Automating Thought — Opportunities and Risks

Business Aspects of Artificial Intelligence

Politics, science, and economics are investing billions worldwide into further developing the use of artificial intelligence (AI) in various business areas. At the same time they attempt to create parameters using laws, standards and ethical guidelines for reasonable handling of the technology and to emphasize its social benefit to minimize reservations among the population and create acceptance. How far along is the technology today, and what awaits us yet in the near future? Will humans relinquish their decision-making authority more and more to machines that can make decisions faster, yet more variably due to learning as they go?

Content

Business Aspects of Artificial Intelligence ...................... 1
Transparency vs. Data Protection, Control vs. Autonomy .......................... 2
Legal and Ethical Framework is Necessary ........................... 3
Result ....................................................................... 3

Artificial intelligence encompasses various technologies: Algorithms that possess a higher, i.e., more human ability for thought and comprehension by imitating human thought processes and synaptic connections within the brain; machine learning via algorithms that learn continually and with no further human intervention to master tasks; and cooperation between human and machine as well as AI systems built into robots. Companies betting on AI promise themselves higher revenues. Research and development are primarily occupied with automation of human intelligent behavior such as thinking, knowledge processing, planning, communication and perception — up to systems that master any intellectual tasks of which humans are capable.

This idea of a human-like intelligence in machines, devices, and robots seems to lie far off in the future and is thus speculative, hardly appropriate to serve as the basis for analysis of ethical and social aspects; machines, after all, only learn from the past and are not equipped to envision the future in such a manner. Intelligent systems are still far removed from comprehension and consciousness. Human abilities such as flexibility, creativity, emotional intelligence and critical judgment are (still) alien to machines. Scientists estimate that it will take decades or even a century for artificial intelligence to achieve a human level.

Thus, the collaboration between man and machine and the synergy of each’s strengths is currently at the forefront of technology use, even if research is occupied with farther-reaching future scenarios. How will humans and machines work together in the future? Will AI support decision making or will it make decisions itself, autonomously? Most likely, the scenario for the years to come will look as follows: AI systems and human experts working together will make better decisions than each on its own — whereby in some cases, humans will withdraw entirely. Thus, autonomous ships will independently avoid dangers and master complex docking maneuvers with no captain on the bridge. Intelligent robots equipped with sensors and computer technology will not only read sensor data but interpret it and modify their actions based upon that interpretation as well.

For this reason, artificial intelligence is currently implemented primarily in specific applications as machine learning. In such cases, a machine gets a certain degree of intelligence and autonomy by learning skills instead of programming, as had been done previously. Machine learning’s goal is to combine data from various sources intelligently, to identify relevant connections, to draw conclusions and make predictions. In the industrial field, for example, it enables prediction of certain situations, such as machine failures (predictive maintenance) or machine operator support using expert systems, thus
optimizing operational processes. AI applications such as virtual assistants, language recognition, self-driving cars, and many more are on everyone’s lips. Despite any reservations, the opportunities and advantages of AI are quite indisputable. Still, with such a sensible technology, how do we avoid or exclude an excess of machine autonomy or even misuse (of data and decisions), and guarantee ethical measures and security as well as protection of the private sphere?

Transparency vs. Data Protection, Control vs. Autonomy

Non-transparent black box algorithms and automated decision making frighten many people off. They perceive powerlessness in the face of technology decisions that immediately impact or concern them. News reports regarding the use of autonomous weapons systems, opaque surveillance of humans, credit ratings and autonomous vehicle malfunctions are negative examples — all the more so, if errors continue to occur cumulatively, as with attempted massive facial recognition at train stations. Or how on Amazon shopping for friends changes one’s own profile, which can never be corrected. In contrast, there is an abundance of meaningful applications, such as one in medicine where a trained intelligent system delivered better results in skin screening than most of the 58 invited dermatologists. Equally groundbreaking is the development of radiomics. Radiological data are correlated with molecular biological data and other clinical markers and interpreted using algorithms. Artificial intelligence in medicine is an important supporting aid for diagnostics to identify at an early stage, for example, micro-metastases or serious illnesses such as psychoses, depression, cancer, and Alzheimer’s much sooner.

