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New Challenges Posed by Robots to China's Civil Code in the Age of Artificial Intelligence

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Abstract In the age of artificial intelligence (AI), robots have profoundly impacted our life and work, and have challenged our civil legal system. In the course of AI development, robots need to be designed to protect our personal privacy, data privacy, intellectual property rights, and tort liability identification and determination. In addition, China needs an updated Civil Code in line with the growth of AI. All measures should aim to address AI challenges and also to provide the needed institutional space for the development of AI and other emerging technologies.

Keywords artificial intelligence (AI), personal privacy, data privacy, Civil Code

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Introduction

The concept of artificial intelligence (AI) was first proposed at a seminar on machine simulation intelligence in the summer of 1956. As a new discipline, AI is known as one of the three principal technologies of the 21st century, together with genetic engineering and nanotechnology. As a leading technology in the latest round of the technology revolution, AI has been widely applied for its ability to replace people in doing simple, repetitive, or dangerous work in such industries as finance, security, and customer service. Indeed, it has performed far better than people in both accuracy and efficiency.[1] The past half-

[1] See China Electronics Standardization Institute, 人工智能标准化白皮书 (*AI Standardization White Cover Version*), at 1 (2018).

Translated from 东方法学 (Oriental Law), 2018 (3): 4–9.

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century has witnessed the strong development of modern science and technology, such as mobile Internet, big data, and brain science. Over these years, AI has made rapid advances, and has become a new focus of international competition and a new engine of economic development.[2] Topical information sovereignty[3] will, to an extent, shape the future role of AI in international competition.[4]

Opportunities and risks coexist in the age of AI. The American film *The Terminator* describes the story of a human-disguised robot assassin fighting against humans. Leading scientist Stephen Hawking warned the world that AI may be the biggest disaster in human history; if managed improperly, AI may indeed become the worst invention, if a robot capable of thought puts an end to human civilization. Such an assertion is not alarmist. "An issue is a slogan of our times." Taking advantage of big data, AI has supported our life and work, yet has posed new legal problems and challenges. As stated in the "New Generation Artificial Intelligence Development Plan" issued by the State Council of the People's Republic of China, "AI is a widely influential technology that can change employment structure, impact legal and social ethics, intrude personal privacy, challenge international relations, and generate various issues involving government management, economic security, social stability, and even global governance." These issues must be solved. At present, research on AI has primarily been conducted from the ethical[5] and cognitive philosophy[6] perspectives. The author aims to discuss the following AI challenges on the prevailing civil law and judicial practice, hoping to provide benefits for the adoption of AI laws and regulations.

I. AI Challenges to Civil Subject Systems

AI development has generated various robots, and brings up critical legal issues: Should robots be regarded as legal persons? Should they appear as a subject or an object in a legal relation? Should they be treated as an ordinary machine, animal, or somewhat as a person?

One of the AI research pioneers, Marvin Minsky, pointed out that AI is the science that allows machines to execute tasks that require human intelligence. The 2016 World

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[2] See The State Council of the People's Republic of China, 新一代人工智能发展规划 (国发 [2017]35 号) (*Development Plan on the New Generation of AI, Guofa [2017] No. 35*).

[3] See XU Zhihua, 网络空间的全球治理：信息主权的模式建构 (*Governance of Global Cyberspace: Model Construction of Information Sovereignty*), (12) 学术交流 (Academic Exchange), 81–86 (2017).

[4] Id.

[5] See XU Yingjin, 具身性、认知语言学与人工智能伦理学 (*Embodiment, Cognitive Linguistics and AI Ethics*), 46 (1) 上海师范大学学报 (哲学社会科学版) (Journal of Shanghai Normal University, Philosophy & Social Sciences Edition), 5–11 (2018).

[6] See WEI Yidong, 人工智能的适应性表征 (*Adaptive Representation of Artificial Intelligence*), 47(1) 上海师范大学学报 (哲学社会科学版) (Journal of Shanghai Normal University, Philosophy & Social Science Edition), 28–39 (2018).

