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KEYWORDS

GDPR; right to explanation; accountability; transparency; data protection by design; privacy policy; news recommender systems; user-centered design; empirical study

ABSTRACT

The GDPR has a significant impact on the way users interact with technologies, especially the everyday platforms used to personalize news and related forms of information. This paper presents the initial results from a study whose primary objective is to empirically test those platforms' level of compliance with the so-called 'right to explanation'. Four research topics considered as gaps in existing legal and HCI scholarship originated from the project's initial phase, namely (1) GDPR compliance through user-centered design; (2) the inclusion of values in the system; (3) design considerations regarding interaction strategies, algorithmic experience, transparency, and explanations; and (4) technical challenges. The second phase is currently ongoing and allows us to make some observations regarding the registration process and the privacy policies of three categories of news actors: first-party content providers, news aggregators and social media platforms.

1 INTRODUCTION

With the rise of Artificial Intelligence and Machine Learning, technology is increasingly mediating our lives. Recently, researchers' interest for algorithms used in mainstream technologies has drastically expanded, looking into the effects of algorithms on society. Willson and Beer, for instance, raise the need for close supervision of algorithms that are being delegated with everyday activities, working semi-autonomously, *i.e.* with limited supervision from human counterparts [2], [19]. Others have addressed the challenge of designing technologies complying with policies and regulations [10], [11]. Despite several initiatives to improve transparency and accountability in this context, it is not entirely clear how the current legal framework is interpreted and applied in practice. The General Data Protection Regulation (GDPR) lays the groundwork for the development of a so-called 'right to explanation' stemming from Art. 13(2)f, 14(2)g, 15(1)h and 22(3). There is, however, little empirical evidence regarding the actual exercise of this alleged right. This study aims precisely at filling that gap. As a result, it is expected that it can pinpoint key issues, create evidence-based policy guidance and support further interdisciplinary research.

2 BACKGROUND

2.1 Policies, GDPR and design implications

The entry into force of the GDPR has significantly impacted the design of technologies that rely on the processing of personal data [11]. Goodman and Flaxman provide an understanding on EU regulations and GDPR implications on technology design [10]. Similarly, Pasquale describes transparency using a legal perspective in cases such as secrecy in electronic medical records, business dynamics in search engines, consumer credit scoring and financial decisions [16]. Another example is provided by Helberger, Karppinen and D'Acunto who describe diversity implementations for recommender systems and how to address them through regulation [13]. The accountability and transparency safeguards provided in the GDPR might, on their own, not provide the adequate remedies against the negative societal impacts often attributed to automated

decision-making processes. Rather, one might appeal to mechanisms that transcend current legal accountability measures [18]. In this regard, HCI methods might provide additional safeguards. The intersection of law and HCI proposes a formulation of adequate design guidelines to comply with regulatory policies such as GDPR requirements in terms of transparency, accountability and data protection by design while maximizing usability and user experience.

2.2 Transparency of news recommender systems

Algorithmic decision-making processes are transforming many markets including media, journalism and the news business. Authors like Napoli have proposed the concept of 'algorithmic turn' to identify this trend, defined as: "the process in which the media industry has been transformed by implementing algorithms in both media consumption and production" [15]. Bucher has introduced the notion of 'computational journalism', namely "a tendency towards large-scale data collection, algorithmic data analysis and computational practices in the production and dissemination of news" [5]. Gillespie considers as public relevance algorithms those delimited by five provisional functions: (i) select or exclude information products, (ii) infer or anticipate information about their users, (iii) define what is relevant or legitimate knowledge, (iv) flaunt impartiality with no human mediation, and (v) provoke behavioral changes in user practices [9]. Therefore, Napoli analyses this market shifting in two main areas: (i) demand prediction and (ii) content creation. It is in the former that recommender algorithms and similar technologies play a leading role, in which the final users are deeply involved. As the author explains, demand prediction describes how media companies try to understand and learn their audience's preferences using big data analysis [15].

Different researchers have suggested user-centered models for algorithmic design. For example, Diakopolous considers that transparency should be based around factors worth of disclosing [7]. Research has also shown negative effects on user experiences with recommender algorithms. For example, Bozdag portraits the many layers of possible bias that can be inserted in algorithmic filtering and personalization [2]. This context opens a set of challenges for technology design and HCI. One of them is the implementation of transparent and 'accountable' technologies to foster trust and use. At the same time, there is an urgent need to explore how these technologies should be designed to effectively implement and promote data protection rights and obligations.

2.3 Interaction design of recommender systems

Recommendation algorithms are at the forefront of information filtering, exploring past behaviours and similarities among users to predict preferences and generate a list of information items that is personally tailored to an end user [1]. Therefore, many scholars have focused on designing the interaction experience with recommender systems. For instance, Knijnenburg *et al.* present a framework for a user-centric evaluation of recommender systems [14].

