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**| RESEARCH ARTICLE**

## Analyzing the “Intrusiveness” and “Destructiveness” of Different Types of Game Cheating Programs

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**| ABSTRACT**

According to China’s criminal law, the production and sale of online game cheating programs are often charged of “providing special programs specially used for intruding into computer information system”. And they are also sometimes charged of “deliberately creates or propagates computer virus and other destructive programs”. Some types of game cheating programs such as “injection game cheating program” meet the criterion of “intruding into computer information system” in the Criminal Law, while other types of game cheating programs such as “offline game cheating program” do not. The “Destructiveness” of game cheating programs should be analyzed according to specific game cheating program and the legal interests it embodied in computer information systems. It should be determined on the basis of legislator’s intention, rather than directly use the criterion of evaluating the “destructiveness” of programs in computer science.

**| KEYWORDS**

Cybercrime, criminal industrial chain, game cheating programs, computer information systems.

**| ARTICLE INFORMATION**

**ACCEPTED:** 11 March 2024

**PUBLISHED:** 11 March 2024

**DOI:** 10.32996/ijlps.2024.6.2.3

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### 1. Introduction

#### 1.1 Research Background

According to China’s criminal law, the production and sale of online game cheating programs are often charged of [the crime of providing special programs or tools specially used for intruding into or illegally controlling computer information system programs and tools]. And they are also sometimes charged of “deliberately creates or propagates computer virus and other destructive programs which sabotage the normal operation of the computer system”, resulting in [the crime of damaging computer information systems].

#### 1.2 Literature Review

Some scholar believes that: “The game cheating programs is merely the modification of the original game program or the data transmitted by the original game, which is a modification of commercial application software. They don’t form the destruction of the functions of the computer information system and the data stored, processed or transmitted in the computer information system and the application programs” (Yin & Sun, 2022). It is true that some game cheating programs directly modify the data information of the player’s client, rather than directly modifying the data information of the game developer’s server. They work by transmitting the modified data information of the player’s client to the server, and the server merely processes the modified data and feeds it back to the client again. So, it seems that the server has not been “intruded”, and the computer information system of the game developer, whether hardware or software, has not been “intruded” either, just processing a modified data and returning it to the player.

### **1.3 Problem Statement and Objectives**

So, whether the game cheating programs “intrude” into the computer information system? Are game cheating programs “destructive programs”? If so, what components of the computer information system do the game cheating games intrude into? What components are damaged by the game cheating programs? This article holds that different types of game cheating programs have different “intrusiveness” for the computer information system of the game developer, and the degree of the directness of “intrusions” are different, so they should be discussed and held accountable by type and the specific game cheating programs. The “Destructiveness” of game cheating programs should be analyzed according to specific game cheating program and the legal interests it embodied in computer information systems. It should be determined on the basis of legislator’s intention, rather than directly use the criterion of evaluating the “destructiveness” of programs in computer science.

### **2. Relative Background Information in Computer Science: Principles of Interaction Between Client and Server in Online Games**

During the operation of the game, a set of interaction rules are formed between the server and the client, which are mainly defined by the game developer. Generally, the communication of Internet client/server mode adopts the TCP/IP communication protocol, which means that the data interaction between the server and the client in online games is usually realized through the transmission of IP data packets (Niu, 2018). When a player performs a certain game behavior, the client will send the game behavior request and parameters to the server through data packets in accordance with the interaction rules agreed with the server. After receiving the request, the server analyzes the request, and then feeds the information back to the client after processing. The client then analyzes the feedback information and displays it to players, forming an interactive closed loop.

### **3. Classification of Game Cheating Programs and the Operation Mechanism of Different Types of Game Cheating Programs**

According to the operation mechanism, game cheating programs can be divided into four categories: offline game cheating programs, packet-simulated game cheating programs, memory-modified game cheating programs and injection game cheating programs.

#### **3.1 Offline Game Cheating Program**

The offline game cheating programs are largely dependent on the leakage of confidential information from game developers. The source code of online games and the data communication format adopted by online games are very confidential to game developers. However, in the case of loopholes in security technology and omissions in the confidentiality work of employees, this confidential information may be leaked. After obtaining this confidential information, game cheating program developers can write offline game cheating programs.

