

# "Excesses of Design" and the Moral Dilemma — Ethical Issues in the Design of Intelligent Vehicles

Jiating Xiong<sup>1</sup>, Yu Jin<sup>2</sup>

<sup>1,2</sup> School of Creative Design, Guangdong University of Science and Technology, Dongguan 523900, China

<sup>2</sup>Corresponding author.

## ABSTRACT

The phenomenon of "excesses of design" has led to the emergence of ethical and moral problems in the field of intelligent vehicles. This paper describes the basic meaning of "excesses of design" and its manifestation in the field of intelligent vehicles. The paper discusses the problems caused by the phenomenon of "excesses of design" in the field of intelligent vehicles from the ethical level of social moral norms, man and man, man and society, and man and nature, and finally puts forward a holistic and harmonious view of design through the relationship between the user-enterprise-nature, in pursuit of the optimisation of the overall interests of the user, the enterprise, and the environment, and the optimisation of the overall interests of the user, the enterprise, and the environment, as long as the elements of design are appropriate. The design of the various elements of the design can be moderated as long as it is appropriate to alleviate the problem.

**Keywords:** Over-design, Ethics, Smart cars, Design.

## 1. INTRODUCTION

Under the wave of the new round of scientific and technological revolution, as an important carrier for the integrated application of advanced technologies in automotive and related fields, intelligent vehicles based on network connectivity have become a strategic high point representing the future development trend of automotive technology and the direction of industrial upgrading[1]. That is to say, intelligent car is one of the representatives of technical artefacts of today's human society. China's intelligent car is now mainly in the early stage of development, L1 level and L2 level cars have achieved practicality and marketability; L3 level in the market is currently only a few can achieve, while L4, L5 level because of technical limitations did not form a market[2]. In the development stage of intelligent vehicles, it has been found that the development of intelligent vehicles is facing a large number of "design faults", which is contrary to the nature of design, and this has also triggered a series of design ethical issues that require designers to reflect on.

## 2. WHAT IS "DESIGN FAULT"? — OVER-DESIGN

To understand what the "excesses of design" are, we must first understand what "design" is, Baidu encyclopaedia defines design as the process of communicating a vision through rational planning, careful planning, and through a variety of sensory forms[3]. The emphasis here is on design that is rational and well thought out. Kenya Hara, a Japanese mid-career international graphic design master, expresses his understanding of design in his book *Design in Design*: design is the ability to feel and insight that captures the essence of things[4]. Here he emphasised that design is feeling and insight into the essence of things. Professor Li Yanzu has suggested that design is the means and way for people to satisfy their needs in life[5]. Here the concept of human needs is emphasised. In summary, we can find that design itself is a process. In quality management, "process" is defined as a set of interrelated or interacting activities that use inputs to achieve a desired result[6]. In other words, a process is a series of related activities to achieve a target result. Is it possible to "overdo" the process of achieving a certain outcome? The process nature of design itself also suggests that design can be

Over-designed. "Over-design" in "Over-design" means "excesses", which can also be interpreted as "over-design". It can also be interpreted as "over-design". Over-design refers to "design for the sake of design", in which designers magnify the needs of the user and put the user experience at the forefront of their design, resulting in a decrease in the usability of the product. The reason for this phenomenon is that in China today, in the context of growing economic affluence, the public has gradually developed an obsessive pursuit of luxury. "This contemporary Chinese consumer fashion, unlike what was done in the West during the period of affluence, is not dedicated to the improvement of the quality of life, but rather manifests itself as a numb, irrational, physiologically vengeful extension of the spirit of Ah Q through the squandering and wastefulness of wealth"[7], and this adherence to the values of anthropocentrism and materialism is bound to cause production and consumption to exceed what the environment can bear. In Design for the Real World, Babanak advocates designing for "needs" rather than "wants"[8]. Over-design is in line with the latter statement, that is, the phenomenon of excesses of design lies in the amplification of human "wants" in design.

