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Challenges in Upholding Human Autonomy through the Right to be Forgotten

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Abstract

The paper examines the difficulties and challenges in implementing the right to be forgotten, highlighting the importance of this right for individual autonomy and privacy. It explores the main obstacles to upholding this right from legal, ethical, practical, and technical viewpoints, providing a summary of the existing problems and making recommendations for potential solutions. To improve the applicability of human rights in the digital world, the research emphasizes the significance of public awareness, international collaboration, and improvements in machine unlearning solutions. In order to assist the effective application of the right to be forgotten, the paper ends with suggestions for future research. These ideas seek to achieve a balance between autonomy, the need for privacy, and the rapid development of technology in digital spaces.

Keywords: *The Right To Be Forgotten; GDPR; Machine Unlearning, Human Right, Autonomy.*

1. Introduction

Machine Learning (ML) opens up new paths for innovation and expansion across various fields, such as online retail, medical care, education, legal practices, and national defense (Wirtz, 2019). ML applications in industry demonstrate abilities to learn adaptively and solve problems, broadening their application from creating new products to independently managing corporate operations (Mann, 2016). As a result, these technologies are quickly becoming a fundamental part of our everyday lives, influencing not just how we obtain products and services, but also altering the way we collect and analyze information, make decisions, and, ultimately, limiting our freedom to exercise those choices (Yeomans, 2015). In essence, ML technologies considerably affect our individual autonomy.

From a philosophical standpoint, autonomy is defined as the freedom to decide and act, along with the chance and freedom to implement our decisions (Pirhonen, 2020). While there are

various interpretations of autonomy (Gumbis, 2008) (Mackenzie, 2014), they all agree on the fundamental principle of self-determination. The United Nations (UN) encapsulates this consensus with its definition: “Autonomy is the acknowledgment of a person's right to hold views, to make choices and to take actions based on personal values and beliefs” (Gumbis, 2008).

Preventing industrial ML from undermining human autonomy is crucial for effective regulatory oversight within the European regulatory framework (Nikolinakos, 2023). However, the importance of autonomy has been largely overlooked in the designing and application of industrial ML technologies (Subías-Beltrán, 2023). Although current legal frameworks, like those set by the General Data Protection Regulation (GDPR), offer potential, their full integration as standard practices has not yet been achieved. In fact, the practical application of specific measures mandated by these laws has not been fully applied in the deployment of industrial ML systems. An illustrative example is *'the right to be forgotten'*.

The development of *the right to be forgotten* within EU data protection law and its formal acknowledgment by the European Court of Justice (ECJ) represent a proactive response to the evolving challenges of personal data protection in an increasingly digital world. This recognition notably progressed through the pivotal Google Spain SL v. Agencia Española de Protección de Datos (AEPD) case, where the ECJ addressed a complaint involving the request for Google to remove links containing outdated personal information. The Court's decision clarified that search engines act as data controllers and are, therefore, subject to data protection laws. This landmark ruling underscored the necessity for individuals to have the ability to control their digital footprint, particularly concerning information that is no longer relevant or necessary. By ruling in favor of the "right to be forgotten," the ECJ set a significant legal precedent, leading to the explicit inclusion of this right in the General Data Protection Regulation (GDPR), thereby embedding individual privacy and data control at the core of the digital age's legal framework which gives the autonomy to individuals to ask for the deletion of any of their data at any time they desire (Peguera, 2015).

Therefore, *the right to be forgotten* encompasses two key aspects, granting EU citizens the authority to request the deletion of any of their personal data. The first part specifically concentrates on the aspect of personal data usage, allowing individuals to demand the removal of their information as their digital right when it is no longer necessary, or if they withdraw consent or challenge the legitimacy of the data's processing. The second part is that the regulation mandates the elimination of any links to, or copies of, this information as well. Here, the focus shifts towards the technical aspect, emphasizing the need for mechanisms of machine unlearning (MU). This is particularly crucial as ML models often memorize training data (Bourtoule 2021). This characteristic renders the models susceptible to privacy attacks wherein adversarial opponents aim to extract information about the training data points. Such scenarios significantly compromise user secrecy and privacy (Huang, 2011). Thus, addressing this

technical aspect is vital for ensuring the comprehensive protection of personal data under the GDPR.

However, there are significant concerns regarding implementation of the right to be forgotten and although it represents a significant advancement towards protecting individual privacy as human right, it is not free from flaws and weaknesses, which diminishes its ability to safeguard human right in the digital realm. In light of this situation, we aim to answer to this question in this paper: 'What are the primary limitations of the right to be forgotten when applied in legal enforcement, and what steps can be taken to address these limitations to enhance the right's efficiency and applicability in the digital era?' In our endeavor to find the answer to this query, we reviewed various academic sources and identified diverse perspectives across different papers. We classified the limitations of *the right to be forgotten* into four primary groups: ethical dilemmas, legal and regulatory challenges, operational problems, and technical issues and discussed them in section 2. In Section 3, we present several recommendations to tackle these issues. Finally, in Section 4, 'Conclusion and Future Work', we underline the importance of continued exploration and development.

