Chapter 2
Artificial Intelligence and Ethical Principles

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第 2 章　人工智能与伦理道德

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Abstract People tend to confuse ethical principles with moral principles as these two concepts are quite similar ethical principles refer to the social relations of propriety, whereas moral principles denote the norms and standardizations for human actions. The former emphasizes objective human relations for people in their interactions, while the latter focuses the corresponding objective norms and moral property, the two of which adjust the value system of social relations among the people, including the intrinsic value ideal and the extrinsic codes of conducts. Artificial intelligence is by no means a generally pure technique, but a revolutionary technology that will significantly transform human society and our world, with much room for development and extensive application prospect. Meanwhile, it is also an open and subversive technology, far from being mature, for which no one can predict both the ethical and moral consequences it will incur. In recent years, with rapid development of AI and its application in broader domains, there appear both positive and negative effects with each passing day, especially its successive breakthroughs of biological restraints. Once such powerful AI technology is blended with biotechnology, there will be the greater probability that the integration will surpass human intelligence, which will lead to huge uncertainty and risks. At the same time, confronting this critical emerging technology, we realize an intense contrast between the robust AI development and our deficiencies, including backward concept, unclear policy orientation, shortage of ethical regulations, the tenuous moral ideas and the imperfect laws and regulations. Under such circumstances, we should set foothold in ourselves, conduct an all-round introspection on AI and the application consequences. We should persist in people-first principle, safeguard human dignity, guard against and dissolve the possible risks so as to establish a reasonable, righteous ethical order.

2.1 Positive Effects on Ethical and Moral Principles Brought by AI

It can be anticipated that the advent of intelligent era will exert enormous and far-reaching influence on the modes of social production, people's living styles and their ways of leisure and recreation. Based on AI development and application, we should mind to strengthen the material foundation for ethical and moral construction, resort to multiple moral means and instruments, and elevate people's ethical and moral awareness so that we may seize the god-given historical opportunities.

2.1.1 Strengthening the Material Foundation for Ethical and Moral Construction

(1) Social and Economic Development and Ethical and Moral Construction

As AI development drives the elevation of productive forces, the degree of social intelligence becomes a landmark evaluating the developmental achievement of a

country or a region. As the intelligent age is approaching, AI is exerting influence on the modes of social productions and people's living styles. Moreover, the emerging intelligent industries contribute a lot to economic growth. A fact shows that the extensive application of AI has driven the restructuring industries, the ongoing transformation, and upgrading of economic structures, the improvement of productivity and the provision of more products and services. With speedy economic development, more social wealth will be accumulated, which, in turn, makes people more affluent, and elevates social governance. Although the remarkable improvement of people's living quality under such circumstances, a solid foundation has been laid for the elevation their ethical and moral standards, the free and all-round development for man and our society.

Historical materialism proves that productivity plays a decisive role in social development and a conclusive force for the free and all-round development of man and our society. The material improvement has been into-relative, interactive and inter-supplementary with the promotion of cultural and ideological progress. An ancient Chinese remarked, "When one's barn is filled with grain, he will know how to behave in a ritual way. Once a man is well-clad, he will be aware of the honor or disgrace" ("Guan Zhong—How to Govern the People"). Only with certain material foundation, from which people may quench their requirements in food, clothing, housing and traffic, will they yearn for spiritual and cultural realm, will they have the time and energy to make up for their deficiencies, will they gradually change the chaotic, ignorant, superstitious and backward conditions around them and achieve progress in spiritual, cultural, ethical and moral fields. Otherwise, they will render themselves into "the generally miserable and extremely impoverished conditions, under which they will again rise up in the struggle for the necessities and all the decayed and filthy dregs will stage a comeback" ("Selected Works of Marx and Engels" (Vol. 1), People's Publishing House, 1995, pp. 86).

With the advent of intelligent era, together with the accelerating development of intelligent economy and intelligent culture, constant improvement is being made in intelligent governance and intelligent services, all of which meet the increasing spiritual and cultural requirements of the people in an unprecedented way. This is especially shown in the fact that people have greatly expanded their survival and activity space. The improvement of living standard will enable people to better develop themselves and bring their potential and value into full play so that they may make substantial headway in "Helping others to reach their aims while subliming one's morality."

(2) Offering Direct Support for Ethics and Morality

As a frontline basic technology, AI is brimming with broad and limitless application prospect. AI not only promotes the adjustment of industrial structure and economic transformation, lays a favorable premise and foundation for ethical and moral construction, but also is directly applied in the fields related with ethical a moral realm, offering support for its construction.

In intelligent era, the central government will pool more funds for the following goals, including enhancing AI education and training, innovating of the modes for

ideological and political education, improving the public cultural quality, scientific and ethical cultivation, providing more precision intelligent services, promoting safe and efficient social functioning so that people may enjoy quality services and convenient life, establishing and perfecting the mechanism for social welfare and social security so as to aid and support the vulnerable groups and realize social equity and harmony, strengthening AI function to exercise real-time monitoring on natural disasters, constructing intelligent monitoring and early warning and controlling system foodstuff, drug and public security, protecting the public life and property from encroachment, applying technical, economic and legal means to exercise penalty on those who violate moral principles (intelligent criminals in particular) so as to safeguard the fundamental ethical standards and social orders.

As ethical and moral principles involve every respect of social life, the construction of those principles should also keep abreast of time, which should accord with the public expectation and requirements in intelligent age. In such an age featured by multi-elements and interactions, ethical and moral construction should organically integrate with economic, political, social, cultural and ecological construction rather than focus formalization and specialism. It should proceed with research, design, production, application and management of artificial intelligence. By means of multiple and multi-level interactions to bring about mutual influence and common elevation, ethical and moral construction will achieve the function of humanization in a gradual way.

2.1.2   Social Development and Betterment of Man's Ethical and Moral Behaviors

(1)   To promote more "ethical" productive process

In agricultural production, man manipulated instruments of production by his physical power and harness of domestic cattle. This production mode exhausted much man's physical energy, but he reaped much fewer fruits of labor as compared with modern production. Industrial revolution has set man free from his strenuous physical labor and considerably elevated production efficiency at unit interval. Moreover, it expands the space needed for people's survival and living and enriches their living experience. However, it has also brought unprecedented negative effects to people. Before machines were put into use on large scale, people followed the rhythm "seeding in spring and harvesting in autumn", and they had certain free time for their disposal, whereas natural time is squeezed out by machines in mechanical production and the workers must keep the rhythm of machines, repeating the tedious and repetitious operation and turn out the standardized production in batches day by day. Workers feel stressed, disinterested, repressed, and annoyed. Karl Marx hit nail squarely, "Machines replace manual labor, turning some workers back to the rustic labor and some others are turned into machines. Labor generates wisdom, but brings

crassitude and dementia to workers" (Vol. 1, "Selected Works of Marx and Engels", 2012 ed. People's Press, pp. 53.).

The rapid development of AI realizes intelligent reform to machines and endows machines with man-like thinking mode and thinking ability. This change not only revolutionizes mode of production and greatly improves productivity, but also expands the space for human survival and living, making them experience abundant and limitless possibilities.

When machines were just applied in production, automation began to appear. Yet, short of sensing technology and the technique to analyze and process information, the automatic machines cannot be made independent judgment in production process. Therefore, man's function is irreplaceable in production process. With IT development, AI grants machines such sensory organs as "eyes" and "ears" and "brain-like" thinking organs. In this way, intelligent machines can undertake much work and set workers free from the alienated state caused by the mode of machinery production. Under such circumstances, man may have much more time to explore and experience the unknown world, to conduct interactions with others, to tap his own potential and to cultivate his ethical culture.

(2)   To help man improve himself incessantly

As the extension of man's hands, legs and brain, AI will enable man's body structure and ability to develop in a dramatic speed by such means as man-machine mixture, man-machine symbiosis, and man-machine integration. For instance, the ever-increasing man-machine coordination and plus breakthrough in AI may substantially improve man's ability in memory (storage), computing, logic, reasoning and management. As a result, man's cognitive competence is greatly strengthened and elevated. With the assistance of data-based analytical technique, virtual technology, and machine-aided learning, man's potential will fully be tapped and applied. Much potential and work that could not be tapped and done previously are now under the people's consideration and operation. For example, as AI may be used in virtual reality, everybody may drive plane, submarine, and spaceship by means of virtual technology. Man can travel through spatiotemporal channels…. "We can fly to the moon to make exploration and dive into the ocean to mine minerals" is no longer a far-farfetched dream, but a "comprehensible" and "perceivable" reality.

