

# *The Formation Mechanism of Ethical Dilemmas of Privacy Protection in the Era of Big Data and Its Governance*

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**Abstract:** Human society has quietly entered the era of big data. While big data technology has brought positive changes to society in many aspects, its brutal growth and extensive use have also brought a series of ethical dilemmas to people's privacy protection. The ethical dilemmas of privacy protection in the era of big data include: data mining and integration of privacy information, data prediction and presentation of privacy information, data monitoring and transparency of privacy information, data sharing and proliferation of privacy information, etc. The ethical dilemma of privacy protection in the era of big data is mainly caused by the negative effect of science and technology, the correlation of wealth creation, the lag of the regulation mechanism, and the fluidity of privacy concept. The basic approaches to address the ethical dilemma of privacy protection in the era of big data include: reconstructing the ethics of science and technology to promote the unification of instrumental rationality and value rationality; improving the ethics of institutions to promote the unification of the rule of law and industry self-regulation; reducing the risk of surveillance to promote the unification of informed consent and outcome control; and constructing the ethics of responsibility to promote the unification of rights and obligations.

## 1. Introduction

In recent years, along with the rapid development of digitalization, the Internet, cloud computing, the Internet of Things, video surveillance and other technologies, the type, scale, speed and potential value of data have increased geometrically worldwide, and a data-driven world has gradually taken shape. In 2011, the amount of data generated and copied worldwide reached 1.8 ZB (1 ZB = 1 trillion GB), which greatly exceeded the total amount of human information before 2011", some scholars found. Big data technology has opened up a major transformation in the governance of human society. Just as telescopes allow us to feel the universe and microscopes allow us to observe microbes, big data is changing our lives and the way we understand the world, becoming a

source of new inventions and services, and more changes are in the pipeline". Big data technology has brought many positive changes to human society, such as making life easier, creating business value, reshaping the way we think, enhancing predictive accuracy, improving decision-making and solving complex problems. However, the brutal growth and widespread use of big data technology has also given rise to problems such as the proliferation of false data, the spread of information alienation and the widening of the data divide, especially the "traces" left by people in social networks, smart life and online transactions, which are over-tracked and permanently remembered by big data technology, making the public's private information in In particular, people's "traces" left behind in social networks, smart life, online transactions, etc. are overly tracked and permanently remembered by big data technologies, so that the public's private information is continuously and recklessly leaked or misused in data sharing, mining, prediction, monitoring and other applications.

## **2. The Main Symptoms of the Ethical Dilemma of Privacy Protection in the Era of Big Data**

### **2.1 Data mining and the integration of privacy information**

In traditional theory, privacy is information that citizens do not want others to know. As the concept of privacy has become popular and more commonly accepted around the world, a set of more effective laws and regulations have been formed in many countries regarding the protection of citizens' private information. <sup>[1]</sup>Traditional ethical codes and laws and regulations protect the right to privacy, mainly based on the perspective of individual information autonomy control, for the protection of citizens' correspondence, home, physical characteristics, life habits, bad experiences, wealth status and other natural type of private information. Driven by big data technology, a new type of citizen privacy has emerged ---- integrated privacy, i.e. privacy generated by regular integration of digital traces of people left on the internet through data mining technology. Compared to traditional data, Big Data has the "4 V's", i.e. large data size, fast processing speed, many types and high value. The rapid development of big data technology has led to a fissionable growth in the scale, speed, type and potential value of data worldwide, laying the information foundation for the rapid development of data mining, statistical computing and other technologies. Big data technology involves data collection, mining, analysis, storage, transmission and many other aspects, each of which requires the support of genetic algorithms, neural network methods, cluster analysis and other related technologies and methods. The widespread use of unified computing methods, data mining and other technologies has resulted in the fragmented data left behind by citizens' activities that were originally disorganised, "atomised", lacked information linkage and implied user privacy. The data is mined and analysed twice or even more by big data users, rearranged and combined, and then collected, stored and recycled. These data modules, which contain personally identifiable information or privacy information, are known as "integrated privacy", which is more likely to be compromised. "The "footprints" of data are everywhere, from daily consumption to major decisions on health and education, and may not be harmful when stored in different systems. However, once a centralised database is established, data integration and information summation, through the corroboration and mutual interpretation of data, can recreate almost all the trajectory of a person's life, resulting in personal privacy nowhere to be seen.

