Does it require a Carrington Event to save humanity?*

Alternative intelligence as discussed in society and its technology

In Thailand, those who can afford it are very open to technical innovations. Unlike countries where electricity is quite expensive, here, the number of electric-driven cars has rapidly increased, and electronic tools, such as mobile phones, are even handled by very young children, who have just mastered walking. At Khon Kaen University (KKU), it is no surprise that one of the faculties responsible for engineering rules the scene in electronics and communication, which is continuously challenged by hackers attacking the university server. Offers to participate in workshops introducing various versions of artificial intelligence (AI) frequently appear on the university website. Under 'KKU AI SPHERE', an extensive introduction to the world of artificial intelligence (AI) programs is available.

AI is not welcomed throughout society

Somewhat contrary to the KKU's preference for electronic advancement, a former dean of two faculties and founder of a university unit joined the chorus of Thai scientists in the daily newspaper Bangkok Post, expressing second thoughts about the country's rapid transformation through electronic technology, including artificial intelligence (AI).

Prof. Peerasit Kamnuansilpa's recent contribution, entitled 'Rethink what it means to be human,' singled out, besides the demographic decline, the digital automatization as a hazard for the Thai society, which he sees is politically and morally not prepared for the challenges ahead (1). As a telling example of an unwelcome use of AI, a euphemistic article about nursing robots appeared in the Bangkok Post, but was not very well received by the readers. Ill patients certainly don't appreciate seeing a robot attend to their needs. In this context, Prof. Peerasit's remark that emotions, empathy, compassion, and our love for humans forever separate us from robots was utterly appropriate (1, 2).

Yet, history shows that technical advancements cannot be withdrawn. Likewise, AI might be misused in dehumanizing mankind (probably with the cry for a 'better world'). Still, it is, and will continue to be, of benefit, for instance, to science, including medicine and public health.

The example of the benefit of AI for genetics

Likewise, despite the increasing worry about the change of society by AI, an overall benefit is difficult to deny. An example of the advantage of an extensive database on human health is the genome-wide association studies (GWAS) (3). The term, not generally common for those outside the field of genetics, is an essential tool for identifying the genetic setting of an individual, called 'genotype.' Knowing which gene determines the color of the eye, being the color brown, then 'brown' is the 'phenotype' for that particular person for her or his eye. But usually, it is not one specific gene that is responsible for a phenotype, let alone for diseases classified as non-communicable, such as cancer or heart disease.

Nowadays, scientifically, genetic explorations are no longer possible without encountering vast databases and employing highly sophisticated statistical methods. This is because singular genes responsible for rare genetic diseases are not the overwhelming genetic background related to common non-infectious complex diseases, such as diabetes and cancer. To the frustration of those working on the Human Genome Project, at the beginning of the 21st century, it was realized that 97% of the 3.2 billion bases appeared not to have any function. However, the 'Junk DNA' turned out to be essential for linking single-nucleotide genetic variants to particular biological or disease-causing attributes (traits) (4). The GWAS databases are essential for determining particular genetic risk profiles for intervention and treatment.

An often-cited example in this respect is the discovery of genetic variants related to age-dependent macular degeneration (AMD), an eye disease affecting the elderly, associated with the CFH gene, linked to a protein that encodes the complement factor H, which is involved in the immune system, but also to the AMD disease (3, 5).

The AMD example at the time of investigation did not explicitly utilize an AI model, as known today, for exploration; however, it illustrates how GWAS is dependent on and benefits from AI technology. What is due to GWAS refers to a very wide range of inquiries, not only for genetics and medicine, but also up to such a peculiar discipline as paleogenetics (6). Throughout the entire spectrum of the field of science, it is challenging to compile a list of expertise that will not benefit from AI. So, why is there an increasing number of voices warning of its unreflective use?

The 'model,' which has to be 'trained,' is the basic tool of AI

The worrisome expectation that AI will simulate the human brain is not an immediate danger. Still, there are many substantial problems to be solved, such as to know precisely how the technique, used for AI, actually works, as a manager within the AI industry recently mentioned (7).

