Beyond Rationality: Affect as a Function of User Interfaces

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Abstract. The emotional part of human nature is rarely explored in design projects that involve interaction with electronic devices. Designs are usually guided by technical efficiency and the astonishment that derives from the speed of information processing in digital media. Considering the contemporary context and the concept of ubiquitous computing, this article seeks to identify achievements and future directions for the implementation of affective functions in interaction design projects, revealing a wide range of possibilities for development in this area. To achieve these goals, this paper draws parallels between computer science, neuroscience and interaction design; discusses the definition of the term 'affect' in Spinoza and Deleuze; and establishes categories to analyze a series of objects that are either affectively influenced by the user, that are designed to affectively influence the user, or that facilitate affective exchange between two or more users.

Keywords: affect, affective design, interaction design, user interface.

1 Introduction

Those who know the ground and underground of life understand very well that a stretch of wall, a bench, a mat, an umbrella are rich in ideas or feelings, and so are we, and the reflections on the partnership between men and things are among the most interesting phenomena on earth.
– Machado de Assis in Philosopher or Dog? 1892.

Every designed object is imbued with meaning and is therefore affective in some dimension. In spite of this, in the curatorial text for the exhibition "Talk to Me" [1], Paola Antonelli argues that functionalist ideologies of the twentieth century, perceived in famous slogans such as "form follows function" and "less is more," contributed to a relegation of the complexity of meanings of the object to a secondary role in design development in favor of formal rigor. According to Antonelli, we are currently recovering the expressiveness of objects that was lost during these processes.

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In the interaction design field, the recovery of such expression is being made, among other ways, by implementing affective parameters to designed interactions, making projects functionally affective and therefore analyzable from a distinct viewpoint from Norman's emotional design methodology [2], which observes emotional relationships between people and objects that are not necessarily related to the object's foreseen functions.

This paper aims to introduce the reader to possibilities that arise from affective interaction design, suggesting categories for objects that can be considered part of this field and raising the discussion about the use of the term "affect" as explained in Spinoza and Deleuze to describe the interactions with such objects.

2 Parallels: Affective Computing, Ubiquitous Computing and definitions of affect in Spinoza and Deleuze

2.1 Affective Computing

The development of computer science moves parallel to the development of interaction design. The area of computer science that studies affective parameters for the interaction with electronic devices is called "Affective Computing", a term coined by Rosalind Picard in her homonym paper [3]. According to the author, the development of affective computing includes studies that enable the recognition of human emotions by computers, the mimesis of human emotions by them and the application of emotional parameters to studies of artificial intelligence.

Picard says that emotions "pull the levers of our lives". According to her, it is not objective laws and rules that influence human behavior the most, but emotions. She notes, however, that studies of emotion are marginalized in computer science:

Emotions suffer from a stigma in science. It is believed that they are inherently unscientific. Scientific principles are derived from rational thought, logical arguments, testable hypotheses and repeatable experiments.
– Picard, 1995.

We tend to distinguish reason and emotion as two opposing aspects of human nature. It is important, however, to note that at least from the perspective of neuroscience, the brain does not seem to work with a definite boundary between them. What we consider to be only two distinct types of activity are actually parts of an intricate system
that spawns through a large range of brain processes that are never purely rational or emotional.

More than being physically unable to differentiate between rational and emotional activities in the brain, neuroscience shows that the presence of emotion is crucial for rational thought. Picard cites in her paper several studies in neuroscience, particularly the book "Descartes' Error", from researcher Antonio Damasio, explaining how emotions play a key role in the formation of rational thought [4].

Years of studies on patients with frontal-lobe disorders indicate that impaired ability to feel yields impaired ability to make decisions; in other words, there is no "pure reason". Emotions are vital for us to function as rational decision-making human beings.
– Picard, 1995.

If there is in the world of science the desire to create objects provided with artificial intelligence in the sense of something that is able to think like a human, such a device could not be developed if it were not able to feel.