In virtual reality, one may be turned into a different person in body and mentality, even make selection by his own or other's will (lover or companion), but the relevant experience may be quite different. Ray Kurzweil, American futurist, makes a bold prediction, "By 2030 or so, we may put nano-robot into man's brain through capillary, which will associate the cerebral cortex responsible for thinking and cloud storage to bring about interactions, a way that will make man look healthier, more handsome and live longer …".

It is noted that AI not only serves as a tool to externally strengthen man's ability, but also develops "internally", changing "man-machine confrontation" state since Industrial Revolution and trying to forge a situation marked by man-machine coordination, man-machine integration and man-machine harmony. For example, with more intelligent technology put into application, personal terminal can not only process

words, but also deal with image, audio and visual materials, forming a holographic operation system for communication between intelligent terminal and man. Moreover, the new-type man-machine system becomes smarter and more "considerate" for people to leisurely operate, free from any "mechanical" attribute. Headway is also made in the research of personal audio and writing system which will easily identify the customer's voice and shift the sound among different languages (interpretation), evolving into "my assistant", "my secretary" and "my companion." Some given intelligent system may take care of the disabled and patients and will be equipped on their bodies or installed into their inner part to help them to get over their bodily defects and inability…. In the new living environment, people's space for survival and living has been greatly expanded, together with numerous modes available for their study, work, leisure, and entertainment. Man will be remolded, more powerful and more consummate. Their imagination and creativity will develop in an unprecedented pace, whose mentality and talent will be fully demonstrated.

(3)   Ethical Implication of Free Time

During industrial upgrading and economic transformation in intelligence era, various human jobs will be done by intelligent robots, especially the posts shunned off by people, with the ever-increasing automation and intelligence in machines. The intelligent production will not only greatly improve productivity, but also free the laborers from the pernicious and dangerous working environment, thus saving up manpower and labor hours which accordingly increases people's free time and makes it possible for man to free himself from the heavy and tedious work and develop himself in an all-round way.

Man's emancipation and all-round development must be based on free time. The so-called free time indicates the time for man to allocate at his will except the necessary working hours, with which people may acquire a free and all-round development in a society. It can be said that free time is the prerequisite for people's emancipation and all-round development.

In human long-standing civilization, due to low productivity, mankind had to spend most of their time on producing living necessities, leaving very little free time for them. With the advent of surplus products or free time based on surplus labor, a small part of people might take up the surplus products or surplus labor to free them from the strenuous production labor and evolve into "white-handed class." By means of arrogating surplus products or surplus labor, they dispossessed the free times, whereas most people had to be loaded with the onerous labor and became "laboring class" in producing materials all their lifetime. They were deprived of the free time they created which was indispensable for study, research, and entertainment. For example, in capitalist society with private ownership, the profit-making nature of capital will inevitably turn the free time made workers into surplus labor and squeeze the surplus value created by workers as much as possible. The capitalists will, by hook and brook, restrict their employees to use the free time to amuse, develop, and elevate themselves. Even if the advanced technology was put into use which resulted in the improvement of productivity, the reduction of labor hours the workers earned through the rising labor movements, the capitalists still tried to

increase the complexity in production process by the claim "increase revenue by laying off employees." In this way, workers had to spend more time for training and reeducation in an endeavor to elevate their laboring quality and competence and do their bit to "capital appreciation" in conscious or unconscious way.

With the advent of intelligent age, although no changes are made in the innate greedy nature of capital, in the existing ruling order and in the situation that some people accroach the surplus labor of others (in other words: free time), labor productivity and social productive forces have been substantially increased due to the development and extensive use of AI, ever-sophisticated automation and intelligence, which not only meets various consumption requirements for man's all-round development, but also sets man free from his taxing mental and physical labor, thus unprecedentedly reducing man's working hours (or man's essential social labor hours), resulting in the weakening of the rulers' and the exploiter's monopoly right over man's development of his potential and competence and the general increment of free time for him to develop in an all-round way.

Economizing labor hours means the increment of free time for a man to fully develop himself, while a man's full development will react on social productivity. From the perspective of production process, economizing working time can be taken as the increment of fixed production cost, which is created by the employee. More free time for the employee indicates that he will no longer have to incessantly work for livelihood materials and that he may pursue what he likes, such as swimming, sports, appreciation of opera or literary and artistic creation. The development of man's interest, hobby, ability and talent will not only promote the improvement of scientific and technological level as well as social productivity so as to further raise social material production, but also facilitate man's emancipation and all-round development, imbued with profound ethical connotation.

In a nutshell, in intelligent times, the ever-innovative advanced technology, the ever-developing social productivity and the ever-increasing free time have forged a more favorable environment, conditions and means for people so that they may better develop themselves in science, philosophy, literature, art and ethics. When intelligent society gets fully developed, man will be the master of nature and society and he can control his own destiny, a free man indeed. Such a highly developed and highly humanistic society will be naturally a social formation with lofty morality and sublime progress.

2.1.3 The Improvement of Modes on Ethical Construction

(1) To help mankind to exercise ethical evaluation and option in reasonable way

Artificial intelligence means the inspiring and innovative simulation of human brain. Based on "objective stance", "sober mind", "abundant knowledge", "agile thinking" and "absolute executive power", AI may help people to control the developing trend

of tines, get to know the detailed facts so as to better recognize man self and instantly improve his ethical evaluation, selection and decision.

Learning algorithm-based AI may systematically grasp man's living experience and his principle of life, help him to analyze his ethical requirements, "discover" his ethical motivation and ensure his ethical right, responsibility and obligation when he is confronted with certain ethical dilemma. Supposing that an intelligent assistant knows that one persists in such "top ethical principle" as "What you do not wish to do to yourself, don't impose it onto others." It will take this ethical principle as the basic norm to deal with the value relation between one man and the other, man and society and two different social communities, to readjust various ethical requirements among people's inter-relations and to normalize the essential starting point as well as guiding principle in autonomy, impartiality, and non-maleficence. With regard to the present situation, it reminds its master what to do. For example, one hates his child to adopt a rush and discourteous attitude to him. If he is impatient to his elder parents for some reason one day, his intelligent assistant will timely remind him that he has violated the ethical principle advocated by himself and his behavior is irrational and improper.

To mankind, given intelligent system may boast more objective stance, broader vision and richer knowledge, more detailed fact, make more reliable prediction, apply more appropriate ethical norms, experience much less interference from snarled varied social relations and traditional codes of conduct. Thus, AI may help people to exercise ethical evaluation, selection and decision in a reasonable way. In fact, given intelligent system is displaying its advantages in judging the dispute over obligation in our daily life, defining the liability in traffic accident, sentencing legal case and predicting the effect of ethical selection. At present, such assistants seem to be imperfect, but they are of help in people's ethical evaluation, selection, and decision. We may be bold to predict that the coming intelligent system will boast more and better data, and it will be "smarter", more "agile" and better to interpret ethical principles and moral norms and will be more effective in helping people to deal with ethical issues.

(2)   Moral self-discipline and self-cultivation

Generally speaking, morality is sustained in two ways: self-discipline and heteronomy. Artificial intelligence for moral self-discipline and morality heteronomy provides new practice foundation and practice way.

Moral self-discipline, based on people's self-cognition and moral evaluation, is a kind of value pursuit of self-restraint and self-improvement. Intelligent system has a broader vision and more systematic knowledge, which can help people have a deep insight into the social environment they are in, accurately grasp the fact that they are facing, so as to guide their behavior in accordance with learned ethical principles and moral norms and constantly revise and improve themselves in life practice.

If people have a kind heart and hope to practice and improve themselves in morality, they can timely remind themselves to restrain unreasonable desires and urge themselves to practice moral norms by virtue of intelligent tools such as intelligent secretary, learning assistant, intelligent nanny and intelligent housekeeper.

For example, remind and urge yourself "should go to see your parents", "should keep your promise to keep your appointment on time", "should repay debts according to the agreement", and "should complete their own work."

This can help people to be self-vigilant, strict with themselves, forge their own moral personality, and be a virtuous person.

For some of their dissatisfaction which is difficult to control bad habits, such as procrastinating, online game addiction, and Internet shopping addiction, we can also design a certain intelligent program to help their "enforcement" in excess of the preset threshold.

Humans are "living" with more and more intelligent machines. With all kinds of intelligent partners who know rules, etiquette, and impartiality, people will externalize the "justice" in their hearts. They can always remind themselves to cultivate their morality, cultivate their character, stop evil and promote good, so as to elevate the level of moral self-discipline to a new level.

(3) Moral heteronomy and new ethical order

Moral heteronomy is maintained mainly by public opinion, education, and management of relevant institutions.

The age of intelligence provides a more transparent social environment for moral heteronomy and more and more moral tools.