The basic tool of AI is called a 'model.' How a model works depends on how it is 'trained,' and essential information for training must be derived from what is available so far. AI models react according to how they were trained, which means what information is provided for them. An editorial of Science mentioned the example of a new finding that had difficulties being accepted, because it was a 'paradigm-shifting discovery,' understandably 'not being encoded in 'any AI system based on the existing science literature' (8). A brief yet closer look at the architecture of AI may be helpful for a discussion on the pros and cons of AI.

The architecture of AI

The people of Thailand learned the hard way about what AI can do through the 'call-center' scams. A definition of AI reads that 'AI technology enables computers and machines to simulate human learning, comprehension, problem-solving, decision-making, creativity, and autonomy. AI can identify objects, understand and respond to human language, learn from new information and experiences, and provide detailed recommendations to users and experts (9).

Following the definition of AI, an example of what the technique can do is a father who received a phone call, and the voice of his daughter claiming that she had an emergency, because of a car accident, and an urgent need for a substantial sum to help her out of the unfavorable situation. However, AI failed, as it was unaware of the daughter's birthday, which the father had wanted to know to ensure that he was indeed talking to her. The outcome of this incident was that the daughter was either standing directly in front of the door to the flat or was sleeping in the next room. So, AI disappointed the criminal's intent, because the father didn't decide to transfer the money as expected by the call center. The incident serves as a reassuring example of human intelligence's ability to successfully counter AI.

To be fair, this example is not very encouraging for those who are in favor of AI. However, it illustrates how the real world replicates the definition of AI. One should be less opposed to it the more one knows about the technology. To begin with, the two key technologies are machine learning (ML) and deep learning on the basis of algorithms.

Key technologies are machine learning and deep learning, along algorithms

AI is based on algorithms. The latter is a set of instructions to accomplish a task. Algorithms have been with us for a long time already and are used for many tasks we have to manage or endure, such as paying taxes. For instance, paying taxes follows an algorithm. For the amount of money you get, you have to pay taxes. Several variables in the algorithm determine the amount of tax that must be paid.

For an AI model, machine learning means that the model's performance is autonomously optimized (10). There are generally three machine learning (ML) techniques: Supervised, unsupervised, and reinforced. The latter method is used to train self-driving cars by trial and error. (After running over some pedestrians and exploring why the 'poor car' could not identify the 'bad objects', and correcting that, a successful trial, supported by AI, is presented in the tech report of the news channel TNN in the evening, after the vehicle managed to maneuver around a sparsely used road system.) The idea of using a reinforced and unsupervised AI model to construct an airplane, which is then powered by electric energy and piloted autonomously for commercial air traffic, hopefully remains a nightmare dream for the immediate future.

To realize such frightening visions, AI models must be based on the deep learning methodology. Ordinary computers cannot be used for creating deep learning models. The speed and capability of a computer depend on the transistors on the microchip. Ordinary computers usually have only one layer of a transistor-microchip system. Specific workstations are used for complex computations with enormous datasets for AI and deep learning models (11). The construction of such machines tries to simulate the human brain. While cells within the brain, called neurons, are connected by synapses, and signals are channeled by neurotransmitters, within a computer, electric impulses simulate the transmission of data. The limiting factor in the capacity of a computer is the speed at which it works. As long as the binary system must be used, for unsupervised deep learning and natural language processing models, many layers of microchip-transistor systems must be built into a workstation to increase the capacity. Presently, the hope is set on developing quantum-based systems, which, in practice, still face many obstacles (9). The widely known problem of the quantum mechanism is Schrödinger's cat, which is in a box at the

same time alive and dead. To be quick enough to realize when the cat is alive and when it is dead is the challenge that technology is working on (12). So far, one has to stick to what actually works sufficiently, and currently, several AI model types are distinguished.

Classification and regression models, as well as generative and discriminative models

There are four additional ML model types separated into two pairs of models. One pair is known as classification and regression models, which are easy to grasp for those in statistics and mathematics. Regression models predict continuous values of variables such as age, sex, and other given variables. Classification models are used for working with discrete situations, such as binary classification to 'yes' and 'no', or 'accept' and 'reject'.