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Robot Conference, held in Beijing, displayed various robots, which could read human faces, expressions, ages, and genders, and even put on emotional and facial expressions similar to those of people. Robots have intelligence and can independently process applicable data and information. Some sophisticated robots have approached some aspects of human-level intelligence. In 2017, Saudi Arabia granted citizenship to a robot named Sophia, sparking further legal deliberation on AI legal status.

AI progress demonstrates that robots have gained some degree of self-awareness, self-expression, and can communicate emotionally with humans. In several years, robots are expected to reach approximately 50% of human-level intelligence. In practice, robots can answer phone calls, provide voice messages, conduct ID identification, translate languages, render voice conversion, support intelligent transportation systems, and even participate in case studies. The statistics available now indicate that robots have performed approximately 23% of lawyer services, because they can learn and analyze available data and information and provide judicial suggestions and recommendations. Some scholars even believe that one day robots will be able to work as court judges.[7] Thus, robots are not only tools, but also own consciousness and make simple expressions. Therefore, some argue that robots should be seen as legal persons,[8] which is a new and profound legal issue.

The author believes robots do not challenge the conventional civil law definition of civil subjects, at least in the short term. On the one hand, robots are not civil subjects, because robots are man-made, and have been viewed in civil law as the "object" from their very beginning. Despite their engagement in human-related activities, they are essentially determined by their encoded algorithms and do not possess the human-level consciousness and thinking skills. On the other hand, robots cannot hold legal rights and duties, and in the case where a robot harms a person, the Product Quality Law and Tort Law of the People's Republic of China should be applied, such that producers or managers of robots shall be held liable. So the current laws and regulations are still effective to manage robot challenges[9] and there is no need to recognize civil law status of robots at present. When robots evolve and one day can think as a person or even think better than a person, then robots can hold rights and bear duties in a pre-set scope of work. But for now, robots cannot and do not need to become legal persons.

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[7] See GAO Qiqi & ZHANG Peng, 论人工智能对未来法律的多方位挑战 (*On the Multi-Faceted Challenges of AI on Future Laws*), 32 (1) 华中科技大学学报 (社会科学版) (Journal of Huazhong University of Science and Technology, Social Science Edition), 86–96 (2018).

[8] See YUAN Zeng, 人工智能有限法律人格审视 (*Review on Limited Legal Personality of AI*), (5) 东方法学 (Oriental Law), 50–57 (2017).

[9] See LI Sheng, 略论人工智能语境下的法律转型 (*On Legal Transformation in the Context of AI*), 36 (1) 法学评论 (Law Review), 98–107 (2018).

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II. New Challenges Posed by AI to Personal Privacy Protection

AI development has challenged personal privacy protection, which includes but is not limited to the following aspects.

First, AI poses new challenges to personal privacy protection. One example is the unmanned aerial vehicle (UAV, commonly known as drone) technology, "heartless observational technology," which can reach targeted areas and spy on others' indoor privacy. Undoubtedly, such intrusion is unprecedented, and has become the source of many disputes. A key challenge in these disputes is that victims have difficulties in collecting and providing solid evidence or in identifying specific perpetrators.[10] Thus, laws and regulations should be urgently updated for furthering protection of personal privacy in the age of AI.

Second, AI poses new challenges to personal data protection. In the age of big data, personal data are recorded and analyzed to support predictions. Some people feel "naked," because almost all data about them place individuals under monitoring or exposure to "a third eye" all the time. For example, Amazon monitors preferences of shopping customers, and Google monitors web browsing history, and so on; [11] No matter where you go, cookie technology allows the software to accurately track your real-time position as long as you carry a mobile phone with you. Analyzing big data, AI may steal personal data. Some robots are programmed to collect personal data on a large scale and implant them into programs. In addition, AI technology may also be used to research and develop a variety of products based on big data, and benefit from the infinite potential of big data, thus stimulating more people to further collect and analyze people's big data information. Nowadays, the evolving technology has made large-scale personal data collection and analysis increasingly cost-effective for various purposes, posing growing risks to personal data and personal privacy.[12] The General Provisions of the Civil Law of the People's Republic of China outline provisions on personal data protection, but do not specify rules on AI collection and application of personal data. Therefore, future legislation should adopt rules for banning illegal personal data collection, leakage, and trafficking in the

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[10] See *How Should We View Drone Violations of Public Privacy?* Sohu News, available at http://sohu.com/a/77373515_115303 (last visited Feb. 12, 2018).