Because the whole society is increasingly digital, networked and intelligent, data collection, storage, processing, transmission capacity are unprecedented. With people's every move being almost under the "spotlight", there is no hiding.

Such an unprecedented and transparent social environment can form strong pressure of moral public opinion to urge people to actively restrain bad motives and consciously regulate their words and deeds.

In certain moral situation, if a person or an organization's behavior is against established ethical principles and ethics, with the aid of artificial intelligence, the social public, and the related institutions can query the background information of the parties in time, accurately restore the story, which was based on facts and form a strong social pressure of public opinion, forcing the offender to refuse evil to reward good, maintain the normal order of ethics.

Losing the moral bottom line is a prominent problem facing the world and China in the period of social transformation.

Entering the age of intelligence, for those who wantonly trampled the moral bottom line and even broke the law such as intentional injury, doing nothing to save others from ruin, being saved to bite the hand that feeds one and civil servants soliciting bribes bribery, we can use a variety of intelligent system including all kinds of intelligent monitoring system, large data analysis system, to find out the truth conveniently and quickly. And to the parties, we take systematic, strong heteronomy means.

例如，除了通过各种媒介曝光当事人，进行大范围、强有力的道德谴责外，还可以对其采取包括技术、经济、法律制裁等在内的惩处措施，切实让作恶者成为反面教材，从而将"善有善报，恶有恶报"落到实处。

For example, in addition to exposing the parties to strong moral condemnation through a variety of media in large-scale, we can also take measures to punish them, including technical, economic and legal sanctions, so as to make the perpetrators of evil become negative teaching materials, so as to implement the principle that "good is rewarded with good, and evil with evil."

It can be seen that entering a new and unique intelligent society and facing the dilemma of lack of belief, multiple values and repeated loss of moral bottom line in modern society, artificial intelligence may become a good helper of moral education and management and a moral weapon to maintain normal social order.

Perhaps, due to the current level of intellectualization in society, people are not benefiting enough today. However, with the rapid development of artificial intelligence, novel and unique intelligent education and management methods are emerging, and a more reasonable and fair ethical order is expected to be formed.

2.2 The Ethical Conflict and Choice Dilemma Caused by Artificial Intelligence

Artificial intelligence is quite different from the technical problems and challenges that human beings have faced in history.

This time the problems and challenges facing mankind will be profound and comprehensive.

Artificial intelligence not only destroys the traditional human relations and causes a large number of ethical conflicts, but also leads to ethical and moral consequences related to human nature and dignity and related to the future and destiny of human beings.

Therefore, human beings have to take it seriously and make wise choices through reflection and criticism.

2.2.1 Ethical Conflicts Caused by Artificial Intelligence

(1) privacy and other basic human rights are threatened

Privacy right is a basic right of personality. In modern society, there has been a consensus on the protection of personal privacy, communication freedom, and so on. However, as an abstract right, privacy right has strong elasticity and has different understandings in different cultural circles.

In general, the right of privacy refers to a right of personality in which the natural person can enjoy private life and private information secretly protected in accor-

dance with the law. This right of personality is protected from unlawful intrusion, knowledge, collection, exploitation, and disclosure by others. Moreover, the parties concerned have the right to decide to what extent others can intervene in their private lives and whether their privacy should be disclosed to others, as well as the scope and extent of the public.

When privacy right is violated, it points to prying into, collecting, divulging, or using the personal information of a party concerned without the permission of the party concerned. This will affect their normal life.

Some scholars believe that "privacy is the foundation of human rights." Then, how to protect basic human rights like privacy?

The artificial intelligence based on big data has posed an unprecedented threat to fundamental human rights such as privacy, which has been caught in a stormy dilemma. In the era of intelligence, people's life is becoming a life where everything is recorded. It may be detailed to an unexpected degree.

All kinds of data collection facilities and various data analysis systems can easily obtain all kinds of personal information, such as gender, age, height, weight, health status, education, work experience, home address, contact information, social identity, marital status, kinship, colleague relationship, faith status, social certificate number.

In the process of personal information collection and various security checks, such as the common holographic scanning and three-dimensional imaging security checks at airports, stations and docks, passengers' physical information and even privacy features can be clearly seen. Privacy disclosure often makes the parties involved into an embarrassing situation and often leads to a variety of disputes.

In the application of artificial intelligence, cloud computing has been configured as the main architecture. Many governments organize enterprises and individuals to store data in the cloud, which is relatively easy to be threatened and attacked. In addition, artificial intelligence can conduct in-depth analysis of massive data through cloud computing.

When a large amount of disordered and seemingly unrelated data is integrated, it is possible to work out a person's personality characteristics, behavior habits, life trajectory, consumer psychology, interests, and hobbies, and even read out some unspeakable secrets, such as hidden physical defects, previous medical history, criminal record, and transsexual experience.

So it's fair to say that data intelligence analysis systems often know themselves better than we do, know what we like, what we hate, what we need, what we reject, what we're for, what we're against, etc.

If sensitive personal information held by intelligent systems is leaked out and shared by people with ulterior motives, or illegally used for commercial purposes, sometimes people will be put in an awkward or even dangerous situation, and the privacy right of individuals will inevitably be violated to varying degrees.

Of course, in the social governance system, in order to protect personal privacy, legislation can be passed to stipulate that personal information cannot be disclosed under any circumstances, and protection can be implemented by popularizing encryption technology.

On the one hand, in order to protect personal privacy, the personal information collected, stored, and analyzed by the intelligent system should be absolutely confidential. On the other hand, anyone must be responsible for his own behavior, and his behavior should be recorded in detail so that people can conduct moral evaluation and moral supervision, and even be used as the evidence of legal proceedings, so as to guarantee the network and social security.

However, what ethical principles and moral norms should be established to protect people's privacy and safety? Under what circumstances can we store, retrieve, and use personal information? What is the basis of moral evaluation of the public? How should we coordinate the contradiction between personal privacy and social supervision? How should we deal with this contradiction and avoid it from becoming a sharp social ethical conflict? There are no definite answers to these questions, thus posing a threat to the ethical order of an intelligent society.

(2) Challenges the ethics of marriage and family

The desire for food and sex is part of human nature. Erotic industry has promoted the process of social informatization. Into an intelligent era, it may also play a role in promoting the intelligent and social development. In recent years, there has been a flurry of news about AI's foray into the erotic realm, even into marriage and family. It constantly impacts people's sensitive nerves and the existing ethical relations, ethical principles, moral norms, and ethical order.

With the development of artificial intelligence, the development of humanoid intelligent robot is making a breakthrough. Humanoid robots are becoming more human-like, more "empathetic" and more "sentimental." They may have "read" a lot of erotic works, have rich emotional experience, can understand the "love" more and more complex, can do things that is possible to break through the existing limits. Experts predict that by 2050, humanoid robots will become indistinguishable from humans. In other words, a humanoid intelligent robot may have the same perfect body, delicate facial features, smooth skin, gentle temperament, and faithful character as a real person. Humanoid intelligent robot can do housework for people, be assistant for people, accompany people to chat, play together, and even flirt with people… People can not only have a humanoid intelligent robot to accompany them for a long time, but also can have a customized sex robot to relieve people's loneliness at the psychological level, meet people's personalized physiological needs including being pregnant, giving birth to children and raising them…

When a humanoid robot really appeared in the people's life, when they enter a home as a nanny, pet, lover, partner, or even a child, they "participate" in people's work and life as domestic helpers, work assistants, game playmates, and life partners. Over time, will there be a variety of feelings between people and intelligent robots?

Will there be all kinds of conflicts of interest?

Especially when people customize the female robot "partner", who is so beautiful, gentle, virtuous, hardworking, considerate, or customize the male robot who is so robust, forthright, generous, knowledgeable, considerate, will people consider marrying it, forming a unique "new family"?

Can such an unconventional marriage be understood and legally recognized?

In any case, the possible arrival of all this will have a different degree of impact on traditional human relations, family structure, work relations, and so on.

In 2013, in the American science fiction romance "Her", the human writer Theodore and samantha, an artificial intelligence operating system, fell in love.

But Theodore finds out that samantha is in love with many users at the same time.

It turns out that their understanding of love is not the same thing samantha's view of love is not exclusive!

The interests and emotional entanglement between intelligent machines and human beings will become more frequent and more difficult to understand.

We might as well imagine that the future intelligent robot should have the autonomous consciousness, have the emotion learning to "act like a spoiled child" or "loses his temper." How do you get along with them when they come into the home, into people's lives, and make demands like lovers, family, partners?

This will inevitably bring about a series of boring new ethical problems, forming a huge impact on the traditional ethical order.

Sometimes, conflicts may even erupt, putting the parties at risk. In 2014, at the end of the science fiction film "Ex Machina", the robot Ava became self-conscious and brutally killed her designer with a knife.