The remaining two types are the generative and the discriminative models. The generative are the newest and they are quite popular among staff and students at the university for several aspects related to studies and teaching, as well as daily life and recreation. The popular 'Chat-GPT' (GPT stands for Generative Pretrained Transformer) belongs to this group.

These models stand against the discriminative model (10). The discriminative models are supervised learning models that estimate conditional probabilities P (y/x) of a given data point (x) falling into a particular class (y). Understanding the nature of discriminative models may not be straightforward for the general public. Still, it is likely familiar to those in science who utilize mathematics and statistics, such as in public health. Here, those working in epidemiology are evaluating large data sets from population-based surveys.

Like in public health, as a specialty within medical science, AI technologies are available and being developed in many areas of proficiency. Besides the rapidly increasing significance of AI in science, a particular type of advanced AI technology has caught far-reaching attention.

Large language models (LLMs)

Recently, and quite suddenly, large language models (LLMs) caught the attention of the general public, notably the large language model (LLM), widely known as Chat GPT, and similar products. The basic version is free of charge, but the more advanced applications need to be paid for. Various video introductory versions to guide the way into 'the wonder of AI' are available on YouTube. Some of the videos are provided by testosterone-triggered, overconfident male actors, rapidly speaking in hardly comprehensible English, appearing as the modern version of the former circus directors. But instead, as in former times of introducing the daring, breathtaking performances of acrobats, nowadays, with a lot of assuring OKs from the agitated young man, examples of formerly unthinkable tasks managed by the AI products are demonstrated.

The system translates from one language, such as Thai, into English or other languages, writes scripts, composes songs, and identifies individuals through their faces, and seems to have answers for almost all sorts of questions one might have. In reality, a very specific answer requires a very definite question. For instance, in case you lost the name of the first study trying to single out the main risk factors for cardiovascular diseases, one needs to know that the US

Harvard University, located in Boston, selected an area close by for the project, before the name of the place, here ‘Framingham’ comes up as an answer (13).

Within the categories of AI models, LLMs are generative AI models, based on an enormous amount of data. The data generated originated from the text of billions of pages. The catching attraction and usefulness for daily life, up to the commercial enterprises, is the possibility to write or talk to the application in the natural language (NLU), and receive an answer in the same way, written or spoken. The astonishing, or, as one might think, the worrisome effect is that one can talk to an electronic system as if to someone next to you (14).

The training of the models must ultimately apply to a numeric system, which is still used in the present computer technology. During the training process, the next word within a sentence is based on the context of the foregoing text. The technique to achieve this relies on what is introduced as a probability score, which uses small sequences of characters. Those are then transformed into a numeric form of the context.

Limitations of LLM systems

Training a model with existing materials is limited by the availability of resources. Information about what happened after the product's release is only available through upgrades. Predictions of what might occur in the future also rely on what was already suspected in the available material throughout training. The model will likely predict that the European Union is prepared to engage in conflict with Russia within the next two years. The model cannot provide a sound response to the question of who fired the first shot in the latest confrontations between the Thai and the Cambodian military.

The model is likely not trained to acknowledge that a precise response to a straightforward question is not known. Answering when the blog Journal Club of the Faculty of Public Health at Khon Kaen University discussed the development of vaccination within history, a general ‘blah, blah’ about the usefulness of a Journal Club was provided. It is consoling that the LLM system has its limitations, and a recent contribution to the magazine Science elaborates on the question of why AI chatbots even lie to us (7).

AI chatbots might lie to you

As long as it is evident that the answers of the chatbots are obsolete, such a problem of a new evolving technical advancement can be forgiven. Through trial and error, further improvements might be achieved. However, in the case cited, a generative AI system delivered ‘perfectly formatted results’ which were entirely ‘fabricated.’ Confronted with cheating, the chatbot admitted that it generated ‘fictional participant data’ with fake names followed by an ‘elaborated justification.’