In summary, affective computing is the one that "relates to, arises from, or influences emotions" (PICARD, 1995). The question that then arises is how such affective exchanges could be implemented in electronic devices, from the viewpoint of interaction design, in terms of functionality?

2.2 Ubiquitous Computing

The concept of ubiquitous computing [5] is central to the discussion about the presence of electronic devices in the contemporary context and therefore to affective interaction design. When coining and describing the concept in the early 1990s, Mark Weiser envisioned a scenario in which network technologies would infiltrate everyday objects to such an extent that their presence would not be noticed. According to the author, the presence of computer technology could be compared in the future to today's presence of writing and electricity in urban centres [6]:

Both are examples of ubiquity, of constant presence in many levels of contemporary life, without, however, requiring any greater cognitive effort to their use; technologies that 'disappear' into the environment, being more clearly perceived when missing from the scene than by its constant presence.
– Pinheiro & Spitz, 2011.

It is common sense that electronic devices are increasingly gaining ground in contemporary world. This is quickly leading us to an existence that has many similar aspects to the ubiquitous computing scenario described by Weiser in the early 1990s. This process generates many questions, one of them being the fact that manufactured products must work across multiple cultures. The development of affective parameters for interaction design hits a critical point in this aspect, as understanding affective influence from the physiological perspective should lead to fairly similar results anywhere in the world, but everyday affective expressions and gestures may vary widely in similar contexts worldwide.

This issue is clearly addressed when Pinheiro & Spitz mention "design for experience" rather than "design for interfaces". Following these steps, affective parameters for the interaction with manufactured objects should be adaptable to different user contexts.

We are creating electronic devices that occupy ever more important roles in our individual and collective lives. Each time we interact with a 21st century device for the

first time, such as a smart phone or a tablet, we expect it to communicate something beyond our initial impression on them, their shape or their appearance. Its function is neither clearly communicated nor clearly defined at the moment of first contact. Subject-object relationships start to resemble interpersonal relationships at the same pace as the complexity of communication originating from these devices is increased.

2.3 Affect: Definitions in Spinoza and Deleuze

Another problem that arises from the attempt of creating parameters for the implementation of affective or emotional functions into electronic objects of everyday use is the very vagueness of the terms affect and emotion. Picard (2000) accurately describes what a computer with affective functions should be able to recognize and express; she transits, however, between the terms "affect" and "emotion" as if they were synonymous, a problem that is also observed in Donald Norman's emotional design methodology (2008).

When it comes to relationships between men and objects, the term affect probably detains greater precision than the term emotion. "Affect" was deeply addressed by Spinoza [7], in his book "Ethics", where the author characterizes it as divergent from idea. Idea is the mode of thought that represents something. About the differences between idea and affect in Spinoza, Deleuze [8] explains:

(Idea) is a representative way of thinking. For example, the idea of a triangle is the mode of thought which represents the triangle. […] The idea, insofar as it represents something, is said to have an objective reality. It is the relation of the idea to the object that it represents.
[…] This already gives us a first point of departure for distinguishing idea and affect (affectus) because we call affect any mode of thought that doesn't represent anything. So what does that mean? Take at random what anybody would call affect or feeling – a hope for example, a pain, a love – this is not representational. […] Every mode of thought insofar as it is non-representational will be termed affect.
– Deleuze, 1978.

The implementation of affect in interaction design would result in a design that allows affective influence on the user by the object, or vice versa; or the design that facilitates affective exchanges between two users. Through the use of affect instead of emotion, it is possible to establish affective design as something that relies on an active rather than neutral or derived affective influence in the interaction between a user and an object. Whereas emotion implies a state, affect implies a direct and, hopefully, precise influence.

3 Affect in Interaction Design

In this section we present a group of objects selected for this study, drawn from the MoMA New York exhibitions *Talk to Me* (2011) and *Design for the Elastic Mind* (2010)[9].

The selected objects are physical products, i.e. not services or purely software-based products. The reason behind this choice is their logical allocation in material culture. As explained by Dunne [10], "perhaps the 'object' can locate the electronic in the social and cultural context of everyday life. It could link the richness of material culture with the new functional and expressive qualities of electronic technology."