(3) Ethical consequences of the combination of artificial intelligence and virtual technology

As we all know, "virtual" is one of the functions of human consciousness.

However, the "virtual" in human consciousness has its own limitations, such as the limited amount of information the human brain can store, the limited speed of information processing, the limited divergence of thinking, the difficulty in the communication of "virtual" images between people.

Language, characters, and sand table technologies have externalized the "virtual" function of human consciousness to varying degrees.

Modern information technology is based on the most abstract machine language (i.e., "0" and "1") to perform various computations that are logically simple and programmatically complex.

At the same time, it can also restore machine language to concrete information symbols (including text, image, audio, and video), thus pushing "virtual technology" to a new stage of development.

With the support of artificial intelligence, machines can spontaneously convert human language, gestures, expressions and so on into machine instructions, and judge by "logical thinking" and "image-like thinking" based on such "understood" instructions. On the basis of this "virtual technology", it can really let the person in the "spirit", producing immersive interactive feeling.

In virtual reality, a person can even choose to be a different person physically and mentally, such an experience is obviously unimaginable in the past.

However, virtual reality it can not only bring magical experience, but also lead to a lot of ethical and moral problems.

Artificial intelligence doctors can make diagnosis through telemedicine and perform surgery on patients, which may be completed by intelligent machines entering the human body.

However, the special feelings between traditional doctors and patients (such as unconditional trust and tender comfort) often disappear and may even cause some psychological estrangement.

In addition, artificial intelligence teachers, nannies, and so on may also lead to similar problems.

With more and more various intelligent terminals put into use, people have such sense that intelligent devices are similar to our body organs, which people can hardly tear with. If those devices are not available, we find it hard to proceed our normal study, work, and living. Living in the virtual world, people sometimes feel it absurd, bored, full of unreliable and fantastic phantom. However, some people, especially the youngsters, are excessively addicted to the virtual world, feeling it realistic and approachable, attached to it so much that they hate to contact people in real life, with the notions "too weary", and "meaningless." Gradually, those young people turn to be solitary, indifferent, and misanthropic, resulting in new barriers for human communications.

The video games are filled with pornographic and violent contents and some even ignore moral baseline. As time goes, the game players will be mentally deteriorated, their personality will be distorted which is shown in complete obliteration of moral sense and rejection of any ethical responsibility. For example, in some violence games, the players will try every means to get a deadly intelligent weapon and kill their "enemies" for their survival. In virtual world, the players have not any sense of bloodiness, cruelty, and inhumanity in "killing" people. Moreover, the players won't feel any disturbed and guilty because there are no face-to-face resentful confrontations, nor are there physical fights and anguished facial expression of their "enemies." In addition, no physical injury is caused.

Although every virtuality is based on real foundation, people are faced with a wonderful world in which virtuality is intervened with reality and possibility when sensory virtuality is technically externalized. The embracers of new life may cheer. Virtual reality is opening up a new space for survival and activity, in which a brand-new ethical sense and ethical relationship are formed together with novel ethical regulations and moral order coming into being, since players have got may opportunities and much experience. Faced with this trend, traditional moralists are laden with such worries that man's moral emotion in realistic society is being fooled, the existing ethical responsibility and ethical codes are being decomposed and social ethical order is at risk of collapse.

(4) Accountability of Moral Responsibility Caused by Pilotless Drive

Pilotless drive, including automobiles, planes and boats, becomes a distinctive area in application AI, generating considerable economic and social effects. To take pilotless automobile for an example, its safety factor is higher than that odd manned driving. At present, as a large number of traffic accidents occur every year, pilotless drive may save many lives. To the aged people and the disabled who are incompetent of

driving automobiles, pilotless drive may thoroughly change their life. In addition, pilotless drive based on mega-data may reduce traffic jams, pollution, and increase utility rate.

As a new innovation with broad prospect of application, pilotless drive cannot be perfect in every respect at present. For example, it cannot completely eliminate pollution and traffic jams in cities, nor can it thoroughly eradicate traffic accidents. As a pioneer in pilotless drive, Tesla received several accidents in this field. On May 7, 2016, an electric automobile produced by Tesla collided with a lorry in "pilotless" mode in Florida, leading to the death of the truck driver. Although the investigation report submitted by National Highway Traffic Safety Administration of the United States claimed that pilotless system was not blamed for this accident, unmanned drive aroused public concern on the safety of this mode. As various problems remain unsolved, many new ethical issues and moral responsibilities surge up.

Pilotless drive may incur some "ethical dilemmas." Someone designs such a scene, in which a pilotless coach loaded with passengers is driving at high speed when it suddenly meets with a pregnant woman who is jaywalking the road. At this moment, if the system exercises emergence brake, the coach may turn over and the passenger may be injured. If the coach continues to move on, it may run into the woman. What will the pilotless system do? If it is a man driver, he may make decision by his instinct or intuition. When AI involves the issues concerning the extreme cases of human ethical dilemmas, its operations are preset by algorithm, in which no program is prepared for such an event. So the system has to make an analogy in light of the similar cases from the databank. If it meets with an alien situation, the system will randomly select on way to deal with the event. It is known to all that the unknown realm is indefinite and alien cases cannot be avoided anyway. Supposing that a traffic accident is caused by a running pilotless vehicle, resulting in injuries, death, and loss of property, who will be blamed for this accident? Is it the designer of the pilotless system, or owner of the vehicle, or the pilotless vehicle that should assume the corresponding responsibility?

2.2.2 Digital Gap and "Social Exclusion"

(1) Digital Gap

In intelligent age, mankind forges an ever-increasing complicated and faster technical system and social structure. However, the development of science and technology won't automatically carry out "universal principle." Due to its advancement and complexity, AI cannot be mastered by the non-professionals. To achieve social justice and enable all the people to enjoy the benefits brought by AI, it cannot be realized by mere progress in science and technology. In mast cases, even though the system is reasonably designed, government holds a fair stance, decisions, and policies will be deflected. What is worse, irregular practice is found in AI field and there are many defects in policy orientation and ethical rules. These chaotic phenomena will result in

the deviation of people's original intention and AI will be rendered into the privileged province of the economic, political, and technical elites. For example, as the development of productivity is uneven, scientific strength is unbalanced, people's quality, and capacity are different from one place to another, intelligence development is varied in different nations, countries, regions, and enterprises, leading to the situation that there exist the disparities in opportunities of applying AI and the competence for application of such technology and digital gap has been forged. To be specific, opportunities for learning and using AI are not equally available for the people in different countries and regions, with diverse competence in using AI products, which results in different compatibilities with AI and yield the inequality in income and position and the expected inequality in the years to come. All these adverse conditions are overlapped with the existing the regional gap and the disparities between urban and rural areas, hastening the parturition of more and more "digitally poor areas" and digitally poverty-stricken people." Moreover, in the fierce international and market competition, developed countries and transnational companies have been monopolizing the critical data resources and blocking the innovative achievement of AI core technology so that they may further control those advantages and gain excessive profits. This situation leads to the widening digital gap and there appears a trend marking "impoverishing the poor and enriching the affluent."

People uphold innovation of knowledge in intelligent age, which is no longer the physical laborer-oriented times. To the common workers, the more progress in science and technology, the greater the productive force will be. The more abundant products, personal strength turns to be weaker, beyond one's control of his own destiny and his selection. Although some elites may become the strong of life and billionaires by means of knowledge and wisdom acquired through their learning and innovation, the digital gap and the difference between the rich and the poor are widening with each passing day. With lowering actual status of the common laborers in economic and social sectors, they will be rendered into poverty-stricken state. Moreover, they will be even deprived of their legitimate rights.

With the development of AI and industrial constant adjustment and upgrading of industrial structure, entrepreneurs tend to spend their capital on intelligent robots, resulting in the ever-severe structural unemployment. In addition, as knowledge is updated in an accelerating speed which gives rise to survival of the fittest, people are subject to enormous mental stress. Every person will be anxious whether his/her knowledge and technology adapt to the requirements of this era. Is it necessary for me to refresh my learning and technique? Shall I need the training for new knowledge? Am I eligible for the new post with my existing competence? How will I deal with the rapidly upgrading knowledge and technology? In retrospection of the informatization and intelligence process, we may easily discover that huge gap has been formed amid industrial upgrading and economic transformation caused by the fierce intelligent and technical competition. In AI era, some intellectual elites earn huge fortune, whereas the jobs of the common laborers are gradually replaced by mega-data and intelligent robots and their economic benefits are seriously undermined. A large number of structural jobless people have to acquire another expertise so that they may be re-employed, whose vulnerable conditions are worse than ever.

