

## **PhD proposition: Design of transparency mechanisms for online targeted advertising LIG (within the MIAI 3IA institute)**

**Keywords:** privacy, transparency, explanations, online targeted advertising, Facebook, browser extension, data collection and analysis, machine learning, statistics

**Lab:** Laboratoire d'Informatique de Grenoble (LIG), Grenoble, France

**Team in the lab:** SLIDE

### **Advisors:**

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### **Project Description:**

The Facebook advertising platform has been the source of a number of controversies in recent years regarding privacy violations, lack of transparency on how it provides information to users about the ads they see, and lately, Facebook's ability to be used by dishonest actors for discriminatory advertising or ad-driven political propaganda to influence elections.

This situation has led many governments and privacy advocates to push Facebook to make its platform more transparent and more accountable for the ads that circulate on it and push for laws requiring transparency. For example, the General Data Protection Regulation (GDPR) of the EU mentions a "right to explanation". However, how to make such systems more transparent is an open question. Indeed, in a recent work [0,5] we showed that the transparency mechanisms provided by Facebook in the "why am I seeing this ad?" button hide key reasons for showing ads; and the way these explanations are designed allow advertisers to easily obfuscate explanations from ad campaigns that are discriminatory or that target privacy-sensitive attributes.

The goal of the PhD thesis is to *study the sources of risks in social media advertising and design transparency mechanisms to reduce these risks*. The PhD candidate will be able to investigate various directions:

1. How to provide explanations without the collaboration of the advertising platform. The idea is to reverse-engineer the targeting formula in order to infer why an ad has been targeted to a particular person. The idea is to use statistics and machine learning techniques to group together people that receive the same ad/ads and study their most predominant properties.
2. What information is necessary for users/regulators/news medias to have access to in order to identify misbehaving advertisers that are, for example, trying to send misinformation, their messages are duplicitous or they are building discriminatory ad campaigns.
3. What are the properties of explanations that makes them robust to malicious attackers that try to avoid detection. For example, if an explanation is not complete (does not show all the targeting attributes used by the advertiser), an advertiser could hide that his ad campaigns are discriminatory.

The student will be able to work with more than 200k real-world ads received by more than 1000 users we collected using our browser extension AdAnalyst ([www.adanalyst.mpi-sws.org](http://www.adanalyst.mpi-sws.org)). Throughout the project the student will be able to familiarize himself with the online targeted advertising ecosystems, and apply machine learning techniques on real world data. The student will also participate at the maintenance of AdAnalyst and will be encouraged to implement the transparency mechanisms proposed in AdAnalyst.

### **Requirements:**

Candidates should hold (or be about to get) a MSc degree in computer science and have:

- Strong coding skills.
- Experience in working with data.
- Strong motivation.
- Interest in the societal impact of advertising platforms.

### **Application instructions:**

The position will be open until filled, interested candidates are invited to send their application as soon as possible. The start of the PhD is expected in Fall 2019. Interested candidates are invited to send the following documents:

- a detailed CV,
- a list of courses and grades during the MSc (and if possible earlier years),
- a list of 2-3 references willing to support their application,
- a short statement of interest and any other information useful to evaluate the application.

### **Additional information:**

The PhD student will be a member of the new MIAI institute (one of the four interdisciplinary institute on artificial intelligence in France created by the government in June 2019), as part of the "Explainable and Responsible AI" chair. As such, he/she will benefit from a lively research environment as well as a broad training offer on all aspects of AI. The PhD student will be a UGA student. He/she will be register at the MSTII doctoral school of Univ. Grenoble Alpes and be a member of the LIG Lab.

Interested candidates are encourage to contact directly the advisor if they have any question about the position.

**References:**

- [0] Facebook's 'transparency' efforts hide key reasons for showing ads: <https://theconversation.com/facebook-transparency-efforts-hide-key-reasons-for-showing-ads-115790>
- [1] Auditing Offline Data Brokers via Facebook's Advertising Platform  
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- [7] B. Liu, A. Sheth, U. Weinsberg, J. Chandrashekar, and R. Govindan. Adreveal: Improving transparency into online targeted advertising. In *HotNets'13*.
- [8] J. Parra-Arnau, J. P. Achara, and C. Castelluccia. Myadchoices: Bringing transparency and control to online advertising. In *ACM Transactions on the Web (TWEB) 2017*
- [9] M. Lécuyer, G. Ducoffe, F. Lan, A. Papancea, T. Petsios, R. Spahn, A. Chaintreau, and R. Geambasu. Xray: Enhancing the web's transparency with differential correlation. In *USENIX Security'14*.