looking at friends' ages, but will keep this in mind as an alternative
8/5/2015, 7:11 PM UTC

- [redacted]

If we are only interested in this data for analytical purposes, does it make sense to store this data only in sc-analytics and NOT in the main datastore as part of the user entity? We do not want some developer to make a mistake and use the inferred age field instead of the actual age field for some age restricted content (e.g. Whatever USA). Just a thought
8/26/2015, 4:23 AM UTC

- [redacted]

Josh Siegel https://quip.com/XHOAEA4ZkIV just a reminder that we should not use age that is based on inference for any age gated products (over 21). Adding https://quip.com/aTGAEA4Wuwd
9/30/2015, 3:57 PM UTC
[redacted] How are we using selfies to determine age? Are you suggesting that the algorithm that looks at the images?
9/30/2015, 3:58 PM UTC

- Josh Siegel JS

[redacted] we are NOT using selfies to determine age. It was just an idea because we have technology to do it if we wanted to apply it
9/30/2015, 4:07 PM UTC
👆
9/30/2015, 4:07 PM UTC

- [redacted]

in addition, i recommend not storing anything in the user object itself. if there's an actual need to have an online (rather than offline) representation of the latest inference, please consider storing it in a separate entity.
9/30/2015, 8:17 PM UTC

- Josh Siegel JS

[redacted] agreed -- this is part of what we should discuss in our meeting later this week
9/30/2015, 8:30 PM UTC

- [redacted]

Agreed.
10/1/2015, 10:12 PM UTC

- [redacted]

Is this part of v1? If so, how are we obtaining this age? Does Nielsen/MB provide us ages or age rages for hashed email addresses OR do we send them a list of matched IDs and they send us back the ages/age ranges for users that have a match?

This detail needs to be present before the spec can be approved
10/2/2015, 8:46 AM UTC
Are there limits to this targeting? For e.g. would we serve an alcohol ad based on inferred age?
10/2/2015, 8:49 AM UTC

- Josh Siegel JS

No, we could not legally use this for age **gating** just for age targeting.
10/6/2015, 9:58 PM UTC
[redacted]i The idea is to test this feature by serving an ad to a particular age group then using https://quip.com/kqjNAlvqZdxA to validate the age range. I don't think this should be a blocker but let me know if I'm missing something here.
10/6/2015, 9:59 PM UTC

- [redacted]

Ok, i am confused since the section of the doc was deleted. Are we storing this in the data store or not?
10/7/2015, 1:25 AM UTC

- Josh Siegel JS

Hey [redacted] this spec is still WIP ("design in progress" on the roadmap tracker), so it's still not ready for review (and the details are TBD). We'll definitely submit this when it's ready. I made some edits today because this was bumped up in priority from the business side, didn't mean to cause confusion.
10/7/2015, 1:28 AM UTC

- [redacted]

cool thanks Josh Siegel
10/7/2015, 1:29 AM UTC
Assigning to [redacted]
10/13/2015, 3:54 AM UTC

- [redacted]

So this feature will attempt to populate that inferred age specifically for those 25 million? Or it is going beyond that as well?
10/26/2015, 3:26 AM UTC
I am curious, how is this passed? Is it cleartext data (e.g. inferred_age=26) or is it somehow obfuscated using some Snapchat <-> DFP encryption first?
10/26/2015, 3:27 AM UTC
Also have you tried any A/B experiment to get that info from those users directly? It will no doubt add complexity to forever have to maintain two different sources of truth for the age because we never tried to put it in the effort to normalize the correct way, no?
10/26/2015, 3:30 AM UTC

- [redacted]X

[redacted]^
10/26/2015, 3:53 AM UTC
For question 1, we would have to populate the entire user base (if possible, some of them don't have best friends/friends) since that the DAU of everyday is different.
10/26/2015, 3:59 AM UTC
For Q2, sorry, what do you mean by "get that info from those users directly"? For some users who has the birth date on datastore, we would use that to know the age directly.