In a nutshell, it is an indisputable fact that intelligent times yield digital gap, "digital poverty-stricken area" and "digital poverty-stricken people", a new trend that endangers social justice and harmonious development. Controlled by few countries, regions, enterprises, or individuals, intelligent technology may turn to be an accomplice for jeopardizing the interest of "digital poverty-stricken area" and "digital poverty-stricken people." It is extremely unfair and immoral. The advent of digital gap and the difference between the rich and the poor in information and new social strata will be an unsolvable social concern, labile factor or even a destructive element in subverting the existing ethical and social orders. "Who" will be the subject, what kind of ethical principle will be applied and what measures will be taken, to protect the "weak" ("digital poverty-stricken area" and "digital poverty-stricken people") so as to achieve social justice and world peace?

(2)   "Social Exclusion"

Confronted with the rapid development and extensive application of AI, man's evolution is tardy to a great margin and find himself unable to deal with the complicated work, as the intelligence in social life reaches such a high degree that intelligent machines may be alienated into the tools for controlling, repelling, and enslaving human being. For instance, before a highly automatic assembly line where the robots are in operation, ordinary people will look rather "clumsy" and "dull" (excluding the "specialized" experts and engineers), who are ignorant of the production process and cannot be even an assistant, let alone control the robots' operation. Even if they have acquired certain knowledge and technique or have been trained for the posts, they grasp only a small part of intelligent machine principle and operation technique. Compared with the machines equipped with greater data, more complicated networks and more intelligent systems, man's physical parts, including his brain once claimed to be incomparable, become more rustic, plain and mediocre. Some science fiction writers make repeated predictions that in the world dominated by intelligent machines, a great majority of people will be rendered into "the slaves of such machines", the insignificant "spare parts" in the robot systems.

After intelligence is applied in production, the machines equipped with man's intelligence or the intelligence higher than man's will replace people to do the dirty, weary, repeated and dull work that they are unwilling to, or the work in toxic, harmful and dangerous environment. Moreover, intelligent machines will embark on the work previously pertinent to mankind, such as surgical operation, offering lecture, translating, lawsuit settlement, poem writing, painting, music composition, playing of musical instruments, driving and battle fighting, etc. …. Some of them even try to possess and "consume" emotions, "replace" man's friends, lovers, companions and children, etc., for example, Foxconn has announced that 60 thousand workers will be unemployed after it puts robots into use. In Kolner, Germany, Ford Motor applies robots, which work side by side with human workers. As intelligent robots can be made and duplicated in a steady way, and they work more "diligently" and "willingly bearing responsibilities without grudge" and operate with higher proficiency. Therefore, robots are capable of more complicated and heavy work and they will replace

more and more human workers, resulting in tides of unemployment with intelligent machines used in production and industrial transformation and upgrading.

What is worse, the literal, scientific, and computerized illiterates will lose their laboring value, excluding any opportunities to be trained for new posts, and they will have no way but to succumb to the fate of unemployment, thoroughly marginalized by the society. Manuel Castells, American sociologist, claims, "Now most people have got nothing to do with the logic of global system, whose conditions will be worse than their state of being exploited. I once assert that: one day the workers will cherish the big time of being exploited in that there exists a social relationship in exploitation at least, for I work for you whereas you exploit me. But I need you, or vice verse, in which you have the chance to exploit me. This relationship is absolutely different from "I no long need you" (Castells, Manuel, "The End of Millennium", translated by Xia Zhujiu and Huang Huiqi, Social Science Literature Press, 2003, pp. 434). Such relationship is called "the black hole of informationized capitalism" Mr. Castells. In intelligent society, "digital poverty-stricken people" are excluded from the global economic and social system, without any enterprises or organization to employ them and exploit them. In Chinese proverb, "No hatred arises without cause." When no one needs to employ such colony, there exists no antagonistic social relationship for them to be rebellious. In this sense, "digital poverty-stricken people" become the "fifth wheel", who will be ruthlessly put away by the highly intelligent society and their existence will be absurd.

Only labor makes man, which is man's sacred right as well as an activity from which man acquires self-affirmation, values and dignity. Featured by its ubiquitous, tireless, pay-irrespective "spirit", intelligent system will deprive people of their laboring right and pose realistic threat on man's fundamental right and the right of their all-round development. In addition, the exclusion of man's role in work and family by intelligent machines will probably spoil traditional working relationship, lead to the disintegration of traditional familial structure and thus pose great shock on the existing working and familial ethical principles replaced, neglected, excluded, and discarded, people will sense the insignificance in life and absurdity in survival. Apart from the worsening surviving environment for man and the drop in happiness indexes, man will be mentally unbearable and feel hopeless. Some surveys show that in the areas with high factory bankruptcy and unemployment, the rates of suicides, drug abuse and depression are higher than those in other places. In certain time of intelligent society, an extensive ethical and social crisis will break out when people cannot bear for any time and risk danger to take resistant actions in desperation. Just as Mr. Castells warns, "The crisis spreading to the whole world will burst out, not in a revolutionary way but in such process that it is beyond my endurance and I don't know what should do, but I have fly into my indignation, for the sake of outburst" (Castells, Manuel, "The End of Millennium", translated by Xia Zhujiu and Huang Huiqi, Social Science Literature Press, 2003, pp. 434).

2.2.3 Challenge to Man's Nature and Man's Destiny

(1) Severe challenge to man's nature

The ever-developing AI is actually changing "man" and his recognition. In the previous over four billion years, all living species (including man) have been evolving on the basis of organic chemical laws of the fittest survival. Yet, to man's anxiety, AI, a form of inorganic life, is changing the evolving process. With the integral development of biotechnology and intelligent technology, man's physical body is subject to "repair" and "remold." Intelligent machines are gradually acquiring the emotion, creativity, and sociability peculiar to mankind, during which the trend of man-machine complement, man-machine interaction, man-machine combination, man-machine coordination, and man-machine integration become an irresistible developing tide. When an intergrowth between man's physical body and intelligent machine, such as "repair" and even "re-coding" of man's gene, transplantation of bio-intelligent chips into man's brain so that it undertakes part of the functions such as memory, computing and expression performed by man's brain. Is the emerging "symbion" a man or a machine? To what significance and what degree will "man's" property still exist? There will diverse interpretations among the public.

The robot under research and development will pose a challenge to man and man's nature. For example, "thinking" is generally regarded as man's substantive feature. With the breakthroughs made in developing AI, "machines can think" is the public consensus. Just as mechanical machines surpass main's physical strength, speed, and endurance, machine's thinking capacity will overwhelm man's in an all-round way. When intelligent machines are not only far over man in storage (memory), computing, and information transmission, but also surpass man in controlling force, imagination, creativity, and emotional richness, they will pose substantial challenge to man's essence of thinking. Moreover, labor, manufacturing, and application of instruments of production are taken as man's essences, but the coming intelligent machines may automatically make or "print" production instruments, put them into production, constantly adjust and perfect the instruments according to production development. What is more, intelligent machines may manufacture robots and adjust them based on the requirements of production and living. For instance, in Xinsong Intelligent Industrial, China's largest robot production base completed in 2017, its C4 Workshop is China's first 4.0 pilot zone, where engineers intend to produce robots with intelligent machines. In this way, whether the manufacturing, or production instrument or the labor of general sense has got nothing to do with human patents. In addition, by means of modern biotechnology and intelligence technology, intelligent machine may be either unlike man's figure or "beyond the reach of human figure" in that machines will be more "standardized" and "perfect" than man's figure. If policy, law and ethical norms are permissible, any man may customize one or several "himself" in form, sound, personalty, response and action, enabling "himself" to live forever. If this happens, whether intelligent machines is still "man" or not will be a vague topic constantly arousing the public discussions. On October 25, 2017, Saudi Arabia became the pioneer to make the attempt by entrusting Hanson Robotics to

develop "Sophia", a humanoid robot, who is granted citizenship. This event triggers a huge tempest in a teapot around the world.

If an intelligent machine is defined to be a "man" to certain sense, it will arouse a range of problems. Will it be allowed to enjoy the fundamental rights as man does? (Can it be kept from mankind's overuse, or from severe environment that will bring damage to its hardware? Will it enjoy the personality and dignity same to man? (such as will it be treated as "man's servant"? or will man be allowed to maltreat it?) will it be a moral or legal subject and undertake the corresponding consequences? Will intelligent machines be allowed to communicate with their kind just like natural men, or to form their own "social organizations"? New problems will certainly keep bubbling up. Realistically, as intelligent machines can be manufactured and duplicated in large quantity and at comparatively low costs, they will be widely used in man's learning, production, living, leisurely and recreational activities…. Some people argue that such pets as cat and dog enjoy certain animal rights. Will the intelligent machines be granted fundamental rights, which acquire independent consciousness making man hard to identify himself from the machine?