While the significance of data privacy and the right to be forgotten continues to grow, there's a noticeable gap in research that comprehensively addresses the various challenges associated with implementing these concepts. Previous studies have tended to focus on only one aspect, overlooking the broader picture. This research holds critical importance as it addresses the intricate balance between technological advancement and fundamental human rights in the modern age, challenges in implementing the right to be forgotten, technical obstacles related to machine unlearning, and the legal and ethical implications of data privacy. By identifying the limitations of the enforcement of *the right to be forgotten* in both protecting personal data and its technical implementation, this study aims to shed light on the complexities and challenges that arise from implementing such a right within the digital landscape.

2. Challenges of the Right to be Forgotten

In this section, we aim to provide a comprehensive understanding of the current challenges of implementing *'the right to be forgotten'* and set the stage for discussing potential solutions in the subsequent section. Some experts view *the right to be forgotten* as a form of internet censorship, as it may make finding pertinent information, or articles related to a person challenging or even unfeasible (Lee, 2015). On the other hand, there are arguments that this right can exist harmoniously with the freedom of expression and information, if there is a clear demarcation of their boundaries and an effective balance between them (ANGELES, 2016).

Moreover, there are various issues in the technical part of its implementation. If we utilize the data in a machine learning model, addressing the need to forget relevant data after training the model involves tackling challenges such as stochasticity and incrementality in ML algorithm

training, and catastrophic unlearning (Nguyen, 2022). Machine unlearning (MU) is designed to address situations where a user requests the deletion of specific data. In such cases, the previously trained model must undergo retraining to produce a new model. This updated model should reflect the distribution as though the deleted data had never been part of the initial learning process (Zhang, 2023). While there have been many proposed MU models, they are typically expensive and complicated, requiring either full or partial retraining of the model (Bourtoule, 2021) or complex matrix inversions (Liu, 2023). Furthermore, even if these methods were to prove effective, ensuring they comply with the regulation demands involves a deeper analysis of the legislation concerning the right to be forgotten to facilitate its translation into practice. This process includes clearly defining the situations where the right applies, choosing suitable technological solutions for enabling data to be forgotten in these contexts and integrating these solutions into the operational framework of industrial ML systems—a set of tasks that continues to pose significant challenges.

In the following subsections, we go through different categories of the mentioned issues.

2.1. Legal and regularity

As discussed in the introduction section, *the right to be forgotten* is defined under the General Data Protection Regulation (GDPR) and applies to EU citizens. However, the application of these regulations outside European Union introduces complexities such as balancing the EU's desire to extend its data protection norms worldwide against the principles of international comity and the legal diversity inherent in different nations. This balance is particularly precarious when it intersects with the concept of digital sovereignty, where countries may view the enforcement of EU standards within their jurisdictions as a form of 'data protection imperialism'. Consequently, this global push for EU data protection standards, including *the right to be forgotte*n, might lead to legal conflicts and contradictory rulings across different jurisdictions, underscoring the global intricacies of human autonomy in the digital age (Fabbrini, 2020).

Another legal issue of the right to be forgotten, in the context of the European Union's regulatory framework, is the intricate balance between the enforcement of this right under the General Data Protection Regulation (GDPR) and the obligations arising from the Electronic Identification, Authentication and Trust Services (eIDAS) Regulation. eIDAS establishes a standardized system for electronic identification and trust services across the EU, enhancing security and facilitating digital transactions and services. While promoting digital efficiency and cross-border interactions, eIDAS intersects with GDPR principles, particularly when it comes to personal data processing inherent in electronic identification schemes. The legal challenge here lies in harmonizing the robust identity verification mechanisms mandated by eIDAS, which are essential for digital market integration, with the stringent privacy rights protected by the GDPR, including the right to be forgotten (Andraško, 2021).

2.2. Ethical issues

The first important issue within the European legal framework is its struggle to balance the right to be forgotten with the fundamental rights of freedom of expression and information, defining the boundaries between an individual's privacy rights through data erasure and the public's interest in information access. This dilemma is exacerbated by the need for a legal mechanism that can effectively determine when personal data should remain accessible and when it should be removed, considering varying contexts and the evolving nature of digital information. The absence of a clear, universally applicable legal standard complicates navigating these conflicting rights, leading to uncertainties in the enforcement and application of the right to be forgotten. This legal challenge impacts not only data subjects and controllers but also broader societal values such as transparency and accountability, making it a critical area for legal refinement and development (Kocharyan, 2021). Another important ethical issue in implementing the right to be forgotten is the lack of awareness among organizations and individuals about the GDPR and its provisions, including the right to be forgotten. This lack of awareness can lead to significant challenges in ensuring the effective application and enforcement of this right (Addis, 2018).