### **3. THE SMART CAR SECTOR — THE EMERGENCE OF DESIGN ETHICS ISSUES**

Intelligent vehicles first appeared in the mission statement of the Strategic Computing Initiative developed by the United States Department of Defense Advanced Research Projects Agency in the 1980s. The so-called intelligent car is simply a car controlled by information technology and intelligent control technology in a network environment, so that the car has advanced functions such as automatic road recognition, automatic driving, automatic speed regulation, etc.[9]. The definition of intelligent car emphasises its advanced functions. And function is defined as an attribute of an object that can satisfy a certain need. From the design point of view, function as the core of the product design process is to meet the user's needs, and its essence is function[10]. With the high-speed development of intelligent vehicles and the user from the "demand" to "desire" in the background, the design concept has also changed accordingly, automotive designers began to design for design, design for consumption. Its main feature is reflected in the functional design of intelligent cars. As far as the smart cars on the market are

concerned, many brands are playing a variety of new functional gimmicks to attract users. For example, the control integration of intelligent cars, designers will be the car's original physical buttons are through a screen, through the interaction of the hand and the screen to complete some of the commands on the intelligent car, and this interaction with the user's traditional mode of operation is very different, which will lead to the user in some cases to produce misuse as well as equipment failure can not be operated when the problem. For example, intelligent cars incorporate a large number of entertainment devices, the cockpit of the driver's seat and the passenger seat can be equipped with up to three screens, and even the back row will be equipped with a screen, to a certain extent, this meets the user's comfort experience, while weakening the negative impact that these entertainment systems may have on the driver. There are also smart cars that have changed their physical mirrors to electronic mirrors, the pros and cons of which are debatable in terms of design cost, design practicality and design safety. These Over-design phenomena are still common in smart cars, and the reason for this is that designers' design focus is excesses of design on intelligence, and they hope to reduce or avoid human operation through advanced technology, while ignoring the original design of the user's hierarchical needs. The famous psychologist Maslow divided human needs from low to high into physiological needs, safety needs, social needs, respect needs and self-actualisation needs, and pointed out that when a person's needs at a lower level are relatively satisfied, he will be committed to achieving the satisfaction of the next level of needs[11]. Therefore, the phenomenon of "excesses of design" has aroused the dissatisfaction of some consumers and the emergence of related ethical problems.

### **4. ETHICAL ISSUES IN INTELLIGENT VEHICLES — AN EXPLORATION BETWEEN MAN, SOCIETY AND NATURE**

Before exploring the ethical issues arising from the "excesses of design" of smart cars, we must first understand what ethics is. Ethics, according to scholars of ethics, is a kind of moral norms to balance the interests of various social relations, through which ethics can reasonably regulate and maintain the relationship between people, between people and society, and between people and nature[12]. In Chinese traditional culture, "Shangshu - Zhouzhong - Travelling Mastiff" "does

not serve the ear, Baidu but chastity, playing with people lose morality, play with things lose their will"; Taoism put forward "not to body fake things", "not to things frustrated"; Laozi proposed that "less yields more, while more leads to confusion"; Zhuangzi advocated that "simplicity and plainness are the ultimate beauty, with which nothing in the world can contend"; Mozi put forward the principle of "taking appropriateness as the standard"; and Mencius stated that "without the compass and square, one cannot form squares and circles." These traditional ideas all reflect that design requires a reasonable and appropriate sense of scale and regulation, and that excess should be avoided. Thus, in design, moderation is emphasized as the proper approach. Western modernist architect Mies van der Rohe advocates "less is more", and clothing designer Ma can "clothes to carry the road, useless" concept interprets the Zhuangzi's simple aesthetics. It is easy to see that both Chinese and Western social and ethical norms have, to a certain extent, criticised the phenomenon of "excesses of design". Then, from the analysis of the ethical relationship between the three layers, we can get that the "excesses of design" of smart cars have triggered a series of ethical problems.