Anyhow, with the development of intelligent technology, the advent of robots with independent consciousness gives rise to serious issue on man's nature. Perhaps, we should recognize and redefine "man", grant "man" new connotation and re-establish the ethical principles for dealing with interpersonal relations and man-machine relations by integrating all the creatures made by man, including intermediary system and intelligent system.

(2) Controversies over Moral Education and Administration Authority

As to ethical principles, there are debates on the issues whether man's ethical principles progress or retrogress. From the perspective of the former, the development of ethical principles fails to keep pace with AI development. In AI development and application, there emerge more and more issues that are beyond the governance of ethical principles, which shows certain moral abnormality and ethical disorder. How to deal this challenge so as to re-forge moral education and supervising modes is an issue to be urgently addressed.

With the coming of intelligent era, more and more intelligent systems are used in man's process of organization and management which stimulates the new reform in educational and managerial modes. As intelligent system stores a large quantity of policy and legal documents, it can automatically process administrative coordination and control assignments, undertake procedural tasks in management, and reduce human errors so as to economize administrative costs and improve manage efficiency. However, the moral education and administration performed by AI will sometimes ignore the cultural tradition and psychological features of the subordinates and even take no notice of the property of a flesh "man", which is short of human sympathy and "personal emotion" that man focuses.

With significant breakthroughs made in AI, people will wonder: whose moral conduct is more outstanding and convincing between man's and intelligent machine's? Who will dominate the moral principles and the right of speech? Who is more eligible for exercising moral jurisdiction and the corresponding power on education and

management? Although man is labeled "the wisest of all creatures", who used to control the right of speech, man is not so confident when facing those issues with definite keys in the times of intelligence.

It is worth our vigilance that with more information and intelligent machines used in our society, super intelligent robots may wantonly seize the rights of speech in ethical appraisal and decision making as well as the qualification in moral education and management with their advantages in power and mental ability and their operating efficiency beyond the reach of mankind. Will they even presumingly exercise moral admonishment and management over mankind who has created them and forcefully bring man into ethical category dominated by intelligent system? If this worry comes true, that will be an earthshaking "ethical variation" since human history.

(3)   Will AI Be Out of Control?

Since 2016, AlphaGo developed by Google successively beat Lee Se-dol and Ke Jie, two champions of world go after the machine adopted training method of self-game with mega-data. This event made people aware of AI's power of in-depth learning and the threat of AI. As known to all, mechanization has immensely "extend" man's hands and feet, setting people from manual labor. No man can run as fast as a car, a train, or a plane. Nor can he carry as heavy load as a truck or a crane…. AI will completely beat man in terms of mental and intelligent ability. Man must recognize and admit this fact, making himself accustomed to these changes and keeping harmonious relationship with various intelligent systems.

Today, apart from in-depth learning, AI may proactively study and develop innovation ability. In the future, it may acquire independent consciousness and exercise automatic upgrading and improvement. Perhaps the situation will go just as Ray Kurzweil predicts, "In 2030s, it will be possible for man to upload the information in human brain. Since the 2014s, the upgrading 3.0 version of human body will appear, in which human body will evolve into non-flesh and transformable state by means of such technologies as gene, nanotechnology and robotics. By 2045, the singularity will come; AI will surpass human intelligence in an all-round way. When mechanical intelligence reaches human's, the unitary super-intelligence will come into being, which may upgrade itself through mutual learning, mutual interaction and self-perfection and forge a super-intelligence organization through networks. This futurist even makes such a bold prediction, Since 2045, the universe will awake. To go beyond the restraints of supercomputer, AI will turn the substances into super-computers and the whole universe will be transformed into super-intelligence. Such intelligence may change the known physical laws, achieve the transversion in multi-dimensional space and realize human dream of being immortal."

Generally speaking, super-intelligence and its systems may master more background data, draw more objective and clear judgment on the situation, formulate more reasonable planning, make calmer and faster decisions and take more accurate and forceful actions as against human being. What is more, super-intelligence demands the survival environment that is less rigorous than human being, but works for longer time and more attentively, consumes less resources. It can automatically

perform automatic error correction and self-upgrading through feedback and learning. So it will gain ever-increasing advantage over human intelligence.

Super-intelligence which acquires independent consciousness is similar to an open "Pandora's Box." Man spares no effort in creating AI. Yet his destiny is like "a muddleheaded child playing a bomb." The mighty power of the bomb forms a striking contrast with the child's ignorance. People may wonder whether super-intelligence will "follow bad examples", boast selfness and greediness as mankind, acquired human errors and rotten values, or enslave and maltreat mankind, uphold the conviction "reaping what is sown" and take revenge as some people in history and reality. The great risk lies in whether super-intelligence may break through the designer's preset critical point and be out of control to dominate mankind by self-learning and independent innovation. Will super-intelligence "drive mankind to the zoos", even judge "imperfection and inability of mankind", so that it despises and brutally wipe out mankind? This profound anxiety on human prospect and destiny has been troubling mankind as manifested in the movies of science fictions, including "The Matrix", "The Terminator" and "Bicentennial Man", etc. Stephen Hawking warns us, "Maybe AI is not only 'the most influential event', but also 'the last event' in human history. AI development may forebode the extinction of human species."

Maybe some people will criticize the above statement to be too pre-acting and sensational. Even if super-intelligence is free from any undesirable motivation and erroneous values, certain organizations or individuals will abuse intelligent technology to bring about their ulterior purposes once they develop and master similar super-intelligence. If they exercise extremely severe and grievous Fascist rule over the people, the consequences will be catastrophic. The disasters will be far severe than those of World War II waged by Fascist Axes and the "nuke blackmail" by the USA and the Soviet Union during the cold war period.

In the past, when it was still in immature and budding stage, people held an optimistic attitude to AI, ignorant of its potential threat. With its rapid development in recent years, especially its independent study and creative thinking which will surpass that of mankind, people are gradually aware of the huge threat brought by AI. The ever-developing AI will gain such overwhelming advantage over mankind that the gap between man and AI will be as large as man's "running race" with airplane and spacecraft. Looking ahead, mankind no longer has the reasons to be arrogant and overconfident.

2.3   Construction of Ethical and Moral Principles

AI is an unprecedented social ethical experiment in human history. In intelligent age, although it offers a possibility to elevate the social ethical and moral standards and to develop man and society in an all-round way, it still remains to be a kind probability, which will bring the consequence hard for people to predict and the consequence will be very difficult to solve within traditional theoretical framework. No matter how it is powerful, technology is man's means or tool only. How to make selective application

of technology involves social field, human beings themselves in particular. A new ethical order based on people orientation, expansion of advanced morality, free and all-round development for man and society will be created with technical progress.

2.3.1 "Can" and "Should" by AI

(1) Relationship between "Can" and "Should"

Just as other technical means, the relationship between "Can" and "Should" of AI must be properly handled in the development and application of this technology. Generally speaking, there are several possibilities of "Can" and "Should" listed as follows.

1. What "can" do is also what "should" do.
2. What "can" do is what "shouldn't" do.
3. What "can" do is "permissible."

At present, as AI is developing with each passing day and its capacity is getting more powerful, what "can" do is incessantly breaking through the original thresholds and extending to many new fields, such as automatic speech recognition, machine translation, electronic police, unmanned driving, private doctor, intelligent babysitter, intelligent secretary, intelligent steward, intelligent lawyer, intelligent judge, intelligent editor and intelligent journalist. …. Apart from human figure, the coming intelligent machines can perform thinking, with intelligence higher than that of human being, capable of completing many assignments which are beyond human ability and dealing with various complicated social relations and social contradictions. Will what AI "can" be what it "should" do? Obviously, the logical relationship between "can" and "should" shows that there exists no such inevitability. After all, what "can" do is also what "should" do, being one of the three logical possibilities, which requires people to make concrete analysis, prudently carrying out evaluation, selection, and decision on the basis of the specific conditions in living practice. While exercising the said conducts, we should be aware of the fact that AI is a novel and complicated technology, with strong uncertainty, which may yield non-human and immoral negative effects. What it "can" "should" not be put into practice.

Maybe someone will quote "theory of value neutrality" or "the conviction of no limits to science" to query or deny the introspection on AI ethics and values. However, as man's intrinsic activity, science is of no "value neutrality" and involves human life of values. So "no limits to science" is not applicable to science and technology. As to the scientific research and technological application which may bring severe danger to mankind or which may lead to unpredictable consequences, they must be subject to public discussions and democratic decision before they are put into operation. We should resolutely normalize and control the research and use of the uncertain science and technology.