Previously, algorithms formed the bases for data that led to decisions. Using artificial intelligence, algorithms find patterns in complex quantities of data upon which to base decisions, and they make predictions with high probability. Algorithms can find new causalities that previously had been hidden from humans. Algorithms are already deciding now whether one receives his/her money at the cash dispenser; they recognize faces on social media and execute tasks on smartphones. What does this look like for consumer protection? More and more, private data and characteristics are being used for data processing and concatenated.

The EU Basic Data Protection Regulation requires transparency in decisions. For that reason, when asking why credit has not been granted, the answer “the machine made the decision” is insufficient. When automated decisions cause harm to humans or objects, the question of liability fundamentally arises. In such cases, it is necessary that AI systems be assigned no legal identity and that manufacturers remain liable.

The degree of AI’s autonomy is limited primarily by the purpose of its use, limits defined by the developer, legal and operational requirements, physical processes, and technical norms. In particular, functionality embedded in physical products operates only within the framework of the manufacturer’s defined safety concepts and anticipated product characteristics. In the industrial environment, therefore, ethical aspects play more of a subordinate role. An uncontrollable machine, drone, or robot condition is also undesirable for the manufacturer who wishes to maintain control over its product and is liable for same. For that reason, a Frankenstein-like horror scenario of an indomitable, independent machine seems farfetched. Thus, limits will be set automatically and concurrently free spaces will be created for sensible interaction with the technology.
Legal and Ethical Framework is Necessary

A legal framework, as well as norms and standards, must yet be created. In 2019, the European Commission’s High Level Expert Group on AI plans to lay out a European strategy for AI and suggest ethical guidelines regarding topics such as fairness, transparency, the working environment of the future, and democracy. What a value system for artificial intelligence might look like is discussed in the Open Community for Ethics in Autonomous and Intelligent Systems (OCEANIS, https://ethicsstandards.org), comprised of numerous international associations and standardization organizations. Its members, together with experts in philosophy, theology, psychology, and sociology, plan to create a catalog of those requirements that will produce ethical artificial intelligence.

In a similar direction, the Statement of the European Economic and Social Committee (EESC) in May 2017 targeted “The consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society”. In its statement, the Committee explicitly promotes a code of conduct for the development, implementation, and use of artificial intelligence. Some companies have already defined such codes, are implementing ethics commissions as monitoring body consisting of external specialists and conducting ethics training for employees dealing with the topic. In these instances, the ethically responsible handling of data is front and center.

From an ethical point of view, the effect of AI systems upon humans’ dignity, safety, independence and freedom of choice must be regulated. Thus, AI-based facial recognition can represent a threat to fundamental human rights such as personal privacy and freedom of expression. Data protection is especially important, particularly against the background of data being used to influence humans’ decisions or even to manipulate their behavior by postulating new (un-)truths. It is pivotal that the underlying data be correct and that they contain no biases or preferences. Among security aspects are the reliability of such machines and their secure function in any situation. Moreover, transparency and comprehensibility of AI systems’ decisions are crucial for their general acceptance. Their operating principles, actions, and decisions should be accessible and verifiable at all times.

Systems also learn while in operation and it is not always comprehensible how a particular learning result has come to be. If the result of data processing is no longer predictable, it may be that the result will cause damage, break laws or violate data privacy. Additionally, there are demands for fairness and non-discrimination in AI decisions which could discriminate against individuals, for example, absent any intention of the systems’ developers. For this reason, preventive risk assessments should be carried out and a continuous, comprehensive evaluation of algorithm-based applications by neutral third parties should be ensured without revealing underlying codes and algorithms.

Result

A legal framework and broad social acceptance are prerequisite to the continued success of artificial intelligence. More trust could result from research in interpretable AI that works toward making the basis of AI decision making comprehensible. In future, norms and standards should define a flexible regulatory framework in order to verify, validate, and control AI systems with regard to security, transparency, comprehensibility, and ethical justifiability, so that excesses such as the influencing of election results via social media can be prevented and a superintelligent machine can be deactivated when necessary. Guiding policy principles should be set as quickly as possible at the international level to serve as a basis for human-in-command artificial intelligence over which humans maintain control over machines at all times.

Interesting links:

OCEANIS:
https://ethicsstandards.org

EESC position paper:

For information on Disclaimer of Liability & Privacy Statement please see www.baslerweb.com/disclaimer