

# *The Ethical Dilemmas of Virtual Reality Application in Entertainment*

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**Abstract**—The emergence of virtual reality technology enriches people's entertainment life. In the virtual world, we can have a full immersion of sensory experience in shopping, traveling, playing games and watching movies. However, just the same as many other human-computer interaction technologies, the use of virtual reality also leads to various issues in security and privacy, further brings ethical issues, which are derived from the process of interaction between users and virtual reality devices. It has not yet been extensively examined. The aim of this paper is to focus on the ethics of virtual reality application, especially in entertainment. We will first introduce the history and its application of virtual reality in entertainment. Then we analyze the ethical dilemmas of virtual reality application in entertainment, and give some useful advice to deal with them. Our results will provide meaning implications for practice and academic.

**Keywords**—Virtual Reality; Entertainment application; Ethical Dilemma;

## I. INTRODUCTION

Virtual Reality (VR), which means an artificial virtual scene, is in contrast to the meaning of normal reality [1]. It is produced by computer simulation system that simulates realistic scene to provide convenience for people to experience and learn in the virtual world. As a human-computer interaction technology, VR uses many kinds of technologies in the field of computer, such as voice input/output, motion sensing, network communication, 3D simulation of computer graphics, and wide-angle stereo display technology. The application fields of virtual reality technology are gradually expanding, including but not limited to entertainment, education, medicine, military and interior architecture [2].

VR entertainment applications mainly include games [3], movies, online shopping, living and travel. With the development of VR technology, it will be used in other new industries, such as advertising. The development of VR entertainment is not plain sailing, which has experienced the stages of germination, doldrums and explosion. The history of VR technology can be traced back to long time ago [4]. In 1930s, the novelist Stanley G. Weinbaum had imagined a kind of glasses that use senses of touch, smell, sight to produce all-round immersive experience. This is considered to be the first occurrence of the concept of VR in human beings [5]. In 1960s, the first head-mounted display device called Sutherland was

born [5]. Although it is difficult to put on Sutherland because it needs to build support bar, it provides a possibility for the birth of VR technology. Over the next 40 years, the development of VR technology has grown very slowly, until Facebook announced the acquisition of Oculus, a VR equipment manufacturer, and launched a new VR goggles Rift. Soon, SONY, Google and Microsoft have entered the field of VR as well. VR gains attention again. In 2016, varieties of VR devices are available, even Taobao announced a new way of shopping, named Buy+, by applying VR technology.

VR products in entertainment are popular with consumers this year, and millions of people in the world are using them. However, during the human-computer interaction between user and VR devices lots of challenges occur, including security, privacy and trust [6]. There is no doubt that the appearance of VR products will bring some ethical dilemmas. Ethical dilemmas of VR in entertainment can be described as some ethical problems, which are caused by the use of VR devices and violate moral principles and ethics. The ethical dilemmas of VR get attention from scientists in fields of computer science and philosophy. For example, in [7], the authors thought plasticity in the human mind can have a potential for deep behavioral manipulation and lasting effect on users' life, so, they called for a code of conduct for virtual reality. Although they did not provide such code, their work underpins the necessity of researching ethics in VR. In our paper, we will research the ethical problems in VR entertainment, which are caused by the interaction between people and VR devices. Meanwhile, we will put forward some advice as a reference for the formation of codes of ethics in VR products.

The rest of the paper is organized as follows. In Section II, we briefly describe some related work and our research field. In Section III, we present the ethical dilemmas of VR in the entertainment application from four aspects. In Section IV, corresponding solutions for the ethical problems are proposed. Finally, the paper is concluded in Section V.

## II. RELATED WORK AND RESEARCH FIELD

With the development of computer science in many new fields, various ethical problems have emerged. For example, the ethics of artificial intelligence has been discussed in [8][9]. Especially, the fact that the robotics may cause crimes and how to make punishments to their manipulator have discussed in

[10]. The privacy disclosure caused by big data technology also attracts widely attention [11]. These studies all can provide some ideas to our research.

The research field of this paper belongs to human-computer interaction ethics. It is an interdisciplinary research which combines software engineering with psychology and other subjects.

### III. ETHICAL DILEMMAS

The emergence of VR technology has enriched people's entertainment and gives people better sensory experiences, but the essence that the virtual world is different from the real world makes a series of ethical problems emerge, such as ethics in the aspect of morality, mentality, responsibility and human rights. The following Fig. 1 is an overview of these ethical problems.