Historically, human inventions and creations, including various tools, machines and even automatic systems, may be used to control their moral representations by scientists, engineers, and users. In his "The Relationship between Science and War", Albert Einstein points out, "Science is a powerful tool. Whether it benefits or brings disasters to mankind depends on human beings themselves rather than the tool. A knife is useful in our life, but it can be used to kill a person" ("Collected Works of Albert Einstein", Vol. 3, translated by Xu Liangying et al., the Commercial Press, 1979, pp. 56.). Emmanul G. Mesthene, a representative of technical neutrality, claims, "Technology brings new possibilities for man's selection and action, but it renders these possibilities into uncertain positions. What effect technology induces and what purpose it intends to reach are decided by man instead of intrinsic properties of technology" (Mesthene 1970, p. 60.).

With hi-tech development in our times, especially in intelligent society with heterogeneity, revolutionary and subversive changes are taking place. What people "can" do constantly breaks through the original thresholds, beyond human imagination sometimes, making people difficult to clearly predict the possible consequences as the development of science and technology is at the risk of being "out of control." The steady breakthroughs made in AI, the potential super-intelligence in particular, renders mankind into great hazard. Some pessimists even hold that instead of quickening human progress, AI accelerates the process of human enslavement and extinction.

Obviously, "can" and "feasible" of science is not equivalent to "should" in value. Nor can we deduce "should" in logic. To this issue, Erich Fromm, an American thinker, once queries the two guiding principles for scientific and technological development which he considers to be "adverse." The first one is "whatever technology is possible should be tried" and the second one is "to pursue the maximum efficiency and output" (Fromm 1968, pp. 3233.). Undoubtedly, the first principle drives people to forsake all the ethical standards, measure value, man's introspection and self-regulation to the effects brought by science and technology. The implementation of the second one may render mankind into the machines of social efficiency and uncharacteristic "spare parts." Such queries are profound in essence because science and technology can by no means exclude man's involvement but relates with man's practical activities. To regard science only as a tool means waiving and dodging human responsibility. To make science and technology available for human benefits and thoroughly erase the unbearable consequences, we must start from the planning, design, invention and creation of science and technology and take consideration of value as a direct influential factor before ethical and moral principles, and value is made to be one of the dimensions for scientific activities.

Based on the above analysis, we have sufficient reasons to exercise evaluation on the value of AI, and formulate ethical norms for AI development and application, all of which are our ethical responsibility and moral obligation. That is the reason why the USA ranks "recognition and AI influence on ethical principle, legal science and human society" as one of the seven strategic developing orientations in "The National Artificial Intelligence Research and Development Strategic Plan" released

in 2016. China also focuses on the solution of the issue "The uncertainty of AI brings us new challenge."

Of course, we will set "should" on facts, call for the value with which mankind may keep a foothold and reach consensus on the basis of democratic consultation. On one hand, although AI is imbued with uncertainty and various negative effects, we are not supposed to decline AI as some romanticists reject technology and waive the application of AI for promoting economic and social development and benefiting mankind. So we argue that it will be inadvisable for us to throw away the apple because of its core. On the other hand, with nearly limitless possibilities, we should guard against the adverse effects brought by abuse of AI, eliminate the fear for super-intelligence and its potential hazards. In AI programming, we should inset human fundamental value and ethical norms, under the guidance of which intelligent robots make decision and take actions so as to make them "Serve the people heart and soul" and bring more benefits to mankind. Mechanism for correcting errors, together with self-destructors should be loaded in robots with super-intelligence. Once they deviate from man's value by accepting vicious commands of ulterior motives, the robots can automatically identify those commands and perform automatic error correction to smother the coming troubles by initiating the self-destroying apparatus.

(2) Embodying the value principle of "should"

Since AI has emerged, some philosophers have retrospected its all-round influence and put forth some basic value principles for this new technology. As early as 1942, Issac Asimov, an American science fiction writer, raised "three laws for robots" in his novel "I, A Robot". Firstly, robots are not allowed to do harms to mankind and won't sit idle to human sufferings. Secondly, under the circumstances that won't violate the first law, robots must be subject to human commands. Thirdly, in the case that won't go against the first and the second law, robots are endowed with the obligation of self-protection. Later, Asimov another law of greater significance in which robots must protect human overall interests from being undermined.

With AI development, people have gradually been aware of the importance of ethical principles for intelligent machines and brought forth more specific value norms. For instance, in October 2015, based on Asimov's three laws, Japanese Keio University added another three principles for robots, covering "keep confidential", "service restrictions", "safety protection", "transparency", "responsibility."

In August 2016, the United Nations Educational, Scientific and Cultural Organization and World Commission on the Ethics of Scientific Knowledge and Technology jointly issued "The Preliminary Report Draft On Ethical Principles for Intelligent Machines", which elaborates the social and ethical issues brought by the manufacturing and application of robots. According to the report, intelligent robots should not only observe human ethical principles and moral norms, but also bear certain responsibilities, all of which will be encoded into robots.

In February 2017, Future of Life Institute, a voluntary organization formed by some scientists and robot amateurs, promulgated "Asilomar AI Principles", in which AI researchers aim at "we must develop beneficial AI, but bring it under control." People should abide by 23 fundamental principles for AI in the fields of research and

development, production, security, etc. Signed by 892 AI and robot research fellows (including Elon Musk and Stephen Hawking) and 1445 experts, this statement exerts far-reaching influence on AI realm.

The above principles are obviously Kantian ethical and moral decrees. As AI is developing in a fast way and exerts ever-increasing influence on our life, the similar ethical norms will keep bubbling up and will be made perfect. These norms are indispensable in guiding AI research, development, and application and will serve as the reference for us to prescribe the AI ethical principles with Chinese characteristics.

2.3.2 Ethical Principles for AI

The fundamental principles for AI cover those in AI research, development, and application as well as those prescribed for the coming super-intelligence with independent consciousness. In this field, the latter is granted by the former, whereas the former serves as the basic guaranteeing for the latter. Based on the above discussions and in light of AI developing trend, we may integrate deontology and consequentialism and put forth the following ethical principles.

(1) People-Oriented Principle

As creative activities yielding value, scientific and technological activities must persist in "people-oriented" principle. Due to the boundless prospect of AI, we should update our ideas, reform our systems, expand intelligent industries and nurture intelligent economy so as to meet human desires and necessities as much as possible and bring more welfare and benefits to mankind. We should do our utmost to promote human self-elevation and self-perfection rather than sit idle to AI risks and its adverse effects to endanger human survival. Although intelligent machines can survive and work in extreme hostile environment, the selection and setting of environment and homeland must be based on the principle beneficial to the survival for man who acquires an organic life. Increasingly powerful, intelligent machines must be subject to man's commands and serve for mankind, do the things which are beyond human ability. Under no circumstances will intelligent robots intentionally do harm to mankind. Nor can they sit idle to the people in danger or disaster. They must respect mankind, tolerate man's defects and boundedness and ensure mankind to live as an organic life. After prudent evaluation, they should also be capable of forbid the scientific research and technological application that will endanger man's survival and prospect and censure the people in charge.

(2) The principle of impartiality

Justice is people's moral intuition that they expect to be treated without discrimination and to deserve what they should as well as rational agreement for mutually acknowledging the interests of the parties involved and safeguarding their interests. According to principle of justice, AI should bring as many benefits as possible to mankind and its creative fruits will be shared by as many people as possible. As all

men are created equal, everybody will have the equitable chances to gain access to AI, use AI products at his will and make good use of AI so that we may fill up digital divide and "digital gap between the poor and the rich, eliminate economic inequality and the polarization between the rich and the poor. Based on equitable principle, we should perfect the design of "people-orientation", through which we will suppress the tyrannizing "capital logic" on one hand and prevent "technical logic" from doing whatever it pleases. Moreover, we will establish and perfect the systems of social welfare and social security, render supports to the underdeveloped countries, regions and enterprises, exercise salvation to the literal and scientific illiterates and take effective measures to safeguard their dignity and legitimate rights and interests.

(3) Transparency Principle

As a proverb goes, "Sunlight is the best corrosion remover." Transparency ensures that AI research, design, and application won't deviate from the proper ethical and moral principles. With regard to the fact that AI research and design is conducted in an operating mode of black box, but its ever-rapid development and potential super-advantage may incur catastrophic risks. During this process, we should adhere to open and transparent principle and put the whole operation under supervisory control from the relevant regulators, the ethics commission and the public so that the super-intelligence of robots are subject to explicable, intelligible and predictable state and prevent super-intelligence from the motives of endangering mankind, ensure that super-intelligence won't be controlled by the persons with ulterior intentions or privately connected to network and upgraded to form a separate organization in evading monitoring. Once intelligent system induces destructive consequences, its designer and user must immediately report to relevant regulator who will take effective measures to deal with the situation and introduce the case to the public. Transparency principle will reduce unpredictability and uncertainty to certain extent so as to relieve people's horror, tension and anxiety.