[11] See Viktor Mayer-Schönberger, 大数据时代：生活、工作与思维的大变革 (*Big Data: A Revolution that Will Transform How We Live, Work, and Think*), translated by SHENG Yangyan and others, Zhejiang People's Publishing House (Hangzhou), at 193 (2013).

[12] See ZHANG Xianli & GAO Qiqi, 人工智能时代公民的数据意识及其意义 (*Citizens' Data Consciousness and Its Significance in the Age of AI*), 38 (12) 西南民族大学学报 (人文社科版) (Journal of Southwest Minzu University, Humanities and Social Sciences), 211–216 (2017).

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course of AI application of those personal data.[13]

Third, AI poses new challenges to portraiture right protection. Leveraging new technologies, such as optical technology, sound control, and face recognition, AI can collect, spread and imitate personal images. For example, optical and photography technologies allow AI to capture high-resolution images, even during nighttime. The simpler process of image acquisition and utilization is a new challenge to portraiture right protection. Recently, facial recognition technology using big data has been gradually applied in various fields, such as digital payment execution, tracking drivers running red lights, and even toilet paper management in public restrooms.[14]

Finally, AI poses new challenges to personality protection. AI has made it possible to implant personal voice, facial expression, and body language of a given person into AI products, which can express ideas and communicate with people. However, implanting the personality features of one person into AI products without obtaining prior permission may violate his or her personality interest.

When AI is so advanced that its legal person status has to be asserted, protecting personality interest of a robot would be an unprecedented issue. Nowadays, criminal law theory scholars are exploring principles for suing for actions of destruction of a robot: intentional homicide or intentional property destruction. According to recent media reports, robot companions have appeared. If the robot companion is abused, whether the robot can claim its personality interest has been offended, and so forth, also needs to be further explored.

III. New Challenges Posed by AI on Personal Data Protection

Clarity of property rights is one of the basic requirements of a market economy. However, big data and AI make this traditional proposition face new challenges. Data and algorithms make up the core of AI, and allow for the development of data collection and analysis technology, as well as more advanced machine learning. Nowadays, big data is an important AI analysis tool and constant upgrades are supported by advanced hardware, such as sensors and microprocessors. With the help of big data analysis, AI can perform relevant drills and operations.[15] AI performance efficiency largely depends on the number of databases it contains. Thus, AI needs a large amount of data from different subjects,

[13] See WU Handong, 人工智能时代的制度安排与法律规制 (*Institutional Arrangements and Legal Regulations in the Age of AI*), 35 (5) 法律科学 (西北政法大学学报) (Science of Law / Journal of Northwest University of Political Science and Law), 128–136 (2017).

[14] See *What else Can Face Recognition Be Used for Besides Catching Three Fugitives in Half a Month?*, National Business Daily, available at http://news.163.com/17/0604/07/CM2PVCQ70001875P.html (last visited Feb. 2, 2018).

[15] See WANG Bo & HAO Yinzhong, 大数据条件下司法公开对我国法官制度的新要求 (*New Requirements of Judicial Openness on China's Court System under Big Data*), (12) 学术交流 (Academic Exchange), 100–106 (2017).

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and data capture and utilization are ubiquitous in the AI industry. The data application value in AI development is increasing, but data development and utilization need explicit data property rights subject and content, and the data transfer and utilization should be standardized. Therefore, AI development needs new solutions related to the property laws.

There are three main types of data used by AI, specifically personal data, data of private enterprises and organizations, and data managed by public institutions. One of the basic principles of data property rights is that personal data belongs to its owner and unowned data is considered public resource.[16] However, AI stores and processes collected data to generate derivative data. Since data possession and transfer are often intangible, there is no solid evidence of ownership. A huge legal challenge now is the identification of data ownership in the age of big data, so as to protect a person's personal data rights and safeguard property rights of legitimate data users and developers. To date, issues of how to confirm data ownership and how to build the rights content and rights transfer system remain unsolved, and require legal solutions as soon as possible.