For those who don't have the birth date, we will use this approach to infer the age and store it in a separate datastore entity, which is UserInferredDemographics. We would like to maintain these two sources all the time in short term. No normalization plan yet.
10/26/2015, 4:08 AM UTC

- [redacted]

[redacted] currently all of our user targeting params are passed down to the client as part of the All Updates response json. The traffic is obviously over HTTPS like all our client endpoint traffic, but no additional encryption is performed on these values. The user will get back a targeting blob like the following, which we then pass along as targeting params to DFP in every ad request made on behalf of the user:

"user_targeting" : {"age" = 21, "gender" = "female", "app_version" = "9.19"}
10/26/2015, 7:08 PM UTC

- [redacted]

[redacted] - get the info from those users directly means ask the users who didn't have their age to enter them through our mobile app.
10/26/2015, 7:18 PM UTC

- [redacted]

FYI, we're building (https://quip.com/stWsAdmKaLyp) this use case, but it's not available yet.
10/26/2015, 11:08 PM UTC

- [redacted]

Thanks [redacted] - so https://quip.com/eHMAEA2zAVc - can you wait until Ilya's team builds that feature first and then avoid the inference altogether?
10/26/2015, 11:38 PM UTC
... "and then maybe avoid the inference altogether" (I left out maybe).
10/26/2015, 11:39 PM UTC

- Josh Siegel JS

[redacted]s, unfortunately no, we can't wait for that feature. The business need is for inference in the near term. "Editing your birthday" will help in the longer term, but we don't have a firm date for that feature (it's been pushed back a few times) and not all users will be required to edit their birthday so we don't know the actual coverage rate we'll get.
10/27/2015, 3:45 AM UTC
To be clear, we will pass inferred_age as a separate parameter to be clear on the distinction from the legal age (i.e. "age = 21" is okay for alcohol, "inferred_age = 21 but age is null" is not)
10/27/2015, 3:50 AM UTC

- [redacted]

Redacted--AC
10/28/2015, 7:03 PM UTC

- [redacted]

[redacted]
11/4/2015, 6:16 AM UTC
Redacted--AC
11/4/2015, 6:17 AM UTC
Redacted--AC
11/4/2015, 6:17 AM UTC
Redacted--AC
11/4/2015, 6:18 AM UTC

Redacted--AC

11/4/2015, 6:19 AM UTC

- [redacted]

Redacted--AC

11/4/2015, 6:21 AM UTC

- [redacted]

Redacted--AC

11/4/2015, 3:13 PM UTC

- Josh Siegel JS

Hey [redacted] Redacted--AC

Redacted--AC

11/4/2015, 10:55 PM UTC

Redacted--AC

11/4/2015, 10:58 PM UTC

- [redacted]

It will be important for us to understand "wastage" before going to market with the mDAR offering as mDAR will need to be priced at a premium to account for "wastage". Google priced in a 30% premium as their ages were 30% off from mDAR.
11/4/2015, 11:05 PM UTC

- [redacted]

[redacted] Redacted--AC

Redacted--AC

11/7/2015, 2:50 AM UTC

- Josh Siegel JS

[redacted] Redacted--AC

Redacted--AC

11/9/2015, 4:52 AM UTC

[redacted] edited at 2015-12-24T04:40:25.065Z

- If the algorith algorithm is complex like decision trees

[redacted] edited at 2015-11-21T01:32:55.853Z

- Identity team will give Bigquery access permission to this new appengine service account. So only the new appengine service account will be able to... team will be managing the permission at this project. We will open a request to formally request the permission from them and lease the permission based on lease term of one week each time until we finish the project.

[redacted] edited at 2015-11-21T00:52:39.158Z

- [redacted]

- We are going to use Google Datalab to access the data and do some machine learning analysis. All of the data will be left... app engine service account to access Bigquery. For better guard on protecting the data, and building the proper process for future monetization ads targeting project projects to access the user data, the identity team and us open the ads team have created a new appengine project. The project name is "monetization-targeting".

- Identity team will give Bigquery access permission to this new appengine service account. So only the new appengine service account will be able to access the data at Bigquery. Identity team will be managing the permission at this project. We will open ticket and a request to formally request the permission from them and lease the permission until we finish the project.