2.3. Operational issues

The right to be forgotten faces issues due to its vagueness, such as unclear legal definitions and varied interpretations across regions. This uncertainty, rooted in evolving EU case law without solid legislative guidance, makes its enforcement challenging. It complicates decisions for data controllers on erasure requests and weakens privacy protection (Kocharyan, 2021).

2.4. Technical Issues

While implementing the right to be forgotten with the help of MU algorithms, some major concerns arise which we mention some of them here. The first problem is the challenge of MU algorithms to handle large amounts of data deletion efficiently in big data. This challenge requires high adaptability algorithms which can process and "forget" significant volumes of data without compromising the model's accuracy or performance (Zhang, 2023). Moreover, measuring the influence of each data point on the learning process before implementing the unlearning algorithm is not fully possible. This is compounded by the computational complexity of influence functions and the challenge of adapting them for complex models like deep neural networks (DNNs) which makes it difficult to catch the change in accuracy before implementing the MU model (Koh, 2017). The incremental nature of training, where updates reflect all previous updates, making the impact of any single training point implicitly influence all subsequent model updates is another problem while implementing Machine Unlearning. This further complicates the unlearning process since the removal of any data point affects the entire training history (Bourtoule, 2021). The trade-off in MU algorithms is mentioned as a problem in implementing it: to achieve a top-performing unlearning or in other words, high 'forget' quality, we must give up a high level of efficiency or utility (Kurmanji, 2024).

These are some problems and issues of implementing the right to be forgotten in practice which shows the complexity and multifaceted nature of data deletion, including technical challenges in completely erasing data without harming the integrity of existing datasets, legal and regulatory ambiguities across different jurisdictions, and the potential for unintended consequences such as compromising the accuracy of machine learning models or infringing on the public's right to information. In the discussion section, we focus on some solutions to mitigate some of these challenges and provide some future research ideas for the scholars to help implement *the right to be forgotten*, as an important aspect of human rights, more efficiently.

3. Discussion

Addressing the challenges mentioned in the previous section requires a multidisciplinary approach and operational considerations. in this section, we outline potential steps to mitigate these challenges and enhance the applicability of the right to be forgotten.

Increasing public awareness about their rights on digital platforms and understanding the right to be forgotten is essential. Educational programs in schools and universities teaching future workforce can be an effective resource in this matter. Moreover, campaigns and training programs in organizations, especially in the data-heavy sectors can train individuals to understand their and others' rights in the digital world and how to exercise them.

All countries, especially countries active in the digital field, should work together to develop an international agreement to enhance human autonomy and reduce legal conflicts.

Machine Unlearning is a newly developed concept and there is a great deal of work that scholars can focus on to enhance efficiency in this area and address the technical challenges associated with data deletion. Focus of the computer and data science scholars to create secure, privacy-preserving, and scalable algorithms that facilitate the removal of data can help to implement the right to be forgotten more effectively without affecting the performance significantly.

A serious effort to refine the legal definitions related to the right to be forgotten is needed to reduce confusion and help more transparent implementation of laws in this area. The development of operational guidelines and best practices can help organizations manage the complexities of implementing the right to be forgotten. Establishing clear processes to assess the response to data deletion, monitoring, and auditing can be part of this process.

In Section 4, we provide some ideas for future work and emphasize the necessity for ongoing interdisciplinary collaboration among scholars to address the challenges of the right to be forgotten and machine unlearning.

4. Conclusion and Future Work

The focus of this paper is on *the right to be forgotten* in the digital era as an important human right in today's world and its challenges in legal, ethical, and technical aspects highlighting the complex interplay between autonomy, privacy, and digitalization. Since the paper discusses a crucial aspect of data privacy and security, it is relevant to web and big data practitioners who are responsible for managing and securing large volumes of personal data. There is a significant opportunity for computer and data scientists to research different techniques and algorithms of MU and data deletion techniques which would help to enhance the accuracy and efficiency of the models specifically in large-scale data. Moreover, research should be done to check the level of awareness of different groups of society about their rights and to plan awareness raising policies accordingly. Furthermore, it seems that with the high speed of artificial intelligence and the digital world, the creation of ethical guides and rules in this world is far behind. Consequently, creating a framework for guiding and deploying artificial intelligence systems concerning autonomy, privacy, and human rights is a necessity.

In conclusion, enhancing the right to be forgotten requires a concerted international cooperation of policymakers, technologists, and legal experts. By addressing the identified challenges in this research through legal reforms, public engagement, and technical innovation, we can become closer to respecting privacy and human autonomy. Future research in this relatively new area will play a significant role in the evolution of privacy rights and its alignment with rapid technological change.

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