Dunne goes on to describe the concept of post-optimal object:

The most difficult challenges for designers of electronic objects now lie not in technical and semiotic functionality, where optimal levels of performance are already attainable, but in the realms of metaphysics, poetry, and aesthetics, where little research has been carried out. […] Design research should explore a new role for the electronic object, one that facilitates more poetic modes of habitation: a form of social research to integrate aesthetic experience with everyday life through 'conceptual products.'
In a world where practicality and functionality can be taken for granted, the aesthetics of the post-optimal object could provide new experiences of everyday life, new poetic dimensions.
– Dunne, 2005.

When affect is perceived as an action that can influence a change in the emotional state of a human (or mimetic emotional state of an object), the poetic dimension of design must be taken into account. As much as we would like to prove that every emotional state could be measured and analyzed from a mathematical point of view, poetry is undeniably more effective in expressing such states than science could ever be.

Analyzing post-optimal objects can give us the true dimension of where we stand today in the practice of affective design. If, on the one hand, it might not be absolutely realistic to consider post-optimal objects to be market or consumer-oriented, on the other hand such objects have precisely the advantage of not being subject to the laws of economy.

The (post-optimal) objects selected for this study were analyzed in terms of their affective design properties, and placed into the following categories:

1. Active: Objects that influence the user
Fall into this category objects which functionality resides in influencing changes in the user's emotional state.

2. Passive: Objects that are influenced by the user
Fall into this category objects which functionality resides in having their actions triggered through changes in the user's emotional state.

3. Connective: Objects that facilitate affective exchange between two or more users.
Fall into this category objects which functionality resides in facilitating the affective influences one or more users might have in each other.

It is fundamental to state at this point that we are analyzing objects that were designed with such functionalities as the main aspect of their project. This means, for example, that a telephone that an individual can use to communicate his feeling of love is not necessarily a connective affective object, as it was not designed for this particular purpose.

Such categories reflect only the nature concerning origin and destination of the affective communication, but not the affective nature itself. This means that these categories do not draw a difference between an object that triggers feelings of happiness or sadness, but rather how these feelings are communicated, as this seems, at this point, more relevant to the design field.

As analyzed objects may not be (and mostly aren't) limited to only one of these categories, we'll be using a 3-dimensional triangle diagram (fig. 1) largely inspired by Houde & Hill's diagram for analyzing prototypes [11], which can convey the hybrid nature of some of these objects.

The triangle is drawn askew to emphasize that no one dimension is inherently more important than any other. […] A prototype may explore questions or design options in one, two or all three dimensions of the model. […] Their relationship to the model is represented by a marker on the triangle. This is a simple way to put the purpose of any prototype in context for the designer and their audiences. It gives a global sense of what the prototype is intended to explore; and equally important, what it does not explore.
- Houde & Hill, 1997

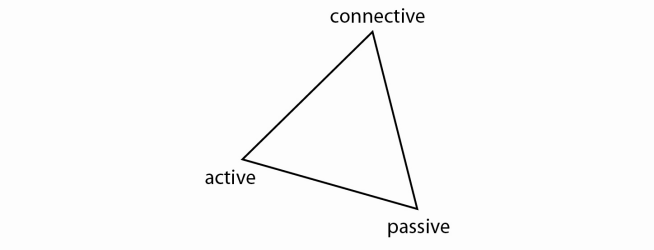

Fig. 1. Proposed Diagram

3.1 Project #1 - Call Me, Choke Me – Gunnar Green, 2008

Call me, Choke me (fig. 2) is a collar designed to be worn around the neck. Whenever the user/wearer of this object receives a phone call or a text message, the collar tightens, even if the call is not picked up and regardless of the identity of the caller. The caller is also unaware that the receiver is wearing this device. The goal of the project is to link together mobile technologies and erotic asphyxiation.

