Секція 3. Науково-технічний прогрес: проблеми та перспективи

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EMOTIONAL ARTIFICIAL INTELLIGENCE: FICTION OR REALITY.

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ЕМОЦІЙНИЙ ШТУЧНИЙ ІНТЕЛЕКТ: ФАНТАСТИКА ЧИ РЕАЛЬНІСТЬ?

As a vital part of human intelligence, emotional intelligence is defined as the ability to perceive, integrate, understand, and regulate emotions. It has been a long-term goal of Artificial Intelligence (AI) to enable a machine to understand affect and emotion [1]. Robots with a heart and soul have been the stuff of science fiction for years, but as AI and software robots become a part of our daily lives, the lines between science fiction and reality are beginning to blur.

The question whether AI machines can have their own emotions, is open to debate. AI and neuroscience researchers agree that current forms of AI cannot have their own emotions. They have no body, no hormones, and no memory of their interaction with the world and have not gone through the process of learning life. They have no emotional memory equivalent to that of Man, with its construction starting in childhood, carrying on with the learning of life in adolescence and adulthood.

Antonio Damasio, one of the neuroscientists that has studied human emotions and feelings, is categorical: "I am totally against the idea that artificial intelligence could recreate a human brain" [2].

However, Ray Kurzweil, an American inventor and futurist, predicts that computers will pass the Turing test by 2029; being able to exhibit intelligent behaviour (intelligence, self-awareness, emotional richness, etc.) indistinguishable from that of a human. Note that to pass the Turing test many learning mechanisms must be employed. Here, the deep-learning algorithms that enable continuous improvement of learning as more data becomes available will be crucial. This will force many difficult ethical decisions to be made regarding technology, especially when involving human data [2].

Ray Kurzweil explains in his book called "How to Create a Mind", that in theory any neural process can be reproduced digitally in a computer. For example, sensory feelings like heat, feeling hot or cold, could be simulated from the environment if the machine is equipped with the appropriate sensors. However, it does not always make sense to try to replicate everything a human being feels in a machine. For example, some physiological feelings like hunger, and tiredness, are feelings that alert us of the state of our body and are normally triggered by hormones and our digestive system. A distinction should be made about the differences between mobile robots and a disembodied computer. The later would have a range of emotions far more limited as it would not be able to physically interact with its environment as a robot would. The more sensory feedback a machine could receive, the wider the range of feelings and emotions it will be able to experience [3].

The systems that are closer to resembling human beings today are those studied in developmental robotics. In this field of study, researchers work with robots that have increasingly complex senses (vision, audio, touch, etc.) and internal information (battery level, system heating, balance, energy required to execute a task, etc.). These researchers aim to understand how human beings develop and evolve, from childhood to adulthood, how humans learn and how decision making is produced, and then seek to instill these processes in autonomous robots. Within this field, cognitive architects study how behaviour emerges through experience. Without a doubt, these AI systems are the closest to developing synthetic emotions akin to those of a human.

Leading the way in emotion AI, however, is detecting emotions in voice using chatbots or Natural Language Processing (NLP). AI can listen to voice inflections and start to recognize when those inflections correlate with stress or anger (since emotion less about what we say and more about how we say it). The challenge is in identifying the many ways words are used and training the chatbots or virtual assistants to know them.

While detecting emotion in voice may be the forerunner of emotion AI, the challenge is that these AI-enabled devices must be trained with huge datasets (just think of the many ways you display your annoyance when you are in a call center phone loop), and that simply takes tons of time.

There are also a number of other obstacles that must be overcome first before emotion AI becomes a way of life: immaturity of computer vision. Computer vision is accomplishing many things, helping AI spot specific items within images faster than humanly possible. Taking it to a more granular level, however, is a far way off. For example, today AI can detect men with blonde hair from thousands of images of people; yet it is not possible for it to detect images of blonde-haired men with sad expressions. [4].

Current AI can even react according to human emotions. Models then exploit the interpretation of the reactions of the emotions. Interactive tools can also help to adjust the emotional level of our own productions. For example, Google's DeepBreadth tool advises users on what to do when writing responses to emails. It warns the user of an inappropriate level of aggression.

Finally, AI can display emotions by simulating them. These are ways to anthropomorphize interactions with users by using their emotional codes. Synthetic speech is the most common way to emit verbal emotions. Even if progress is made (such as the Tacotron 2 designed by Google), we are still a long way from a solution. Even the most advanced solutions like Lyrebird are low in technical ability and their famous video featuring a Barack Obama synthesis, both in video and audio left the former US President looking too much "in control" of his emotions [5].

There's still a lot of work that needs to be done for algorithms to accurately interpret data, for technology to evolve and for misperceptions to shatter, but once that's accomplished, we'll be on whole new level of human-to-machine communication. We can expect to hear more about emotional AI in the future.

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