

Affective Computing and Interaction: Psychological, Cognitive and Neuroscientific Perspectives

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Epilogue

A Philosophical Perspective on Incorporating Emotions in Human Computer Interaction

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Recently attempts are being made to enhance Human-Computer Interaction (HCI) in order to achieve a sound communication between humans and computers just as the way people communicate with each other. In order to succeed in doing so, human-like computers should be created. Creating a computer which understands and acts like a human being is considered as the best move for the intention of enhancing HCI.

THE NEED FOR AFFECTIVE COMMUNICATION

One of the issues that latest studies emphasize is the importance of inclusion of emotions in this interaction, since a real-life interaction does not seem to be provided without this aspect. Com-

puters emerged as a product of the human mind. However, if the aim is to make computers much more like human beings, then the fact that humans are not made up solely of the mind should be considered. Human beings possess substantial amount of abilities besides their thoughts. Emotions may not be perceived consciously, due to a multitude of things happening in the body which the mind—or the thoughts—cannot control. For example, emotions, physical responses of the bodies (reflexes, pains etc) as well as culture can be reckoned as such abilities. There are numerous factors which can ideologically and biologically influence humans outside of consciousness. As far as emotions are concerned, in order to act and respond like human beings, a human-like machine has to “infer” some affective features of humans such as mood and communicate accordingly.

On the other hand, from the human perspective, initially humans had difficulties in getting acquainted with the computer technology, since it seemed so distant and cold. Computers were perceived as mechanical, metallic and inorganic tools. Over time, everybody got used to utilizing these machines, but only as tools that facilitate their lives. Moreover, in reverse fashion, the facilitation of remote communication provided by these machines led people to become unsocial creatures who tend to stay at their homes in front of the computers. Alternatively, rather than humans just dictating whatever they want the computer to perform, a more active relationship which allows the computer to initiate/share affective communication could be constructed.

In order to succeed in constructing a proper HCI which can translate emotional reactions of users to the computer, we should first comprehend emotional reactions of human beings clearly. There exist some tools in order to measure physiological expressions of emotions such as skin conductance, heart rate, eye tracking ... etc. However, these tools' adequacy in measuring emotions is a questionable issue. Human beings are much more than the behaviors they show.

The existing technology of our times only allow for processing of measurements such as blood pressure, electrical pulsation, brain waves, and facial expressions which can be translated into the recognition of emotions. Although the helpfulness of these tools for observing the physical outputs of emotions is inarguable, it is almost impossible to identify and generalize an emotion in its entirety just by looking at these measures. People from different cultures may seem to understand and claim to perceive basic emotions, but what they really feel inside may be totally different. Moreover, different people and different cultures may have different emotional reactions.

Going back to computers, although they may be augmented with the aforementioned physiological technology, human-like machines will still be just "machines". This is because computers

exist in a world which cannot be considered as a phenomenal world, where human beings can touch, smell, see, hear and taste things, by utilizing the physical environment they live in. Humans are always in a continuous interaction with their outer world within which they can experience things. The reflections of their experiences, what they exactly feel, on the other hand, are in their brain. No one can define clearly and objectively someone else's feeling. In the very same way, computers, although they may "seem" to feel or process emotion-related information, they will not actually feel and define the exact meaning of the feelings of humans with which they interact.

This presents a huge problem both for philosophy and technology. Let's assume that human behaviors, actions and neural reactions can be measured somehow with electrical wirings or probes penetrating the skull (i.e. using EEG), and these outputs can also be reflected on a computer screen. The results on the screen may show that the person is excited. However, how that person feels and experiences that excitement may be considerably different than the reflections of this excitement outside the body. One's sensation of a specific feeling could conflict with another person's sensation of the same "physical" feeling. Can the machine experience the exact phenomena that humans experience, or not? This is a very crucial point to be addressed.

HUMAN-LIKE COMPUTERS

If scientists somehow achieve to create something which has the same neural networks as humans have, could we call it a "human being"? This also, is an important problem in philosophy. Philosophers diverge on the issue that a human being's identical twin or something similar to him/her could be created or not. Let's assume that the technical problems are solved with the help of genetic engineering and such a creature is created. If they clone someone at birth and provide

the same external conditions for this clone while it is developing, would there be any differences with the original creature? Will this brand-new clone experience phenomenally? Will it feel intrinsically? Or will it play “being human”, i.e. just imitate? What if some material is brought from somewhere else and a human body is constructed without missing any detail? Would this creature “feel” like a human being?

On another front, creating a complete human being with all its details seems impossible. This is because scientists induce while trying to congregate little parts in order to reach the sum or in other words, the whole picture. However, a human being is much more than the sum of its parts. There is a topological divergence here. One cannot assume that a human being can be created just by concatenating some cells together. As for the information or computer technologies, the whole is formed by gathering pieces together; but as for the human beings, when all pieces are brought together something more is obtained. Mystically, one can call it a soul or energy. It is so difficult to tell whether a machine can feel or not. Scientists can gather pieces together, but there will always be this extraneous piece which cannot be generated by technology.

