**AI, a double-edged sword in the future**

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In the last decades, we have seen huge progress in AI and machine learning due to a substantial increase in computation power and availability of data. In the next 10-50 years, our society will undergo a digital transformation and also tackle consequent problems in the process.

On the bright side, AI and ML have already been applied in many technical devices in our daily lives nowadays, bringing high efficiency and much convenience to us humans. In the future, they will be further integrated into building smart systems which will be commonplace used almost everywhere.

In industrial manufacturing, AI predicts maintenance and reduces the probability of incidents by analyzing machines’ data and scheduling maintenance proactively. Computer vision with AI refines quality control and anomaly detection on assembly lines, which also prevents machine failures. Robots in workshops can also perform repetitive, high-precision tasks for humans. In this way, AI help to avoid downtime, extending machines’ lives and cutting down manufacturing cost.

In addition, AI can be utilized to build cyber-physical systems in IoT by managing multiple interconnected elements. Decentralization enables information sharing among machines and AI serves as a data miner, finding the correlation between different variables. By using ML, AI systems are not only able to collect a large amount of data being generated by transmission devices in IoT but also analyze them, extract information to make real-time predictions. More crucially, they can automatically optimize the algorithms, increase the accuracy of predictions, and even work without human interventions. Using features from data, diligent AI systems can offer new technical services such as face recognition, speech recognition, and predictive analysis. Their self-learning and data-process capabilities help to optimize business results, boost operating efficiency and safety, lessen the operation cost, and operate services, which assist IoT to reach its full potential.

Leveraging AI in healthcare enjoys a broad prospect. Doctors can detect and diagnose diseases and even predict cancer patterns by using ML to extract features in images and gene sequences. Remotely monitoring patients with sensors and detecting abnormalities will save much time for medical workers. Moreover, surgical systems can perform or assist complex surgeries and make minimally invasive surgery possible.

In agricultural production, AI systems use data from the sensors to make smarter decisions on crop variety, irrigation, fertilizing, and pest control. We can adjust farming methods based on forecasts of natural factors like weather conditions and temperature. What’s more, computer vision with ML can be applied to monitoring crops and raising the alarm when necessary.

When considering transport and logistics, AI can be applied to fleet management based on data collected from GPS trackers and sensors. Despite monitoring and predicting for maintenance, AI can also help fleet operators reduce fuel used and identify risky driving behavior through navigation in real-time.

In retail management, AI can be applied in two ways. For retailers, AI can collect and analyze users’ data for making accurate, data-based decisions, such as product placement strategies. For customers, AI provides personalized recommendations based on their behavior and personal information. Robots with face recognition can guide customers, enhance their overall shopping experience and improve customer service.

In intelligent housing systems, AI can lift energy efficiency and upgrade the living experience. A robot vacuum cleaner, equipped with sensors, can collect environmental data and use AI techniques such as enforce learning to determine its path through space and adjust its response accordingly. The house will automatically adjust appliance control such as lighting based on climate conditions and user preference. For now, the idea of a fridge connecting with your smartwatch is still a half-baked one, but perhaps people may take it for granted shortly.

AI in smart cities can collect and analyze vast amounts of data from sensors for people to manage real-time situations. Apart from the maintenance of urban infrastructure, it also promotes community public services such as waste management and intelligent lighting, which save both energy and time. Drones can be used to monitor traffic in real-time, and their data can be used to adjust traffic lights or lane allocation and management to reduce congestion without human intervention. Sensors can be installed on bins to tell cleaners to empty them when they are full, and also possibly on bridges for knowing when and where to repair them. All above contribute to lower expenditure and convenience.

Equally important, we may attempt to use AI to solve many social issues such as collective risk dilemmas and ecosystem protection. The idea has been put into practice, for we already have systems like PlatformOcean with deep social knowledge, which starts with a basic platform, enables communities to customize it to meet their own goals and needs. Another interface, Urban Refill, whose aim is to incentivize people to reuse plastic bottles and minimal plastic waste, promoting an environmental-friendly lifestyle.

In general, AI can solve problems ranging from delivery robots and virtual assistants to disaster search and rescue operations. While AI and machines are exceeding our cognitive faculties in most fields, raising fears of ethical or safety risks, and other considering scenarios cannot be neglected. Four main risks are listed below with possible precautions.