- Here is our the first identity data use request from ads.

[redacted] edited at 2015-11-20T22:14:29.327Z

- [redacted]

-
-
-
-
-

- Table2 updated

[redacted] edited at 2015-11-20T20:10:04.627Z

- Approach to access data (Updated on Nov 20)
- We are going to use Google Datalab to access the data and do some machine learning analysis. All of the data will be left in the protected Bigquery dataset and won't be copied into any other storage. However, since the datalab instance is running on appengine environment, it uses the app engine service account to access Bigquery. For better guard on protecting the data, and building the proper process for future monetization ads targeting project to access the user data, identity team and us open a new appengine project. The project name is "monetization-targeting".
-
- Identity team will give Bigquery access permission to this new appengine service account. So only the new appengine service account will be able to access the data at Bigquery. Identity team will be managing the permission at this project. We will open ticket and request the permission from them and lease the permission until we finish the project.

-
- Here is our identity data use request.

[redacted] edited at 2015-11-16T18:35:32.881Z

- Table1_2_2 updated

[redacted] edited at 2015-11-12T23:04:16.303Z

- Data access restrictions:
- Operate at the once week lease model
-
- Histogram Construction
- **Generate Features**
- BQ Friend List - Sizing could creep into 1T rows scanned
- Big Query Join to get user to friend mapping (one row per user friend pait)
- Join in age on friend (one row to user to friend age
- Group by to get one row per user to friend age hist)
- Join in to get one row per user to age inference feature set (two features are best freind hist and friend hist)
- BQ - Conversation List ***[Not privacy approved by [redacted]n. Ask her first!!!!]***
- One time import from [redacted] for friend IDs from conversations in last 30 days
- Mapper option
- **Learn the model**
- Sampled
- Start by generating feature vectors for only 1% of users to learn the model
- Unsampled
- Run each user row through a ML model to infer age (trained on users where we have age provided by the user)
- **Apply the prediction**
- If algorithm is really basic (like mean)
- Apply prediction in BQ
- If the algorith is complex like decision trees
- Need to map (python or the like)
- **Store the prediction**
- Make this information available in the all_update targeting blob
- Put this back into Datastore (Snapads or Feelinsonice)
- Feelinsonice has a user inferred demo already. Try to reuse this
- Mapper

[redacted] edited at 2015-11-12T16:53:29.441Z

- Table1_2_2 updated

[redacted] edited at 2015-11-06T23:49:56.913Z

-
- Age can be inferred into buckets (planned), or used to infer a DOB with a confidence interval (not planned).

[redacted] edited at 2015-11-05T01:48:33.514Z

[redacted] edited at 2015-11-04T06:19:52.023Z

- Nobody explicitly, but we This information will provide aggregated demographic data about campaign performance and audience size not be shared outside of snapchat. C

[redacted] edited at 2015-11-04T06:16:02.489Z

- Table1_2_2 updated

[redacted] edited at 2015-10-28T19:02:58.203Z

- **Product Specific Review *Please only answer the questions that are specific to your feature**
- **3V/Geofilters**
- Will this feature include a form of advertising other than 3V or Geofilter? If yes, please explain.
- No
- Will this feature present ads in new parts of our App or in/on a different platform?
- No
- Will this require presenting ads in a new geographic area?
- No

- **Content (Includes Live Stories and Discover)**
- Will the feature include Discover content (including Snap Channel content)?
- No
- Will the feature use images, likenesses, videos, photos, quoted text, brand names, or other art?
- No
- How long will the content be available?
- N/A
- Will the feature include any music or sound effects?
- No

Josh Siegel edited at 2015-10-27T03:43:13.589Z

- [WIP]Age Inference for Ad Targeting

- We will need a user's user_id, user_age, best_friends_list, friends_list
- How will the User Data be used?
- To infer users' ages based on the ages of their friends. We will run a couple of ML model towards the friend's age data.
- Who outside of Snapchat will the User Data be disclosed to?