The offline game cheating programs can make the third-party program take the place of the client and communicate and interact with the game server directly. This third-party program can simulate the data packets during the whole process of the game from account login to attack output. Even if the data packet transmitted from the server has been encrypted, the third-party program can simulate the encryption method of the data packet according to the leaked source code. Third party programs simulate data packets and then send the simulated data packet to the server. The server cannot determine whether these packets are sent by the client or third party programs. Even if the server has relevant verification technology, game cheating program developers can easily simulate the verification mechanism of the server according to the leaked source code, so that third-party programs can pass the verification. In the whole operation of offline game cheating programs, it is even totally no need to start the game client.

#### **3.2 Packet-simulated Game Cheating Program**

The packet-simulated game cheating programs mostly depends on the accurate analysis of game data packets. In general, game cheating program developers are required to have a good understanding of the development logic of online games. Without the online game source code and the data communication format adopted by the online game, the packet-simulated game cheating program developer adopts the method of “debugging + packet capture analysis” to capture and analyze some key data packets in the game. On this basis, the packet-simulated game cheating program simulate server to send data packets to the client, and simulate client to send data packets to the server, so as to achieve the purpose of modifying the game.

#### **3.3 Memory-modified Game Cheating Program**

Memory-modified game cheating programs do not require an understanding of the “commonness” of the running mode of all the game or the “particular property” of one specific game, but focuses on the computer system. Memory-modified game cheating programs do not depend on the mastery of game source code, data communication format and other relevant information, or even does not require game cheating program developers to have relevant knowledge of game development logic. Memory-modified game cheating program generally requires game cheating program developers to master the operation mechanism and system structure of the operating system, mainly the related knowledge of memory and kernel mechanism (Huang, 2017). In order to ensure the smooth operation of online games, game developers allow many data to be saved directly in the local memory of

the client, rather than in the server of the game developer. The data saved in the client's local memory is easy to modify, and the modification process does not need to involve the modification of the game developer's server. This is the reason why the memory-modified game cheating program is the most common game cheating program.

### ***3.4 Injection Game Cheating Program***

Injection game cheating programs are also known as specialized plug-in game cheating programs. Injection game cheating programs often have a high degree of specificity, specifically targeting at one game to implement cheating functions. The implementation of injection game cheating programs requires the use of plugins to inject functional modules into the game process space (Wang et al., 2023). After being injected into the game process space, the functional module can perform a HOOK operation, and through the HOOK operation, it can jump to the code written by the game cheating program author to perform the program written by the game cheating program author. In addition, some game cheating program authors may use various means to hide the injected modules, making it difficult to detect injected cheating.

## **4. Comparative Analysis of the "Intrusiveness" of Different Types of Game Cheating Programs into Computer Information Systems, as well as the Degree of "Intrusiveness"**

### ***4.1 Type of Game Cheating Program That do not Constitute "Intrusion" into Game Developers' Computer Information Systems: Offline Cheating Program***

The offline game cheating program does not have obvious "intrusion" into the computer information system of the game developer, but only uses third-party programs to achieve the simulation of the player's behavior and automatically carry out the game. Therefore, this article believes that the conviction of producers and sellers of "offline game cheating program" should focus more on the way which the game cheating program authors use to obtain game source code, rather than focus on the act of "intruding" into computer information systems. Because the vast majority of offline game cheating programs are based on the leakage of source code. Under the superficial phenomenon of offline game cheating programs, the crime of Article 219 of the Criminal Law [the crime of infringing trade secrets] may well be concealed. The source code of a game company is "secretive", "valuable" and "confidential", and conforms to the "three elements" of trade secrets recognized by law, representing the core competitiveness of Internet enterprises. Once the "source code" is disclosed, it will cause a destructive blow to the online game enterprise.

### ***4.2. Types of Game Cheating Program that Constitute Indirect "Intrusion" into the Computer Information System of Game Developers: Packet-simulated Game Cheating Program and Memory-modified Game Cheating Program***

By simulate server to send the data packets to the client and simulate server to send the data packets to the client, the packet-simulated game cheating programs modify the process of the game, to realize the illegal game advantage, which has in fact reached the effect of modifying the game. Although the simulated-package game cheating program has not directly "intruded" into the computer information system of the game developer, it has constituted indirect "intrusion". In particular, the act of simulate the server to send data packets to the client is no different from the effect of directly intruding into the computer information system of the game developer to modify the code in the system.