## **4.1 Human-to-Human**

### **4.1.1 Privacy Protection Issues**

As smart cars integrate sensors such as cameras, LIDAR, millimetre-wave radar and other sensors inside and outside the car, and are equipped with Internet connectivity features, they may generate problems such as privacy leakage and geographic information leakage. Currently, the smart cars of many car companies, such as Azera, Xiaopeng, BYD, etc., are equipped with in-vehicle cameras, which are usually arranged above the rearview mirror in the car, and most of them are used to monitor the fatigue state of the driver for prompting, but there is no guarantee that they will turn on the monitoring of the passengers and disclose important information without the knowledge of the driver[13]. And most of the in-vehicle cameras here are mainly to monitor the driver's fatigue status rather than to provide road information for the intelligent vehicle's automatic driving, which contradicts with the definition of intelligent vehicle. In the near future, when the intelligent vehicle achieves the L5 level of automatic driving level, without the driver's operation, such a function is a trade-off that the designers need to consider in the design process.

### **4.1.2 The Issue of Division of Responsibilities**

As we all know, intelligent vehicles are still in the early stage of development, and automatic driving technology is still immature. Consumers are often unable to properly understand and grasp how to use intelligent driving functions and what requirements should be complied with in the process of using them. Over-design" phenomenon exists in the publicity of some manufacturers, over-exaggerating the production of vehicles with "fully automatic driving" function or "automatic driving system", but in fact only L2 level assisted driving function. In fact, only L2 level assisted driving function, which will lead to consumers' misunderstanding of the functions of the car. This situation will lead to the problem of responsibility division; the manufacturer thinks that the consumer has made a mistake in operation, and the consumer thinks that the manufacturer has exaggerated the promotion, thus leading to accidents.

## **4.2 Between People and Society**

### **4.2.1 Fairness Issues**

The technical foundation of Chinese autonomous enterprises is relatively weak, resulting in China's unmanned vehicles still lack of core technology in sensor perception, control decision-making, etc. In weather conditions such as rain, snow, haze[14], camera capturing image ability, radar sensing ability are declining, and then can not make accurate judgement, and foreign suppliers in the automatic driving industry in certain technology maturity and market acceptance is better than the domestic, especially in the LIDAR, computer vision and automobile manufacturing technology[15]. It is not difficult to find that foreign intelligent vehicle brands are obviously leading in intelligent technology, while domestic intelligent vehicle brands still rely on imported core technology, and then continue to add on functions to exacerbate the phenomenon of "excesses of design", which also triggers the problem of uneven development of intelligent vehicles at home and abroad. This has also led to the problem of uneven development of domestic and foreign smart cars, which in turn has led to the problem of fairness for consumers in the process of using smart cars.

#### 4.2.2 *Employment Impact Issues*

The emergence of "excesses of design" in smart cars also raises the social issue of employment impact. The number of domestic R&D teams engaged in autonomous driving has exceeded that of the United States, but still relies mainly on the introduction of overseas channels. The training mechanism of domestic autonomous driving AI talents is still backward, unable to adapt to the speed of the development of the autonomous driving industry[16]. The maturity of the self-driving function also means that a large number of drivers will be at risk of losing their jobs. This will inevitably affect the stability of society.

### 4.3 *Between Man and Nature*

#### 4.3.1 *Environmental Impact Issues*

Currently, smart cars rely on battery technology to provide energy. Compared with conventional cars, electric smart cars consume more energy and emit 30%-50% more greenhouse gases during the production process, mainly due to the production of batteries, and charging and use also affect the size of emissions[17]. In the domestic smart car market, a large number of smart car makers use large-capacity batteries to achieve a high range of standards, and this is precisely the "design of" phenomenon. This practice is the phenomenon of "design", large-capacity batteries are bound to produce a large amount of pollution in the production process, which is also a typical "pseudo-green" design[18]. The term "pseudo-green" design refers to the practice of the so-called "green" design by designers. At the beginning of the design conception, the designers or design teams only focus on the concept of "green" design for the current product. At the beginning of the design concept, the designers or design teams only focus on the concept of "green" design for the current end-users of the products, but not from the perspective of the entire product life cycle to consider the issue of "green" design, so that the designed products in the future recycling or reuse process will cause pollution and damage to the environment. As far as the current situation is concerned, designers are trying to increase the range by increasing the battery capacity, but it is better to reduce the power consumption per mile travelled through design without changing the battery capacity, so as to get more range.