- Nobody explicitly, but we will provide aggregated demographic data about campaign performance and audience size
- If a copy of the User Data will be saved and stored in a separate repository, when and how will that copy be deleted?
- N/A

[redacted] edited at 2015-10-27T03:39:24.984Z

- The inferred age should be calculated[redacted]t to fill in schedule] calculated weekly or monthly for each user
- Ideally this should include a confidence interval
- user
- This field should be added to the appropriate Snapchat entity "UserInferredDemographics" in feelinsonice datastore so that it . This entity is available currently being used to use and store the inferred gender information. The inferred age will be another field at the entity. This information will be passed back to DFP
- This field will be added to the entity "UserInferredDemographics" at datastore at feelinsonice. This entity is currently being used to store the inferred gender information. The inferred age will be another filed at the entity. This information will be passed back to the clients from the all_updates calls.
- the clients from the all_updates calls.

- ~~Other notes:~~
- The inferred age accuracy should be regularly vetted by a third party (Nielsen mDAR)
-

[redacted] edited at 2015-10-26T03:26:15.043Z

- Table1_2_2 updated

[redacted] edited at 2015-10-23T20:43:01.794Z

- What User Data is needed for this feature?
- A users' friends' ages[redacted] to fill in with other data needed) We will need a user's user_id, user_age, best_friends_list, friends_list
- How will the User Data be used?
- To infer users' ages based on the ages of their friends. We will run a couple of ML model towards the friend's age data.
- Who outside of Snapchat will the User Data be disclosed to?

- The inferred age should be calculated[redacted] to fill in schedule] for each user
- Ideally this should include a confidence interval
- This field should be added to the appropriate Snapchat datastore so that it is available to use and be passed to DFP[redacted] again to fill in how this works)
- This field will be added to the entity "UserInferredDemographics" at datastore at feelinsonice. This entity is currently being used to store the inferred gender information. The inferred age will be another filed at the entity. This information will be passed back to the clients from the all_updates calls.

[redacted] edited at 2015-10-13T03:53:26.047Z

- Table1_2_2 updated

Josh Siegel edited at 2015-10-06T21:59:26.232Z

- [WIP] Age Inference for Ad Targeting

- Table1 updated

- What User Data is needed for this feature?
- A users' friends' ages [redacted]rt to fill in with other data needed)
- How will the User Data be used?
- To infer users' ages based on the ages of their friends

- The user object(?) should be updated with an [redacted] field that is separate and distinct from the actual user's legal age
- The inferred age should be calculated [redacted] [redacted]t to fill in frequency> schedule] for each user
- The [redacted] field
- Ideally this should include a confidence interval
- This field should be added to the [redacted] dataset tables appropriate Snapchat datastore so that it is available to use and be passed to DFP [redacted] again to fill in feelinsonice https://bigquery.cloud.google.com/dataset/feelinsonice-hrd:user_identity how this works)

- Other notes:
- The inferred age accuracy should be regularly vetted by a third party (Nielsen mDAR)

[redacted]ti edited at 2015-10-02T08:47:56.710Z

[redacted] edited at 2015-09-30T15:56:44.826Z

- Table1_2_2 updated

[redacted] edited at 2015-09-29T23:57:04.396Z

- Table1_2_2 updated

[redacted] edited at 2015-08-26T04:21:52.927Z

[redacted] edited at 2015-08-05T18:55:18.825Z

Josh Siegel edited at 2015-07-21T00:37:51.936Z

- Age Inference for Ad Targeting
- *This document describes the feature that will estimate a users' age based on their friends' ages.*
- Feature overview
- We do not know the age of approximately 25 million daily Snapchat users who were not required to submit their age when they signed up for the service. These ageless users are mostly early users in the US, our most valuable source of advertising revenue. By estimating the age of these users based on the age of their friends, we can more broadly offer age-based targeting to advertisers.

- Design owner(s)
- Table1 updated
- Privacy & Security Review
- Does the new product, application, feature, or initiative involve a new use of User Data?

- Table1_2_2 updated
- **Status**
- n/a = not applicable
- needs review
- pending
- approved
- [No|Yes], privacy & security review necessary
- What User Data is needed for this feature?