AUDITING, MEASURING, AND BRINGING TRANSPARENCY TO TARGETED ADVERTISING ECOSYSTEMS

ATHANASIOS ANDREOU
NEED FOR TRANSPARENCY IN TARGETED ADVERTISING

- Targeted advertising is prevalent:
  - Facebook's ad revenue in 2016: 27B$ (Source: statista.com)

- Very frequently black boxes

- Use users' personal data at a massive scale

- Have social and political impact:
  - Facebook Lets Advertisers Exclude Users by Race

- Transparency on how these systems work is important

- Reflected in legislation (GDPR)

We focus on transparency in targeted advertising
THIS TALK

1. TARGETED ADVERTISING IN FACEBOOK
2. AUDITING FACEBOOK TRANSPARENCY MECHANISMS (NDSS2018)
3. MEASURING THE FACEBOOK ADVERTISING ECOSYSTEM (NDSS2019)
4. BRINGING COLLABORATIVE TRANSPARENCY TO TARGETED ADVERTISING
5. ADANALYST- A TOOL TO HELP USERS MAKE SENSE OF THEIR ADS
TARGETED ADVERTISING IN FACEBOOK
Why am I seeing this ad?
HOW ADVERTISERS TARGET USERS

AUDITING, MEASURING, AND BRINGING TRANSPARENCY TO TARGETED ADVERTISING ECOSYSTEMS
MANY ATTRIBUTES AVAILABLE FOR TARGETING

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<thead>
<tr>
<th>Fascism</th>
<th>Suggestions</th>
<th>Browse</th>
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<tbody>
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<td>Anti-fascism</td>
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<tr>
<td>Income &gt; $50,000 - $74,999</td>
<td>Demographics</td>
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<td>Demographics</td>
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<tr>
<td>Income &gt; $150,000 - $49,999</td>
<td>Demographics</td>
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EVEN MORE TARGETING TYPES

Prepare a file with your customer data

Identifiers you can use (10)

<table>
<thead>
<tr>
<th>Email</th>
<th>Phone Number</th>
<th>Mobile Advertiser ID</th>
<th>First Name</th>
<th>Last Name</th>
<th>ZIP/Postal Code</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>State/Province</td>
<td>Country</td>
<td>Date of Birth</td>
<td>Year of Birth</td>
<td>Gender</td>
<td>Age</td>
<td>Facebook Page User ID</td>
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</tbody>
</table>

Create a Lookalike Audience

Find new people on Facebook who are similar to your existing audiences. Learn more.

Source

Choose a Custom Audience or a Page.

Create New

Location

Search for countries or regions to target

Number of Audiences

0 1 2 3 4 5 6 7 8 9 10 % of countries

Hide Advanced Options

If you measure revenue per conversion or lifetime value for people in different audiences, you can create separate lookalikes with different ranges of similarity to your source. This allows you to bid differently for audiences with different conversion values. Learn more.
FACEBOOK HAS EXPLANATIONS

AUDITING, MEASURING, AND BRINGING TRANSPARENCY TO TARGETED ADVERTISING ECOSYSTEMS
FACEBOOK HAS EXPLANATIONS

About This Facebook Ad

Why Am I Seeing This Ad?

One reason you’re seeing this ad is that Leibniz wants to reach people interested in Ferrero SpA, based on activity such as liking Pages or clicking on ads.

There may be other reasons you’re seeing this ad, including that Leibniz wants to reach people ages 25 and older who live or were recently in Germany. This is information based on your Facebook profile and where you’ve connected to the internet.

Let us know if this topic interests you
Ferrero SpA

Tell Us What You Think
Was this explanation useful? Yes No

Manage Your Ad Preferences

Learn more about Facebook Ads
AUDITING FACEBOOK TRANSPARENCY MECHANISMS (NDSS2018)
Do explanations show all the attributes?
• Completeness

Are they correct?
• Correctness

Are they personalized?
• Personalization

Do similar ads show similar explanations?
• Determinism

Are explanations for users consistent?
• Consistency
EXPERIMENTS

- Browser extension to collect ads from Facebook timeline
  - 35 users for 5 months
  - 26K unique ads and explanations

- Controlled experiments targeting users with ads
  - We targeted users
  - We collected explanations
  - 96 successful experiments

Ground truth
EVALUATION

Are explanations complete?:
- 61 Controlled experiments (e.g. target users interested in Instant messaging AND Mobile Phones)
- Only one attribute appears in the explanation (e.g. Instant messaging)

Which attribute appears?
- Depends on attribute type (e.g. Demographics>Interests>Behaviors)
- Depends on audience size (least unique attribute appears)

Explanations are incomplete

Incomplete explanations:
- Malicious advertiser can conceal sensitive/discriminatory attributes
- By adding a common popular attribute to the targeting audience

Establishing properties can help create better explanations
MEASURING THE FACEBOOK ADVERTISING ECOSYSTEM (NDSS2019)
Questions:
- Who are the advertisers?
- How are they targeting users?

Dataset:
- More than 600 users, 200K ads, 40K advertisers
- Across the globe
Who are the advertisers?
- ~10% from sensitive categories such as News and Politics, Finance, Medical Health...
- 38.9% of ads come from unverified advertisers

How are they targeting users?
- 21% of ads use Data Brokers, PII-based and Lookalike Audiences
- North America vs Europe (e.g. for PII-based 6 vs 2%)
- Advertisers from News and Politics tailor their ads over time, users and attributes

Need for extra transparency!
BRINGING COLLABORATIVE TRANSPARENCY TO TARGETED ADVERTISING
IDEA: COLLABORATIVE TRANSPARENCY

- Group users that received the same ad together

- Infer targeting from group properties of users that received the same ad:
  - which attributes do users that received the same ad share?
  - how can we use them?
ADANALYST- A TOOL TO HELP USERS MAKE SENSE OF THEIR ADS
https://adanalyst.mpi-sws.org

Enhance transparency by aggregated statistics

Who else received this ad?

Disable adblockers and anti-tracking!
Set Facebook in French or English!
We audited Facebook transparency mechanisms and identified weaknesses

We show how are advertisers targeting users and found concerning practices

We bring more transparency to users in a collaborative way

We provide users with a tool that helps them make sense of their ads
Questions?