Privado: Privacy-Preserving Group-based Advertising using Multiple Independent Social Network Providers

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Online Social Network (OSN)
Advertising

Extract Attributes

Age: 19
Hobbies: Painting, football
Location: Turkey
Introduction

Privado

Conclusion

Advertising

Age = 19
Hobbies = Painting, football
Location = Turkey
Lack of advertising in secure OSNs\textsuperscript{1–5}

Secure Advertising
User Privacy: Personalized Advertising

Ad={Age=18 AND Hobby=painting}

Leakage

Yes/No

{Age=18, Hobby=painting, Location=*}
User Privacy: Group-based Advertising

Privacy is the un-linkability of the output to the input
User Privacy: Group-based Advertising

- Age = 19
  Hobbies: Painting, football
  Location: Turkey

- Age = 15
  Hobbies: football, Reading
  Location: Canada

- Age = 32
  Hobbies: football, Dancing
  Location: Canada

Ad = {Location: Canada AND Hobby = Football}

Matches = 2

Unlinkable
Advertising Transparency

Advertisers

OSN Users

The servers execution time must be independent of users/advertisers active time
Advertising Transparency

Advertisers \( \rightarrow \) Secure OSN with Federated Servers \( \leftarrow \) OSN Users

Advertising Transparency

7 million\(^1\) active advertisers

Facebook had 2.41\(^2\) billion monthly active users!

Secure OSN with Federated Servers

Privado*

Advertisers

OSN Users

Privado

Privacy Preserving Group-Based Advertising

Complexity, Performance and Security Proof

Secure OSN with Federated Servers

Adversarial Model

Malicious adversary

Secure OSN with Federated Servers
Running Time

![Graph showing running time vs group size for different group sizes (N=2 to N=20)].

- Time in millisecond
- Group Size
- Legends for different group sizes: N=2, N=3, N=4, N=5, N=6, N=7, N=8, N=9, N=10, N=11, N=12, N=13, N=14, N=15, N=16, N=17, N=18, N=19, N=20.
THANK YOU!