However, if someone claims that there is a spot in the brain —an emotion center— which causes the emotional life to be impaired when it malfunctions, then we could project that technology to create a human-like machine. Still, to think of a body part as an independent organ, separate from all the others is a very simple approach. Every body part is connected with other parts of the body. The whole has always an influence on the functioning of any other body part. Hence, the parts influence the whole and the whole influences the parts, which is called double hermeneutics in philosophy. Therefore, although it may be the case that the malfunction of a single emotional spot causes emotional problems, actually the emotional problem may occur because of the failure of one

or more spots (neurons or neuron groups) which congregate the whole emotional system in the brain. It is doubtful that this type of complexity could be embodied within an algorithm.

Let's now move on to another example: Searle's Chinese Room argument (1980). In this thought experiment, Searle stands in a room without knowing any Chinese. He receives Chinese characters from the outside of the room and then uses an English book where he can find all information about the instructions of a computer program which provides him to respond properly to this Chinese input. Although Searle does not understand any word in Chinese, he can successfully “seem” to know Chinese, just by performing the written instructions appropriately. The view that a computer can 'understand' what it performs is known as Strong AI (Artificial Intelligence). Thus, assuming the existence of a computer program which is created without the knowledge of how the information between emotion and cognition flows is a similar trade to the Chinese room, making us argue of computers which can “feel”. Therefore, believing that computers can 'feel' rather than just “seem” to feel is a strong AI argument.

On the other hand, it is not clear whether the human brain knows what is going on within itself or not. Perhaps the brain works like a Chinese room too. The brain may also be an organ which shows outputs depending on some chemical and electrical processes, but it may not know or understand anything about what it actually does. Moreover, what is going on amongst people may also be viewed as just an interaction. Thus, the world may be a huge hall with lots of Brain-ese rooms in it.

UNDERSTANDING THE HUMAN BRAIN

When considered as an organism, it is pretty much correct that whatever happens in the brain

is a process with which we cannot intervene and which we do not comprehend very well. It is very similar to the nature, to the fact that we do not understand well the structure of a growing flower or spawning of ants ..., etc. It is self-contained. This is one of the problems that can be faced in simulating humans: The body has something very different than it is thought, it has an internal order. Could we find out about that order sometime? Contrary to what is called “the self”, the body performs continuously by itself, without asking anything of the self. You may enter the room, your butt just finds the correct place to sit, when you get into the car, you can drive home without even thinking about it, the body rides a bike, it swims, talks, ... etc. Even sometimes one may talk without planning what to say, because the body is actually a tutor. It is wise; it is much more than every one of us. This is exactly why Eastern philosophies suggest building an excellent endearment with the body. Being a part of an academic world, a part of a culture, a part of the world, people always suppose that they are merely composed of thoughts. Moreover they see their bodies as their slaves which should obey them upon commands. On the contrary, the body is the master. People have to listen to their bodies, have to try to understand what it says, since their body is their advisor. In philosophy, this way of thinking actually began with Nietzsche. Usually, philosophers, and perhaps the computer engineers also, suppose themselves as pure reason, a program. This is the mark of rationalism. However, the tutor, the body has a very different way of reasoning.

Through neurology and physiology, we try to comprehend the body. But it is clear that humanity has a huge problem understanding the mind exclusively. As far as philosophers are concerned, since Plato, they have always tried to put the body out of the mind, claiming that the body is mischievous. It needs to pee, it gets hungry, and it is awful. 2500 years old Western way of

thinking has always disregarded the body. Not only philosophy but religions have also made the same mistake. Religions ordered not to gratify the flesh cravings, they ordered to disregard what body wants and to fight it down, because people are composed of pure souls, the body does not mean anything. This is a big deception. The body is merged in the mind. If the mind does not get the wisdom of the body, then it is condemned to stay as incomplete.

THE MISSING LINK: INWARDNESS

Although we could develop a system which can communicate with people, producing emotional input and outputs which human beings can understand and interpret correctly, this system would still have no actual emotions, even if it can act as if it has emotions. Human beings have an inner world. Would this inner world be also copied when the outer world is copied? It seems it is not possible, because the ones who want to build this creature must first know about this inner world and build the human-like machine accordingly. In order to create such a computer, the creators must also consider thoughts and beliefs, as well as inwardness. Inwardness should be examined deeply, considering its relationship with the brain parts. Inwardness is a reality felt and lived by artists, mindful people, and scientists who ruminate while researching. Anybody who looks at the sky and senses the mystery and the wisdom hidden in it can also travel inward.

In conclusion, to see human beings from a dualistic point of view will absolutely create obstacles in the way of constructing human-like machines. The puzzle of the brain may seem to be solved biologically, however, thinking about simulating it just by gathering its cells together will stay a delusion. For a neurosurgeon, the brain may seem to be highly clear and understandable, since doctors know where the brain parts should

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be located. However, it is still unknown how those parts create consciousness or feelings and how the congruent or incongruent actions of people with respect to their feelings participate in daily

interactions. Therefore, without understanding how exactly humans “work”, no one may succeed in creating a computer which works like a human.