#### 4.3.2 *Resource Consumption Issues*

The development of smart cars means that there will be a large number of traditional cars eliminated in the later stage, and the elimination of these traditional cars will produce a large amount of waste of resources, and the reuse of these resources is also a difficult problem to be solved at the current technological level, so smart cars are really environmentally friendly? In the face of this problem, modern designers are still mired in the fog of "excesses of design". The development of smart cars cannot be separated from the maturity of electronic technology, and the development of electronic technology requires the support of resources. Unlike traditional cars that use common metal resources, smart cars need to use a lot of rare earths and scarce resources, which will undoubtedly bring pressure on resources.

## 5. **A MODERATED APPROACH TO THE ETHICAL PROBLEMS OF SMART CARS — "MODERATION" FOR USERS, BUSINESSES, AND THE ENVIRONMENT**

To alleviate the ethical problems of intelligent automobile under the phenomenon of "excesses of design", it is necessary to firstly understand the concept opposite to the phenomenon of "excesses of design", and the concept of moderate design is proposed to address the current phenomenon of "excesses of design". Moderate design is proposed for the current phenomenon of "excesses of design", but it is not limited to solving the problem of "excesses of design". Moderate design advocates a holistic and harmonious view of design, and pursues the optimisation of the overall interests of users, enterprises and the environment, as long as the various elements of the design are moderately good. So what kind of "degree" should be grasped to alleviate this kind of ethical problems among users, enterprises and the environment.

First of all, for the users; Gandhi said: "The earth can satisfy human needs, but it cannot satisfy human greed". Demand is endless, with the development of productive forces, human beings, after satisfying the basic physiological and safety needs, have higher requirements for life and desire to have more material wealth. And irrational demand is a kind of value that is not in line with social ethics and morality, it makes the product design become a tool for people to show off,

comparison, enjoyment, resulting in showy consumption, profligate consumption, corrupt consumption, greatly corrupting the social atmosphere, catalysing and intensifying social conflicts, is not conducive to the harmonious development of society. Therefore, users should avoid the generation of irrational demand, in order to promote the healthy, civilised and harmonious development of society.

Secondly, for the intelligent vehicle enterprises; the purpose of the enterprise is to pursue profit maximisation, so it will often make the vehicle design appear in order to stimulate the consumption of the vehicle. Over-design, the use of consumer's comparison, vanity mentality to design intelligent vehicles beyond the actual demand, forcing consumers to buy, which requires through the enterprise designers through the appearance of commercial design, through the perspective of the design of the discernment, to go through the hypothetical way. This requires corporate designers to look beyond the surface of commercial design, through the lens of discursive design, to explore the possibilities of the technology before it has a material impact[19]. The shift from "moral spectatorship" to "responsibility" will provide a suitable reference for the company's own design.

Finally for the environment, the environment needs the joint action of users and enterprises to change, the relationship between users and the environment and enterprises and the environment is actually similar, for users and enterprises, on the one hand, they need to continuously obtain resources from the environment in order to seek development, on the other hand, the over-utilisation of the environment will threaten the long-term survival and development of human beings. Therefore, the overall effect will be optimised only if we are impartial and appropriately satisfied.

## 6. CONCLUSION

In summary, intelligent vehicles as an important product of technological progress and industrial upgrading, play a significant role in improving travel efficiency, optimizing driving experience, and promoting the intelligent development of transportation. However, in the process of rapid development, the phenomenon of "excesses of design" has gradually exposed a series of ethical issues, including privacy and security risks, unclear division of responsibility, social inequality, employment impacts, environmental pollution, and resource consumption. These issues indicate that

intelligent vehicle design should not merely pursue the accumulation of technical functions and the satisfaction of user desires, but should return to the essence of design serving genuine needs.