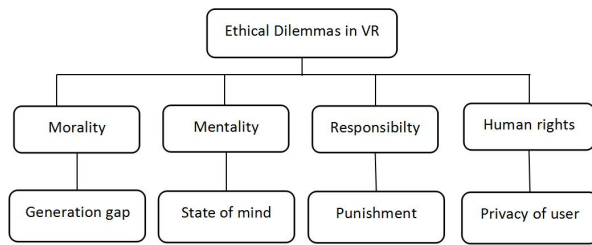


Fig. 1. Ethical dilemmas in the entertainment of VR

In the following, we will explain these ethical dilemmas in detail.

#### A. Ethics in the aspect of morality

Ethics in the aspect of morality, which first appeared on a Chinese newspaper called VR Daily [12], can be explained as a phenomenon: because the users immerse in the VR games, they have less time to communicate with family members. Thus, they are unfamiliar with each other gradually; a generation gap forms between them.

The all-around immersive sensory experience brought by VR entertainment equipment becomes a highlight to attract users and lets people be addicted to it, which makes individuals in the environment of games lack communication with the real world [12]. From the point of view of psychology, this kind of isolated environment easily causes autism, indifferent to people and things beside himself, even counterproductive and resentment to the real world. Nevertheless, human beings live in family groups, this kind of environment in games hinders us improving our communication skills, and it is not conducive to promote emotion between family members. Just similar to the present situation that people are addicted to smartphones, our concern for VR applications is not nonsense. With the emergence of VR, shopping, travel, movies, games and other necessary activities can be easily completed in the virtual environment without interaction with others. In the long run, the user will gradually be used to staying in the virtual world that lead to teenagers miss a lot of experience in the realistic social environment, thus they have the risk to become more extremalization in personality.

#### B. Ethics in the aspect of mentality

Ethics in the aspect of mentality, which also first appears on the newspaper of VR Daily [12], refers to a bad mental condition, which generates in the virtual world. It affects user's state of mind to change, and in turn is brought into the real world to affect users' behaviors in life.

Virtual world created by VR can produce an illusion - just as if you were in the reality- that also makes a big risk of ethics in spirit [13]. In the virtual space, values, such as loyalty and filial piety that built on the fundamental of the traditional interpersonal relationship, may be deconstructed and overthrown. When traditional cognitive mode and the truth standard are affected by the information flows of the virtual world, people's ways of thinking and thinking ability may change. Virtual environment affects the behaviors of human being in the real world, and it even produces some acute behaviors. This phenomenon is called Proteus Effect [14]. Proteus effect is a psychological term and turns into a new perspective to research the social environment of VR in recent years.

Because the virtual world created by VR devices are specified by the subjects according to certain audio and visual senses, there is a possibility of manipulation [12]. Virtual world easily becomes tools that some institutions or organizations use to achieve their wills or seek illegal interests. When individual psychology affected by virtual environment is taken back to the real world, it is likely to result in cognitive restructuring. Especially, if the content of the virtual world involves violence or crime, we need to raise our vigilance much more. At present, the main VR products in the VR entertainment market are games, and most of the content of VR games are shooting and fighting. When a person is constantly immersed in the virtual experience of violence, the virtual experience will put the game's negative behavior into reality and causes damage to the main players, especially teenagers.

#### C. Ethics in the aspect of responsibility

Ethics in the aspect of responsibility means conviction and punishment because the behavior of the user in the virtual world makes damages to the people or things in the reality. Since this is a new application domain of technology, the relevant laws and regulations are rare.

The current bottleneck of VR technology is the humanization of wearable devices and the popularisation of market prices. Once long-term market outlook and the commercial value of VR technology are discovered, we will quickly realize the connection between "Internet of humans" and "Internet of things". Someday, VR games evolve to a new level, then users can acquire the control ability of real machine tools through artificial intelligent machines [15] to operate objects in the real world. When this kind of technology that the real world operates the virtual world through the network is mature, we are equivalent to create a physical world again.

In the physical world including "Internet of Humans" and "Internet of Things", many new types of crimes appear, so the corresponding punishment also needs to redefine. For example, a man has a double who is operated through VR and commits a crime in another city. How should we sentence them?

Is the relationship between the man and the double belongs to an individual or two different individuals? How much responsibility should the man assume? If the double of the man crimes in another country, which country's law should we employ to punish the man? If the man is male in the real world, but he chooses to be female in the virtual world and rapes a woman, it may cause the current law improperly [16].