(4) Principle of Informed Consent

AI research and application may substantially change man, his mental integrity, and his living conditions. The collection, storage, and application of individual and corporate data may involve man's mental integrity, his personality and dignity as well as the research and application of man's legitimate right and interest, who should have the right to be informed. Before the above-mentioned practice is carried out, the executor must solicit the consent of the client. During the implementation, once the client's life or his mental integrity is endangered and his legitimate right and interest run into unpredictable consequences, the executor should halt his operation at once and try to regain authorization.

(5) Obligation Principle

In the course of AI research, development, application, and management, we must define the rights, responsibilities, and obligation of different moral subjects, predict and prevent the adverse effects, take necessary measures to remedy trespasses and ascertain who will be responsible for misstep. The design and operation of intelligent

system must comply with human fundamental value, brimming with basic ethical judgment and controlling force on actions so as to ensure the value goal that AI must obey human commands and serve mankind and the harmonious man-machine coexistence. We must emphasize that it is of great significance to take precautions against the known or potential risks of AI, determine liable nature and attribution of liability. For the scientists studying AI, they used to be the evaluators and decision makers based on human knowledge tether. In the times of AI, what they perform will decide the moral outlook and presentation of intelligent machines. Moreover, they bear the sacred and inescapable moral obligations and resolutely carry through the principle of "people-orientation." In his "To Make Science Beneficial to Mankind", Einstein warns, "if you want your life work to be beneficial to human beings, it is nor enough for you to know how to apply science. The concern for man should be your major goal for technology acquisition from the beginning to the end. You should focus the significant unsolved issues on how to organize people to work and how to distribute the products in a fair way si that our scientific achievement benefits human beings rather than scourge them" ("Collected Works of Albert Einstein" Vol. 3, translated by Xu Liangying et al., the Commercial Press, 1979, pp. 73.).

2.3.3 The Specific Paths to Construction of Ethical and Moral Principles

Regarding the ethical and moral issues induced by AI, international community is taking initiative action, as shown in "The Roadmap of Robot Ethics" by EU, "Constitution of Robot Ethics" formulated Southern Korean Government, Ethics Commission set up by Japanese AI Society and "Ethics Commission on Studies of Artificial Intelligence" of Google. We should also keep a sober mind to those issues, take effective measures to deal with them so that we may reach the consensus and direct its development in an active way.

(1) To Enhance the Construction of Moral Subjects

Moral subjects are dynamic persons who boast ethical rights and responsibilities as well as the consciousness of ethical obligations and who can perform activities on the basis of their ethical requirements. Ethical principles are set for mankind. So long as there exist evil intentions and greedy desires in man's mind, there will definitely be villainies. As AI is imbued with complexity, unpredictability and risks in application, it is the prerequisite for AI healthy development that the persons in charge should strengthen their conscience, define their own ethical rights and responsibilities and take prudent and reasonable actions. Therefore, in the course of researching, developing, applying, and managing AI, we should intensify the construction of ethical subjects, aiming at arousing the moral sense of the decision makers, administrators, engineers and users, who should consciously acknowledge and following the corresponding value principle and moral norms through self-communion, self-discipline and "cautiousness" so that they may utilize AI to benefit others and the society

and keep alert of AI adverse effects that may endanger the society. Although AI is not eligible for "a full ethical subject" at present, it remains a controversial topic whether AI will be "a full ethical subject". Even if more breakthroughs will be made in AI, super-intelligence with the ability to perform independent thinking and actions should identify and observe man's ethical principles and moral norms by keeping man-machine interactive state all the time and following man's commands.

(2) To Establish "Ethical Commission"

During AI search, development, and application, there appear a number of frontline problems featured by inconsistency, making it difficult for researchers to exercise evaluation, supervision and regulation of AI. So it is necessary for us to form "Ethical Commission" which consists of AI scientists, engineers, and other experts in ethics, law, politics, economics, culture and social sciences so as to ensure the proper orientation for AI development.

The functions and power of "Ethical Commission" should be based on the above value principles. Under the premise of fully democratic consultation, the Commission will, according to the principle "majority decision" performs evaluation on AI development program and the research of cutting-edge technology, conduct democratic deliberation of the ethical conflicts arising in application, seek the consensus through full discussions and reasonable demonstration by relevant information and data so as to coordinate the parties involved to take concerted actions. As this issue is great significance, "Ethical Commission" has the power to delay the vote and exercise veto. Naturally, the client may appeal for the resolution which he claims to be incorrect so that the possibly erroneous decision may be rectified.

(3) To Stop the Evil Conduct and Award the Benevolent Performance by Integral Measures

All social organizations should make concerted efforts to tackle the major problems, popularize the mature AI technology and promote industrial upgrading so as to improve production efficiency and generally increase the public income and elevate living quality. We should pool more funds for free education and training to help the jobless and unemployed people to improve their professional competence so as to ensure people's employment as much as possible. We should also establish and perfect social security system for coverage of the vulnerable groups, provide the "digital deficient areas" and "digital poverty-stricken people" with professional service so that all the people may share the benefits brought by social intelligence.

We should set up effective risk pre-warning and disposition mechanism and transparent AI monitoring system, carry out double-deck monitoring mechanism of design censure and application supervision so that we can exercise the regulation on the complete flow operation of AI algorithm, product development and application of achievement. We should urge AI industries and enterprises to be self-disciplined, to hold up the bottom line of ethics and to perform their social obligations and refrain themselves from doing whatever they please for earning profits. We should establish international coordinating organizations with disposal rights, contribute more efforts

in studying such universal issues as alienation of intelligent terminal and safety super-vision and store coping technology scheme so as to deal with the global challenge. As to the immoral behaviors, such as data abuse, invasion of privacy, intentional injury, pilferage of others' belongings and dereliction of supervising duty, we must exercise severe penalty over the said atrocities with such means as ethical denouncement, confiscation of gains and legal sanction and form a benign mechanism featured by "Evil seeds yield bad fruits."

(4) Ethical and Moral Construction Taking A Long Time to Complete

As a new technology, AI develops by following its own law and logic, and its devel-oping trend is by no means the straight simulation of human beings. If a car, a train or plane, made similar to man, moves by two legs. Then it runs as fast as man does. Rather than direct imitation of man's brain, AI will personalize man. With only one brain, man cannot focus on two things at a time. However, equipped with a number of processors, an intelligent machine may complete several assignments at the same time. It is the premise for our consideration and action that we should break up man's existing mindset, conform to AI law and logic in developing such technology, enable intelligent machines to do what man is unable and unwilling to and make them to help and serve mankind to a great extent.

At present, AI is at its initiative stage of development. It is similar to the morning sun just over the horizon, which is now lower than man's intelligence in most fields. Yet, we shouldn't predict the development of super-intelligence based on man's existing intelligent level. Now AI is developing at an accelerating speed. With its boundless prospects, AI will approach and even surpass man's intelligence, free from any technical restraint. If it is not controlled, the event will probably occur that an "alliance" will be formed among the machines equipped with super-intelligence. AI may induce profound social influence, which we have preliminarily sensed.

AI is complicated and revolutionized new hi-tech, an unprecedented social eth-ical experiment in human civilization. As far as the present conditions of AI are concerned, we should update our concepts, make technical breakthroughs, expand its application areas. As we cannot predict its application consequences, have very superficial experience, we shouldn't draw the premature conclusion on the ethical results brought by AI. Whether man's existing ethical principles and moral norms are applicable to the evaluation of AI, we should unfold more open discussions. We still have to probe the effective methods and measures for exercising technical super-vision and normalize the moral principles on AI. In this sense, we may conclude that the construction of ethical principles and moral norms for AI will be a long historical process. It will be detrimental to AI development if we seek quick success and instant benefits or we expect to accomplish the whole task at one stroke.

Naturally, as AI is developing in an uncontrollable way, it is filled with uncer-tainty and risks which may result in the worst consequences unbearable for mankind. Therefore, we should take precautions against such situation. We must make more efforts to study AI, keep track of AI technical innovation, be well-informed of the developing trend of AI, so that we can put it into application, make it better serve mankind and bring more benefits to us. More importantly, we should make bold

prediction and thorough introspection on AI, make prudent value evaluation and decisions, bring forth an insurmountable "ethical bottom line", take reasonable and feasible countermeasures in different stages, gradually accumulate AI experience and technology and remold anew ethical order featured by man-machine cooperation and man-machine integrity step by step.

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