Additionally, the "black box" nature of recommenders has been analysed with different visualization strategies as pictured by He, Parra and Verbert who present a survey of interactive

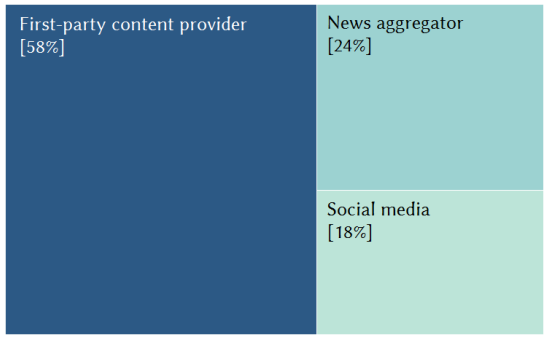

Figure 1 – Types of services investigated in this paper

Table 1 – News providers' nationalities (Headquarters and Data controller)

Country	*Headquarters location*	*Data controller location*
Belgium	7	7
Brazil	4	4
Ireland	-	6
Spain	3	3
Netherlands	2	2
UK	3	3
USA	19	11
Not informed	-	2

recommender systems [12]. Also, Gedikli, Jannach and Ge compare different types of explanations for recommenders algorithms [8] while Tintarev and Masthoff evaluate seven different aims for explanations [17]. Likewise, Bakalov *et al.* propose five aspects to evaluate user models and personalisation effects in recommender systems [2]. Although research has addressed the design for transparency in recommender systems, how those aspects comply with specific legislation such as the GDPR remains underexplored.

3 METHODS AND PRELIMINARY RESULTS

We chose the following approach to address the objectives of this study: (1) identify and document the main challenges hindering adequate algorithmic transparency and the efficient exercise of the so-called 'right to explanation' in existing legal and HCI scholarship; (2) empirically test how news recommenders are explained in practice, using binding legal provisions to enforce transparency. A workshop was organized to identify the challenges associated with the particular nature of these recommender systems. This collaborative workshop included a mix of researchers specialised in (data protection) law and HCI. First a literature study in both HCI and legal domains was conducted; then key concepts from each of the studies were extracted and written on sticky notes; finally, using affinity diagramming, the concepts were combined and structured, which resulted in four main research topics (see section 3.1).

As a next step, data was gathered by eight researchers through surveys incorporating all the questions that emerged from the mapping workshop. By now, a total of 38 different news providers have been included in the analysis. Screenshots were taken during the registration process to gather the main design strategies used to present data and privacy rights to users. Final results are later going to be analyzed by both legal and HCI experts to pinpoint the most problematic elements. The preliminary results can be seen in section 3.2.

3.1 Results from Mapping Workshop

The main research topics resulting from the sessions were: (1) user centered design taking into account legal compliance such as the protection of minors, consumer protection, sensitive data protection and rules regarding data processing; (2) inclusion of values in the system such as recognizability of the advertiser, diversity, democracy, fairness, visibility, right to data protection, and trust; (3) design considerations such as interaction strategies, algorithmic experience, transparency, and explanations; and (4) technical challenges such as data controller identity, data protection by design, privacy dashboards, and data processing logs.

3.2 Preliminary services analysis

As can be seen in Figure 1, 22 services are first-party content providers (58%), nine are news aggregators (24%) and seven are social media (18%). Table 1 shows the related countries that have been incorporated in the analysis and the locations where their headquarters, often acting as the controllers, are located. Interestingly, five services did not provide any information in relation to

Table 2 – Platforms that present a section informing about privacy and data protection while registering, by sector

Service	*No*	*Yes*
Content provider	2	20
News aggregator	3	6
Social Media	-	7

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privacy or data protection during the registration process (as can be seen in Table 2), three of them from the US, one from the UK and one from Brazil. The category in which users were least likely to be informed about privacy and data protection during the registration process was that of 'news aggregator'.

Screenshots were taken during the registration process to keep track of the main design strategies used to present data and privacy rights to users. Currently, we are sending an explanation request to the platforms regarding the recommender system and how it personalizes content-delivery to users. The eventual goal is to check if they provide that information and how understandable the information provided is.

4 CONCLUSIONS AND FUTURE LINES FOR HCI

It seems clear that HCI is a fertile ground for reflecting on the so-called 'right to explanation' introduced by GDPR. While lawyers can certainly provide legal analysis, how to meaningfully implement these provisions requires a truly interdisciplinary approach. To that end, we propose several research activities in the field of algorithmic transparency and accountability from both a legal and an HCI perspective. First, design explorations to create a framework or guidelines seems a major opportunity to adequately comply with GDPR. Second, current design proposals should be analyzed not only in their obedience level for GDPR, but also in there UX and adaptability to the user's context and needs. Third, developing solutions to comply with the GDPR will also create new design needs, such as properly addressing a user-centered design approach for data portability, among other issues that will rise in the coming years.

The next stage of our research consists in developing and evaluating a prototype for maximizing the understanding and legibility of news recommendations algorithms. The survey's results provide the current stage of the platforms regarding both categories of information offered and the formats used by providers to explain recommender algorithms. This knowledge will help to build a diary study. A diary study will be conducted with a small sample of users (n=20), who will be asked to document their experience of algorithmic systems in the form of a diary. This will serve as input for two co-design workshops where, together with said users, we will define which elements of algorithms are to be made transparent. Based on the outcome of the workshops, we will prototype different versions of a user interface with varying ways of explaining the underlying algorithms. These prototypes will then be used in experiments (n=30) to assess users' comprehension, acceptance and trust of the algorithmic system.

Through its data protection mechanisms, such as transparency, the GDPR could also indirectly safeguard other societal values at stake where news recommender systems are concerned, such as media pluralism and democracy. It is expected that the outcome of our research will be transposable relatively easily to test other types of algorithms (e.g. in the context of Smart Cities, Healthcare or the Internet of Things).

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