### ***4.3 Type of Game Cheating Program that Constitute Indirect "Intrusion" into the Computer Information System of Game Developers: Injection Game Cheating Program***

Injection game cheating program force the game to perform the code customized by the game cheating program author through injected modules and function plug-in, resulting in the direct modification of the game code. As the functions customized by the game cheating program authors can almost be said to be "totally follow their own inclinations", the injection game cheating programs can modify the game code to a amazingly large extent. Compared with other types of game cheating program, the injection game cheating program's functions are more diversified, the methods of modifying game codes are more flexible, and the impact on the game is more serious. Correspondingly, the threshold for injection game cheating program is also higher, and the technical requirements for game cheating program developers are higher. This shows that the injection game cheating program has caused a direct "intrusion" into the computer information system of the game developer.

## **5. The "Destructiveness" of Game Cheating Programs Should be Analyzed According to Specific game Cheating Program**

From the above analysis, we can see that some game cheating programs constitute direct or indirect "intrusion" into the computer information system of the game developer. However, if we want to determine whether a game cheating program is a "destructive program" in the [crime of destroying computer information system] or not, we cannot simply distinguish it from the type, but we should make a specific analysis of the specific game cheating program (Wu, 2021). With regard to game cheating programs, computer science and legal science must have different definitions of "destructive procedures". These two discourse systems can link with each other, but the discourse of computer science could not be transferred to the discourse system of legal science without any amendment. In computer science, perhaps some game cheating program does not constitute "destructiveness". The focus of computer science in making such a conclusion is that the functions of computer systems have not been damaged.

However, legal science emphasizes more from the perspective of legal interests and intention of legislators. From the perspective of legal interests, such game cheating programs may destroy the legal interests embodied in computer information systems by invading computer information systems. These legal interests include economic interests, brand value and technical security of the game developer. To determine whether a game cheating program is a “destructive program” or not, we should consider whether it infringes upon the economic interests, brand value and technical security of the game developer or not.

### **5.1 Economic Interests**

It should be noted that game companies obtain income through the sale of virtual goods and game currencies, and the degree to which specific game cheating programs weaken the profitability of game developers needs to be considered.

### **5.2 Brand Value**

The game cheating programs may damage the brand image of the game company, and other players may be angry at the existence of game cheating program users, which ultimately affects the user retention rate and reputation of the game company (Liu, 2022). For example, nearly three months after the online game “Battlefield 1” developed by an American online game developing company was released, the number of PC players of this online game fell from a maximum of 170,000 to 70,000 due to the rampant game cheating phenomenon. Therefore, it is necessary to consider the impact of specific game cheating programs on the brand reputation of game developers.

### **5.3 Technical Security of the Game Developer**

As for the technical security level, some types of game cheating programs rely on the modification of game programs, which may lead to security loopholes in the game, thus endangering the personal information security and account security of players. Therefore, the impact of specific game cheating programs on the technical security of online games should also be considered.

These three types of “destruction” are not owned by specific types of game cheating programs, but are determined by the scope of dissemination and code model of specific game cheating program. In the judicial process, they should be judged in combination with the appraisal reports provided by professional and technical personnel.

## **6. The Rampant Criminal Industrial Chain of “Invasive” and “Destructive” Game Cheating Programs Forms Great Challenge to the “Humility” of Criminal Law**

From the above analysis, this article carries out the conclusion that some types of online game cheating programs constitute “intrusion” into computer information systems, and some specific online game cheating programs belong to “destructive programs”. However, by this standard, there are indeed too many game cheating programs suspected of committing crimes, which pose a challenge to the humility of the criminal law, which is a core attribute of the criminal law.

For a long time, there has been great controversy over the conviction of the act of creating and selling online game cheating programs. The key controversy is that online games have great particularity, for they have both the attribute of entertainment and the attribute of commerce and seriousness, which two sides form the complex attribute of game cheating programs. Because of the complex attribute of online games, online game cheating behavior has fallen into “gray area”, and it is difficult for the criminal law to determine a criterion for “to be strict or to be loose”. In addition, through the above analysis, it is not difficult to discover another reason, that is, different game cheating programs have different operating mechanisms, different degree of bad affects, different degree of “intrusiveness” and different degree of “destructiveness”, which should not be treat indiscriminately.

From the perspective of the attribute of entertainment of the online games, in some cases, the small-scale dissemination of game cheating programs and the use of game cheating programs by players to “entertain themselves”, without affecting others. It seems that in those cases, there is no need to blame them too strictly (Zhang, 2023).