### **2.2 Data prediction and the presentation of private information**

The European Renaissance movement focused on the study of nature, breaking the bonds of religious theology and giving rise to modern science, which is primarily interested in exploring the causal relationships between the phenomena under study. <sup>[2]</sup>Big Data is a new technological

revolution that is reshaping people's worldviews, ways of thinking and modes of knowledge production, in particular making "science move from the pursuit of causality alone to a focus on relevance, and by "giving voice to data" proposing a new mode of knowledge production in which "science begins with data". "In the era of Big Data, people are confronted with massive amounts of data that are difficult to process in real time, and it is impossible to find a definite causality between each piece of data and other pieces of data, so they can only look for correlations between massive amounts of data at a macro level.

### **3. Mechanisms of the Ethical Dilemma of Privacy Protection in the Era of Big Data**

#### **3.1 The negative effects of science and technology**

There have been five scientific and technological revolutions in humanity: the first was the birth of modern physics, the second was the steam engine and mechanical revolution, the third was the electricity and transportation revolution, the fourth was the relativity and quantum mechanics revolution, and the fifth was the electronics and information technology revolution. Each of these revolutions has had a profound and lasting impact on the course of human history and social development. As a result, the rapid development and widespread application of science and technology has brought with it a series of "side effects" that have created social risks. The formation and development of Big Data technology has also led to a series of 'side-effects', which are creating social risks. This is also the case with the formation and development of Big Data technologies. As the size, speed, type and potential value of data grows geometrically around the world, a data-driven world is taking shape. "The scale of data is now so huge that it can no longer be processed and grasped using traditional techniques and tools, so Big Data is a collection of data that has exceeded our conventional processing capabilities and must be processed with the help of new scientific techniques and methodological systems."" As a technological revolution, Big Data technology has brought many positive changes to human society, such as providing convenience to life, creating business value, uncovering the truth of data, reshaping the way of thinking, enhancing prediction accuracy, improving decision-making ability and solving complex problems. However, the brutal growth and widespread use of big data technology has also given rise to negative effects such as the proliferation of false data, the spread of information alienation and the widening of the data chicken gutter. In particular, people's social networks, smart lives, online transactions and even emotional expressions, which originally did not seem to be related to privacy, are over-tracked and permanently remembered by big data technologies. Through sophisticated statistical algorithms, data mining and other techniques, valuable connections can be discovered and more accurate action predictions can be made.

#### **3.2 The lagging nature of regulatory mechanisms**

In the era of big data where "everything is digital", citizens enjoy the convenience brought by big data technology in production, life, study and entertainment, while their identity, communication, social, shopping, travel and medical information are also continuously traced, recorded and stored through big data technology, which creates a security risk for citizens' private information to be leaked or misused arbitrarily. This has created a security risk for citizens' privacy information to be leaked or misused. However, the existing legal system and ethical codes cannot adapt to the real needs of the big data era. In particular, the legislation on privacy protection is lagging behind, and lacks the necessary industry self-regulatory mechanism and ethical bottom line, making the existing rules on online privacy protection too general, outdated and anachronistic. "Whether it's inform and permit, obfuscation or anonymisation, the three main privacy protection strategies are failing. Many

users today feel their privacy is already at risk, and the situation will be even worse when big data becomes more prevalent." The current regulatory regime lacks realistic relevance and appears impotent in the face of the proliferation of ethical issues regarding big data privacy. In particular, "laws are by nature reactive, and laws and regulations rarely anticipate potential inequalities. Rather, they react to problems that have arisen, usually in an extremely slow manner". It is difficult to decipher the protection of citizens' privacy caused by big data technologies. In *Digital Survival*, Negroponte writes: "I think of our laws as if they were fish baring and struggling on the deck. These dying fish are desperately gasping for air, because the digital world is a very different place. There is no place for national laws in a world where most laws are made for atoms, not for bits." In addition, the imperfection of the code of ethics related to Internet companies has caused ambiguity in the criteria for ethical evaluation. Some Internet companies are tempted by huge commercial profits to reveal their users' private data at will, and even sell citizens' private information through underground industrial chains to obtain illegal profits. In short, the lagging nature of legal regulation, industry self-regulation and other regulatory mechanisms has further indulged the ethical dilemma of big data technology alienation and privacy protection.