Property Law of the People's Republic of China divides property ownership according to property nature: movable or immovable. However, dividing data this way is difficult. Thus, debate persists among scholars on whether data falls under property right or creditor right. Article 127 of General Provisions of the Civil Law of the People's Republic of China lists the data protection rules. On the one hand, data falls under a new type of property right in nature, but data protection is not limited to the data ownership and distribution, but also involves such legal issues as data transfer, utilization and storage. When AI is applied, major practical issues, such as how to standardize data collection, storage and utilization, avoid data leakage and abuse, and ensure the security of national data, need to be solved urgently.[17] On the other hand, the application mode and scope of AI depend on its algorithms to a great extent. Thus effective algorithm regulation is also crucial to avoiding infringement. For example, by analyzing the frequency of cancellations of orders in online transactions, AI can assess the buyer's social credit and economic status, and such an assessment may significantly impact the buyer's personal life. Currently, the openness, transparency, and fairness of AI algorithms are the core issues of AI technology development, yet they have not received sufficient attention.

IV. New Challenges Posed by AI to Intellectual Property Protection

AI development also requires the protection of intellectual property rights. Robots, an AI product, can create music, paintings, and things previously done only by humans,

[16] See WU Xiaoling, 大数据应用：不能以牺牲个人数据财产权为代价 (*Personal Data Should not Be Sacrificed for Big Data Applications*), (10) 清华金融评论 (Tsinghua Financial Review), 2016.

[17] See ZHENG Ge, 人工智能与法律的未来 (*AI and the Future of Law*), (10) 探索与争鸣 (Exploration and Free Views), 78–84 (2017).

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challenging current intellectual property rights law. For example, Baidu has developed robots that can write poetry, Microsoft (Asia) has developed the XiaoIce AI system that published an anthology of poetry in May 2017, entitled "The Sunlight that Lost the Glass Window." In Japan, robot-created novels have even passed the first round of selection for a Literature Prize. Some robots can compose or paint, and their pieces are sold on the market. The question now is who owns their intellectual property rights, the robot software inventor, the robot owner, or the robot itself if it enjoys legal personhood? As discussed above, at this stage of AI development, a robot is not seen as a civil subject, thus it is not right to assert that the robot-created works are robot-owned. Thus, their intellectual property rights belong to the robot owner. One day, robots may advance in creative technology, reaching or even exceeding human-level ability. When this day comes, the question of whether to grant robots legal personhood and intellectual property rights will need further elaborations.

In addition, robots must go through the process of "deep learning" and "deep thinking." To this end, AI may need to collect and store much information copyrighted by others, which may constitute plagiarism and copyright infringement. Robots have a large storage capacity. Some countries have legally made it clear that storing information copyrighted by others is copyright infringement. A robot is a machine copying intellectual behaviors of humanity. A robot actions in leveraging knowledge or information copyrighted by others, creating music or a song containing some syllables of others, may also constitute plagiarism.

Who and how to blame for violating intellectual property rights is also an issue. If a robot is given legal personhood, from what sources can it provide compensation? If there is no source, does the tort liability fall on its owner, seller, or creator? These issues all require further elaborations.

V. New Challenges Posed by AI to Tort Liability

AI development also impacts the determination of tort liability, a long-standing concern to scholars. With the increasing application of AI, the identification and determination of tort liability have become increasingly difficult according to the current legal framework.[18] New liabilities surrounding AI can harm people and vice versa, and they must be addressed accordingly.

There have been cases of AI harming people. At a German Volkswagen factory in July of 2015, a 21-year-old worker was hit by a robot's arm and was crushed on a metal plate when installing and commissioning a robot. In 2016, Google's self-driving car collided with a bus during a test drive in Mountain View, California, and the court ruled

[18] See ZHU Tizheng, 人工智能时代的法律因应 (*Legal Response in the Age of AI*), 39 (2) 大连理工大学学报 (社会科学版) (Journal of Dalian University of Technology, Social Science Edition), 97–102 (2018).

that Google was responsible for the accident. Similar cases have happened in China. At the 18th China Hi-Tech Fair in Shenzhen in November of 2016, a robot named Fatty suddenly malfunctioned and smashed glass booths and injured one person.[19] Superficially, robots are simply human-made products and their creators should be responsible for damages caused. However, they are unlike general products that can be easily traced and held accountable since robots utilize their own algorithms and operating procedures. Therefore, when a robot causes damage, the responsibility cannot automatically fall on its producer. These machines are created in many steps by different individuals and organizations, making it difficult to determine which party should be held accountable for an accident.