From the perspective of the commercial and serious nature of the game, in other circumstances, some game cheating programs are considerably “destructive” in terms of economic interests, brand value and technical security. And the social harmfulness of some production and sale of game cheating programs should not be underestimated. Serious acts of creating and selling game cheating programs need to be imposed sanction against in accordance with the Criminal Law. Online game life has become an extension of the real world life and a part of people’s real life. As of June 2023, the number of game users in China is 668 million (Wang, 2023). Players interact in the network, and the standard of online game life is also an important factor affecting the happiness index of Internet users. E-sports has become a new profession. In 2023, the number of Chinese e-sports users is estimated to reach 478 million (Penguin Youdiao, 2023). And ensuring fairness and justice in the e-sports professional circle is also a necessary measure to guard this emerging industry. Therefore, under certain circumstances, online games can no longer be regarded simply as personal entertainment and recreation.

The seriousness of online games is also reflected in the establishment of China's international image. Online games with global service area have become a channel for many foreign players to communicate with Chinese players in the game community to have a general understanding of China. However, due to common use of game cheating programs by Chinese players, some foreign players have formed the stereotype of "Cheat to win" for Chinese players, and even have the extreme stereotype of "low moral quality" for all Chinese people. The online game "PUBG", developed by South Korean game developers, has a global player population of 30 million, of which 46% are Chinese players. According to the data published by BattlEye, the provider of anti-cheating technology for PUBG, 99% of the accounts of PUBG players banned due to cheating are from China. As a matter of fact, the main reason for Chinese cheating programs are so rampant consist in that: in China, the criminal industrial chain for the production and sale of game cheating programs is too mature, and it is too convenient for Chinese players to obtain game cheating programs.

In an era of increasingly fierce competition, in China with a large population, some citizens tend not to enjoy the labor process anymore, but to obtain the results by whatever means, thus breeding a series of illegal and criminal acts. The Internet world is an extension of the real world. In online games, some citizens are also more inclined to show forged strength to meet their vanity than to enjoy the happiness brought by the game process. Users of game cheating programs often use them in order to quickly obtain virtual objects, virtual currencies or honors in the game. This mentality of pursuing short-term interests reflects a social ethos of pursuing ostentatious vanity, lacking recognition of the values of achieving success and happiness through genuine efforts and skills. Undoubtedly, the rampant use of game cheating programs has fostered a social atmosphere of vicious competition and eager for quick success and instant benefits.

From this we can see that totally not using the criminal law to impose sanction against the online game cheating program will lead to rampant illegal acts in the "gray area", resulting in huge commercial and social consequences. However, it is also unreasonable to punish all online game cheating programs by the criminal law, which violates the "humility" of the criminal law. This article holds that the specific cheating programs should be dealt with in light of the degree of "destructiveness" of economic interests, brand value and technical safety. On in this way can punishment genuinely adapted to crime.

## **7. Conclusion**

### ***7.1 Summary of Viewpoints and Research Methods in this Article***

This article solves legal dilemma by focusing on technical issues, starting from the principles of computer science and analyzing the operating principles of different types of game cheating programs. It reveals the different legal responsibilities corresponding to the production and sale of different types of online game cheating programs. This article constructs a bridge between the two discourse systems of legal science and computer science at the intersection of online game cheating programs. These two discourse systems can link with each other, but the discourse of computer science could not be transferred to the discourse system of legal science without any amendment. It should be determined on the basis of legislator's intention, rather than directly use the criterion in computer science. At the same time, this article further elucidates the reasons why it is difficult to convict the production and sale of online game cheating programs, through the analysis of the entertainment, seriousness and commercialization of online games and game cheating programs.

### ***7.2 Future Outlook Suggestions***

#### ***7.2.1 Legislative Proposals***

In view of the complex nature of online games and the increasingly important position of online game life in citizen's life, coupled with the rise of the Esports professional circle, there is great need to legislate separately on the issue of online game cheating programs. It is necessary to elucidate the crimes committed by different types of online game cheating programs. And what should be specifically point out is that whether specific types of online game cheating programs belong to the reference of "etc" in specific legal provisions respectively.

#### ***7.2.2 Judicial Advice***

In the judicial process, attention should be paid to hiring professionals to make appraisal reports on the types and operating mechanisms of specific game cheating programs, so as to make specific analysis of specific cases, rather than "one size fits all". Just as in the first national criminal case of game cheating programs of the online game "Glory of King", the case-handling personnel have such a conclusion after handing the case: "The case-handling personnel are skillful in the law, but sometimes they are unable to deal with technical problems. So they should make good use of the wisdom of others and gather professionals to assist in handling cases" (Wu, 2018).

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

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