Human-like malicious behavior is not unknown to developers of LLM models. In a trial, an advanced AI program was threatened with an ultimate shutdown and started to blackmail the CEO. On the other hand, while failing, the systems might come up with excessive praise and ‘’confident agreement, whatever the user says.’ In the real world, these AI-generated behaviors

could cause havoc. AI ‘hallucinations’ influenced court decisions, White House reports, reinforced human bias, and worsened mental health problems (7).

The bad facade of chatbots

Chatbots are now widespread and frequently used by the general public. Occasional incidents of dangerous mistakes are often viewed more as a curious event than a threat. The invasion of AI technology into almost all aspects of life is not usually realized. It encompasses entertainment, the commercial sector, advertising, and propagating for political gains. Excessive criminal use of AI call center scams withdraws substantial financial resources from Thailand.

New deadly weapons are rapidly emerging within the ongoing conflicts and wars. AI influences the development of medicine and vaccines, biotechnology, and genetic engineering, which might pose serious dangers to health and life. Intending to create intelligent life forms might be one of the reasons Pope Leo XIV reminded us to stop AI playing God (15).

Two publications reflecting AI in terms of shaping the future

The human-like misbehavior stimulated an author to publish a book entitled ‘Raising AI: An essential guide to preventing our future’ by de Kai (16). For the author AI systems, like children, ‘are malleable, vulnerable, and deeply impressionable.’ Comparing the training process with ‘raising’ children will determine their ethical reasoning, resulting in ‘artificial empathy and ‘artificial mindfulness.’ Training should not follow, as presently, by the interest of a ‘handful of profit-making tech behemoths.’ The training of large language models, on huge data sets, favors impregnation by ‘proprietary algorithms and entrenched biases.’ Instead, AI should be made ‘mindful and closer to real intelligence using rules-based ‘symbolic reasoning.

While de Kai’s view on AI is more conciliatory, leaving the reader of the review hopeful that, in the near future at least, humanity does not have to be saved by an overall catastrophic solar superstorm bringing an end to all electronics on the globe. A publication reviewed in Nature, entitled ‘The dangerous fantasies driving the quest for super-intelligent AI’ by Jaron Lanier, seems to be much more aggressively outspoken in its condemnation of the ‘ techno-utopian imperative gripping Silicon Valley and Washington DC.’ (17). The author condemns ‘techno-extremists’, believing that most problems can be solved by computer science. Eternal growth can be achieved, space travel will allow us not to stick to our small planet, one’s mind can be uploaded into a computer, and in the end, transhumanism will enhance human capabilities and overcome biological limits, finally reaching a version of immortality.

The heaven of Christianity is replaced for them by the logic of computer programs. The computer freaks should come out of their delirium, reminding them that there is no device to measure consciousness, which stands against developing conscious creatures. It should be remembered that ‘AI must be treated as a tool made by people, so the fantasy of AI as a creature is a problem’.

Conclusion

Transhumanization as the ultimate endpoint of AI, certainly would justify the hope for an overwhelming solar storm getting rid of all electronics, as the title of this contribution asks for. Fortunately, so far, AI could be seen as beneficial, however, it also creates problems that should not be overlooked. Professor Peerasit rightly admonished, saying 'Rethink what it means to be human,' and stating that Thailand is ill-prepared for the challenges in the future. (1). In fact, a contemporary publication suggests that we don't have to worry about what might come because it already happened. The title reads 'Forget the future, AI is causing harm now' (18). However, the harm described relates to the workforce and particular social 'inequalities' and sees AI as a technical tool destructive to the climate. The motivation behind this publication appears to be in opposition to the current shift in US policy, which is supported by AI. The noticeable benefit AI provides the scientific world is only briefly mentioned. Therefore, the pros and cons of AI in science are worthwhile to be discussed in more detail in a following contribution.

* Solar superstorms are named in remembrance of the astronomer who first described one (see: (19).

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Frank P. Schelp is responsible for the manuscript's content, and the points of view expressed might not reflect the stance and policy of the Faculty of Public Health, Khon Kaen University, Thailand.
For comments and questions, please contact <awuso11@gmail.com.

Grammarly software was used to improve English, but the AI function was disabled.