AI development has also generated self-driving technology, which poses new challenges to road traffic accident liability.[20] Recently, the self-driving bus routes in Shenzhen, China attracted attention worldwide. Who should be responsible when a self-driving automobile has a road traffic accident? Can the current road traffic laws and regulations be applied to self-driving automobile accidents? Is it necessary to formulate liability laws specifically for self-driving automobiles? This issue has already appeared. On March 20, 2018, an Uber self-driving car crashed into a bicyclist in Arizona, United States, and the Arizona State Government immediately announced the suspension of Uber's self-driving cars within the state. In the end, the case was settled in reconciliation and no corresponding legislations were enacted.[21] The author believes such accidents should be handled on a case-by-case basis and the responsible party should be identified accordingly. For example, if a self-driving car accident is caused by mechanic failure, the self-driving car business operator should be held accountable, according to the Tort Law and Road Traffic Safety Law. If the accident is due to a malfunction in the self-driving operating system, requesting the business operator to take full responsibility is unfair. Thus, allocation of responsibility is worth discussion. With the growing application of self-driving technology, introducing a new insurance coverage, mandatory for self-driving road traffic accidents only, may be necessary, to protect and compensate accident victims.

Another question worth considering is the identification of road accident liability for flying cars in the future. According to media reports, Sebastian Thrun, former Google vice president, having been involved in the creation of Google's self-driving car, announced

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[19] See *China's First Robot Casualty Incident Occurred at Shenzhen's Hi-Tech Fair*, 联合早报 (Lianhe Zaobao), Nov. 18, 2016.

[20] See CHEN Xiaolin, 无人驾驶汽车致人损害的对策研究 (*Research on Countermeasures against Human Damage Caused by Self-Driving Vehicles*), 23(4) 重庆大学学报 (社会科学版) (Journal of Chongqing University, Social Science Edition), 79–85 (2017).

[21] See Uber 与无人车撞死行人案受害人家属和解赔偿金额未公布 (*Uber Has Reached an Undisclosed Settlement with the Family of a Pedestrian Killed by a Driverless Car*), available at https://xw.qq.com/tech/20180329012517/TEC2018032901251700 (last visited Mar. 31, 2018).

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that Google expects flying cars in the sky within five years.[22] The flying cars will likely overturn current road traffic rules and regulations. Legally categorizing flying cars as a new type of aircraft under aviation law or as a regular motor vehicle under vehicle and traffic law is a matter of great interest.

Conclusion

The age of AI has come. It impacts our work and life, and also our legal system. Early in the 21st century, Xiaokai YANG, a famous Chinese-Australian economist, proposed that if China devotes all attention to technological imitation and neglects institutional construction, China's later-mover advantages may turn into disadvantages.[23] China cannot solely focus on technological advances and neglect the possible side effects of technology. Legal theory research should pay close attention to social reality and respond to legal challenges posed by emerging science and technology, including AI and big data, so as to provide strong theoretical support for further legislative improvements. Law should not only look at today, but also look into tomorrow. The legal system should arrange legal space for the emerging science and technology. It is especially critical to fully understand and embrace the structural and revolutionary impact of science and technology on work and life in observing and predicting the future legal development direction. This will help us formulate effective and efficient laws and regulations, promote healthy AI development, and eliminate its side effects. Therefore, the Civil Code of the People's Republic of China should look at new challenges posed by AI and develop updates to truly stay abreast with the times and better respond to future technological development.

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[22] See *The Father of Google Autopilots: Flying Cars in Five Years*, Tencent Technology, available at http://tech.qq.com/a/20180212/024798.htm (last visited Feb. 13, 2018).

[23] XU Zipei, 数据之巅 (*The Epitome of Data*), CITIC Press Group (Beijing), at 337 (2014).