Therefore, in response to the ethical dilemmas in the design of intelligent vehicles, designers, enterprises, and users should all establish an awareness of moderate design. Designers should seek a balance between technological innovation and ethical responsibility, avoiding blind design driven solely by intelligence, entertainment, and commercialization. Enterprises should assume social responsibility, paying attention to public safety, environmental protection, and social fairness while pursuing economic benefits. Users should also view the functions of intelligent vehicles rationally and avoid allowing irrational consumer demands to further promote excessive design. Only by establishing a more coordinated relationship among users, enterprises, and the natural environment can the design of intelligent vehicles move from "functional expansion" toward "value balance," thereby achieving a positive unity among technological development, social ethics, and ecological sustainability.

## ACKNOWLEDGMENTS

This project is funded by the 2025 Guangdong University of Science and Technology "Quality Engineering" project. Project Title: Teaching Reform and Practice of the Course "Creative Thinking and Methods in Design" Based on the STEAM Concept from the Perspective of New Quality Productive Forces. Project Number: GKZLGC2025223.

## REFERENCES

- [1] Wang Minghe. Research on China's new energy vehicle industry policy [D]. Jilin University, 2023.
- [2] Ren Yi, Zhou Mengfei. Introduction to the status quo and development of intelligent vehicles in China[J]. Automobile Practical Technology, 2020, 45(23): 23-26.
- [3] Zhu Jiang. Teaching Reference and Practical Experience of Modern Design System--A Review of World History of Modern Design (Second Edition)[J]. Chinese Journal of Education, 2019(10): 130.

- [4] Kenya Hara. Design in Design [M]. Shandong: Shandong People's Publishing House, 2006:237.
- [5] Li Yanzu. From Utilitarianism to Ethics: The Realm and Philosophical Way of Design Art[J]. Literature and Art Research,2005(10):100-109+168.
- [6] Liu Shaolang. Research and Optimisation of the Relationship between Duration and Cost under Design Institute-led EPC Model [D]. South China University of Technology,2021.
- [7] Hangma. Goodwill by Design [M]. Guangxi: Guangxi Normal University Press, 2011:8.
- [8] Victor Babanak Green Laws [M]. Beijing: CITIC Publishing House, 2012:13.
- [9] Editorial Board of the Chinese Journal of Highways. A review of academic research on automotive engineering in China-2023[J]. Chinese Journal of Highway, 2023,36(11):30-60.
- [10] Li Xuesong. Product design and service design thinking [M]. Xinhua Publishing House:202310.204.
- [11] Robbins, Kurt. Management [M]. Sun Jianmin, Translation. Beijing: Renmin University of China Press,2012:427.
- [12] Jiang Songrong. "The Fourth Principle"-A Study of Design Ethics[J]. Ethics Research,2009(02):57-62.
- [13] LI Xiaolong, LI Minglang, ZHANG Zezhong et al. Cybersecurity Challenges and Development Suggestions for Intelligent Networked Vehicles[C]// China Society of Automotive Engineers (CSAE).2021 Proceedings of the Annual Meeting of China Society of Automotive Engineers (6). CHINA MACHINE PRESS,2021:3.
- [14] Mao Jiaqi. Research on experience design of intelligent in-vehicle information system under bad weather [D]. Jiangnan University,2023.
- [15] Min H, Li X, Zhao X, et al. Intelligent Vehicles Development and Research Based on Vehicular Ad-hoc Network, Advances in Informa-tion Sciences and Service Sciences, 2015, 7 (5) :1-9.
- [16] XU Zhigang, ZHANG Yuqin, WANG Yu et al. Discussion on the development status quo and existing problems of China's self-driving car industry[J]. Automobile practical technology,2019(01):13-21.
- [17] Xue Xiuyuan, Xue Yueyuan. Discussion on the environmental protection of electric vehicles[J]. Shanxi Chemical Industry,2017,37(03):145-148.
- [18] Liu Wei. Competitive Status and Strategic Analysis of Azera Automobile[D]. University of Electronic Science and Technology, 2023.
- [19] ZHANG Li. From radical to discursive: How design catalyses social dreams[J]. Journal of Nanjing Arts Institute (Art and Design),2017(04):14-19+187.