#### D. Ethics in the aspect of human rights

Ethics in the aspect of human rights mainly refers to the personal privacy due to the use of VR equipment. Each VR device is a data collection terminal, and numerous data may eventually become valuable business model, then personal privacy is disclosed inevitably. The boundary of the privacy is not distinct, but the personal information is valuable. The abuse problem of privacy in big data is a lesson, from which we should learn.

### IV. DISCUSSION AND SUGGESTIONS

The birth of a new technology will come along with potential risks. In order to make the VR technology serve human better, we must try to avoid its negative effects and inject correct values into it to establish a peaceful virtual environment. For the above ethical dilemmas, we suggest some solutions from the following several aspects.

#### A. Moral autonomy

Moral self-discipline means correct values. These mandatory rules can be maintained through social public opinion, education and inner conviction. We need work together to build a good public VR environment. The users of VR entertainment are mainly young people who tend to be tempted to produce wrong ethical and moral tendency due to the limited experience. Sometimes, these errors about ethical and moral tendency are brought into the real world, which will destroy the ethical and moral standards in real life. Therefore, we must intensify propaganda of ethics and morality in the process of education for teenagers, to help them set up the correct values gradually and thus form the moral self-discipline.

#### B. Informed consent

Informed consent [17] means prompting users when they enter and exit the VR environments to avoid confusing the virtual and real world. Due to the plasticity of the human mind, this is a very necessary measure to tell them while they leave the VR environments so that they can avoid bringing some negative emotions into the real world.

#### C. Governmental censorship for authorization

Each kind of technology has to undergo a process of test by market before it is received. In the process, if we just rely on market, we can't solve a series of ethical issues in VR entertainment. So, government needs to strengthen supervision at this time, uses the laws and regulations to normalize VR entertainment industry [18]. In particular, we should set barriers to restrict the entry in the VR industry and formulate a series of policies and regulations. As VR applications in entertainment are mainly in games, movies, we can set up corresponding departments to review the content of them. Only the VR entertainment products that successfully pass review and acquire authorization can appear in market. Accordingly,

we establish incentive mechanisms to award those people who report unauthorized products for sale.

#### D. Legislation for punishment

Legislation is a mandatory measure to assure that we have enough ability to cope with uncertainty caused by VR products. The contents of legislation can be considered from three aspects. The first part should be directed against manufacturers who produce VR game with violence or eroticism and escape from governmental censorship for authorization to sell VR goods. The second is aimed at those criminals who use VR technology to produce specific criminal behaviors, which will be prescribed and given corresponding punishment. The third is that we should limit the user's age to avoid teenagers exposure to adult's world too early.

### V. CONCLUSION

In this paper, we research the human-computer interaction ethics in VR entertainment, which arises with the application of VR products in recent years. We discuss the ethical dilemmas in VR and provide the corresponding solutions, which are summarized as four main aspects in the following Table 1. The options ticked in the table stand for the corresponding suggestion of an ethical dilemma.

TABLE I. SUMMARY FOR ETHICS OF VR IN EHTERTAINMENTS

Suggestions	Ethical dilemmas			
	<i>Morality</i>	<i>Mentality</i>	<i>Responsibility</i>	<i>Human rights</i>
Moral autonomy	√			
Informed consent		√		
Governmental censorship for authorization			√	
Legislation for punishment				√

In this paper, our contribution is to give some solutions and suggestions for those ethical dilemmas to make VR technology serve us better. However, we must acknowledge that our work is just preliminary; there are lot of room to do research in this field.

First, VR technology develops rapidly and attracts well-known internet companies to invest a lot of manpower and material resources. Its existence has huge market value. However, how to make good use of the double-edged sword is a long topic, which requires us to explore. The novel immersive sensory experiences VR brings attract the attention of users. Meanwhile, it also causes ethical dilemmas. We should see the positive side of VR technology, and try to avoid the disadvantages it brings. The key lies in how to use this technology well. For example, with the improvement of the relevant policies and regulations, violent and pornographic content in VR will never be contained in the movies. We can produce more thought-provoking, meaningful, educational content to resonate with audience. Second, the experiences VR

brings is close related to the psychology of human beings. So, we will investigate the appropriate users who use VR products to learn the real cognitive issues they face, and analyze the impact of individual differences of attributes on their cognition in VR by the method of empirical software engineering. Thus, we can get the fully information about the application of VR.

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