Firstly, job demands will become increasingly higher and more meaningless jobs may emerge. Research shows in China about 40% of simple and high-competitive jobs will be replaced by 2030, 14% of jobs in developed countries are highly automatable and another 32% could face substantial changes. Consequently, in the coming years, some of our jobs will no longer exist and the overall number of posts will probably decrease so the general demand for our jobs will be much higher. For low-education workers, the elimination of low-demanding jobs will lead to unemployment. For people receiving tertiary education who won’t lose their jobs, there will be fiercer competition in the job market. What’s more concerning is the increase of “meaningless” jobs, which means people working for goals that don’t make sense in human progress. For example, there will be more programmers working in social media companies, trying to figure out what teenagers like to browse most and how to get them hooked in so that the company can maximize the profit. In this case, they are spending time and making money, but actually doing no good or even harm to humankind’s progress.

To get prepared for the change, job hunters should anomaly combine AI techniques in business processes, organization structures to avoid being sifted out. Regulators should operate policies to restrain “meaningless industry” and the public should have a clear awareness of these threats of digitalization.

Secondly, it will be challenging to settle privacy violation problems such as surveillance capitalism, privatization of innovation, and Deepfake videos. The government, educators, developers, and users need to cooperate to fix the problem. For regulators and legislators, law-making should be in the smallest detail, and police should attach more importance to digital safety and apply high-technical detection on this matter. Developers should be given less consent and apply safety methods to prevent data breaches. Educators need to widespread the risks and users should have a second thought before uploading their photos on social media.

Thirdly, AI development may take a toll on public mental health as well as our brain function. With designers leveraging tricks such as ‘near-miss effect’ and reward systems, we are easily addicted to digital devices and thus waste otherwise productive time. Many mental illnesses like distress and isolation may affect the general public. In recent years, the cyber-bullying rate has been soaring and excessive perfect body images on social media contribute to body shaming. According to a study in Kaspersky Lab, one-third of European adults will turn to the internet for answers before trying to recall the information themselves. In this case, the convenience brought by AI may lessen our ability to store and process information and ultimately lead to declines in brain function.

To get rid of reliance on devices and avoid sinking further into the virtual world, all of us must lay great emphasis on the issue. Educators should raise public awareness of the serious consequences above. Parents should limit their screen time themselves, establish more face-to-face interactions with children, and pay more attention to how much their kids depend on digital devices. Taking advantage of some apps, all of us can avail ourselves several hours a day without digital devices. Furthermore, we should have a clear independent mindset and be alert when using AI to find solutions, for they will probably deceive us and easily get us hooked.

Finally, AI may inherit or even reinforce biases due to biases in training data. Amazon’s sexist recruitment AI has reflected that, although AI can utilize more information than we do, it isn’t immune to errors, and it will have biases that actually can't be eliminated. Therefore, operators should be careful when applying AI systems to decision-making, and we human should always bear in mind that machine is not always correct. Indeed, the machine itself can't generate biases, but troubles come from the designers behind it. So, we should first develop critical thinking to figure out the problems. Then refine AI systems by designing certain data accordingly or widening the data sources and exaggerating the dataset.

In a nutshell, AI development will lead to more adverse consequences than expected. The more we are aware of these harms, the better we are to cooperate together to face them.

Every coin has two sides. Whether AI and machine learning will transform all aspects of our lives is no longer a question, what we should do is to maximize its utility and introduce precaution measures to deal with the matters.

Oxford Prospect Online Programme is the first international program I have participated in. Even though the program is set online, all sessions are dynamic with lots of interactions and faculties are friendly and welcoming. During the two weeks, not only did I acquire knowledge and skills, but I also make friends with many brilliant participants in the course and create mutual understandings.

The thought-provoking lectures contain both cutting-edged information and explanations of classical principles. “Weighing the invisible” really broadens my horizon of astronomy and “Using math to clean up our oceans” impresses me with how mathematics integrates with geography as well as how basic but practical the model is. Moreover, “intelligent manufacturing" and “Development of Oncological Imaging” give me a deeper insight into the application of data mining in the clinical and manufacturing field. They also further my exploration in my future career, lighting my enthusiasm in leveraging my data-mining skills in the medical field.

Workshops provide thinking, writing and presentation techniques and their utility is quite beyond my expectation, particularly the one with Professor Martin Bureau and Eric. I also obtain practical skills like writing in structures and summary for presentations, which is certainly useful in my academic career.

As a supplement to the lectures, the seminars dig deeper and wider to the topics, and I’ve learned a great deal during my preparation of my presentation and from the feasible guidance from Professor Bernardo Cuenca-Grau.

Thanks to the multi-discipline program, I’ve got a profound insight into what’s related to my major and a wider sketch of the frontier areas for other science disciplines. Additionally, it’s quite a precious opportunity for me to interact with the prestigious professors and the special guests in the lectures.

Oxford has always been my motivation. For academic development, I plan to participate in the Oxford tutorial program and the visiting student program, and it will be my privilege if I could gain admission to studying for my master's degree in Oxford. Looking forward to the next wonderful session with Oxford.