#### **4. The Basic Rationale for Managing the Ethical Dilemma of Privacy Protection in the Era of Big Data**

##### **4.1 Reconstructing the ethics of science and technology and promoting the unification of instrumental rationality and value rationality**

The achievements in science and technology since the Enlightenment are the result of human rational development. As a form of thinking to understand the nature and laws of objective things, scientific and technological rationality is guided by certain scientific theories. It is the basic cognitive paradigm that actually governs human practical activities by means of some material and technical means. Technological rationality usually consists of instrumental rationality, which is the desire to achieve one's rational ends, conditional on or by means of the situation of external things and the expectations of others' actions, and value rationality, which is the conscious and unconditional belief in a particular intrinsic value, such as ethical, aesthetic, religious or other values, whether or not one achieves them".<sup>[3]</sup>As technological rationality evolves into the omnipotent means and goal of development in modern society, it degenerates into one-dimensional instrumental rationality. Big data technology has brought unprecedented changes to human society and is a fundamental tool for social governance. However, the distinctive problem-orientation and the inherent need for continuous optimisation in its development and application have demonstrated a strong operational instrumental rationality. When big data technology gradually evolves from a means to an end, it becomes a fundamentally dependent tool for the rapid development of material production, thus "disembedding" itself from the value rationality that should govern it, leading to the proliferation of false data, the spread of information alienation, the widening of the information divide, the dilemma of privacy protection and other problems of the times.<sup>[4]</sup>As a result, a paradox of modernity has emerged: while technology, including big data technology, is bringing progress and convenience to society, it is also creating real problems and ethical risks. This disturbing "man-made risk" is mainly caused by the unrestricted advancement of big data technology and the imbalance between the ethics of science and technology, which "manifests itself in the form of the externalisation of the intrinsic nature of the interaction between technology and human beings". Therefore, the development of big data technology needs to promote the unification of instrumental rationality and value rationality.

## 4.2 Constructing an ethics of responsibility and promoting the unity of rights and duties

There are two sides to the development of things. The main reason for this is that people are not aware of or simply unwilling to take responsibility for the overall operation of the technology system". It is true that while big data technology has brought positive changes to society in terms of providing convenience, creating business value, reshaping the way of thinking and enhancing decision-making capabilities, its brutal growth and widespread use have also put the protection of citizens' privacy in an ethical dilemma. The ethical dilemma of privacy protection stems from the fact that the stakeholders involved in the life cycle of big data are too enthralled by the convenience of life and wealth creation brought about by technological changes, while neglecting the responsibility required in the overall operation of the technological system. To resolve the ethical dilemma of privacy protection in the era of big data, it is urgent to balance the responsibility ethics of stakeholders and promote the unity of rights and obligations. The ethics of responsibility is the ethics of people sharing the responsibility for human coexistence and coexistence, and is the ethics of the high-tech era that is oriented towards humanity as a whole and the future". In building an ethical code of responsibility for privacy protection, each stakeholder must reflect the reciprocity and balance of rights and obligations. All actors involved in the data lifecycle enjoy the rights and benefits brought by the development of big data technology, but must also assume the obligation to protect data security and citizens' privacy.<sup>[5]</sup>

## 5. Conclusion

As users of big data at the top of the chain of interests in the data life cycle, they can use data mining, data analysis and other complex statistical calculations to derive new connections and knowledge from massive amounts of data to create wealth, but they must also take responsibility for protecting citizens' privacy, improving decision-making capabilities, promoting social development and enhancing human well-being. The key to constructing an ethic of responsibility and promoting the unification of rights and obligations in the "pyramid" structure of data lies in transforming the chain of benefits of big data into a chain of responsibilities, and casting the ethical spirit of "whoever collects and uses the data bears responsibility" into the concrete actions of data collectors and users.

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