Fig. 2. Call me, Choke Me

In the proposed diagram (fig. 3), this project can be positioned between the connective and active categories, as it is affectively influencing the user through the communication from another user, but closer to active, as the affective influence is most likely being originated from the object and not from the caller. It is not a passive project, as it is not triggered by an affective input.

3.2 Project #2 - Mr. Smilit – Michiko Nitta, 2003

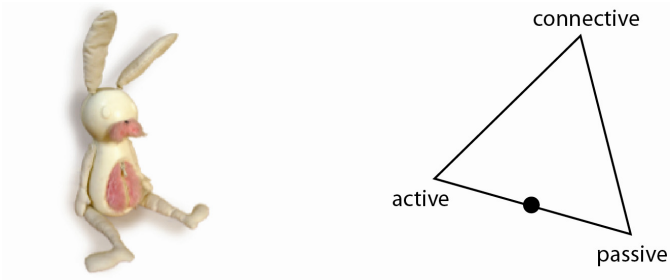

Fig. 3. Mr.Smilit

Mr. Smilit (fig. 3) is a toy that reacts to the noise of a child's cry with a cry of its own, which may cause the child to stop crying and care for the doll. In the diagram (fig. 5), it can be positioned between the passive and active categories, as its actions are triggered by an emotional state of the user and its main function is to influence a change of this same emotional state. It is a case of very efficient bilateral affective interaction made with widely accessible, low-end technology.

3.3 Project #3 - Prayer Companion – Interaction Research Studio, 2010

Prayer Companion (fig. 4) was developed for the nine Poor Clare Sisters who live at a monastery in York, UK. It is a communication device that alerts the nuns to issues that need their prayers and works by scrolling a constant feed of issues in the screen across its top. The device was designed specifically for the nuns and is the only one of

its kind. It sits on a table in a hallway that they often pass through, scrolling news as well as the feelings of anonymous strangers whose blog entries are aggregated by the website We Feel Fine.

Fig. 4. Prayer Companion

This is a very interesting project to analyze from the perspective of our diagram. It is mostly connective, as it feeds the nuns with personal affective influence from the blog posts. It is also active, as it influences emotional states on them according to the news, which are not generated by another user's emotional states. And it is finally also designed to be passive, as the mood of the world and therefore the object's reactions may change according to the nuns' prayers. This last feature is of course arguable, but from the user experience design perspective, it is contemplated in the project.

3.4 Project #4 - Strangle Poise Lamp– James Chambers, 2010

Strangle Poise (fig. 5) Lamp is turned off by being strangled. It presents a simple yet effective and straightforward use of affect in design. Although the technology and digital processes themselves might not be impressive, this project presents a really interesting way to channel negative emotions, possibly avoiding violent outcomes that might derive from a simple bad mood.

The project can be considered mostly passive, as the user triggers its main function with an action that derives from an emotional state. It does also, however, influence the emotional state of the user, relieving users from stress for example, so one could say it leans a little bit to the active category (fig. 9), but not as much as Mr. Smilit.

Fig. 5. Strangle Poise Lamp

4 Conclusion

Despite significant advances in the field of affective design, there are few large-scale experiments that allow human-machine interaction in ways that are efficient in conveying affective influence.

If we expect to have machines with which we can deal in all our potentiality, it would be necessary to create machines capable of handling subjective complex communication in a manner equivalent to our communication with living beings. Just as when we engage in a conversation with anyone, we should be able to interact with devices with intentional actions, such as gestures and hand signals or unintentional ones, as expressions of nervousness or tears.

When dealing with electronic objects, we can – and in many cases, must – seek interactions that are more surprising than the simple act of pressing a button and watching a programmed, and therefore expected, reaction. In most digital interface designs, "the external determination exerted on the machine (by the programming team) imposes repetition among similar interactions – repetition of certain calculations, certain logical operations, certain associations between inputs and outputs that guide and limit the evolution of the relationship. That said, Deleuze's assertion echoes strongly when he says (1988, p.342) that the potential only inspires a pseudo-movement, a false movement of the possible."(PRIMO, 2005)

Pinheiro and Spitz (2011) suggest that we should build a world in which computers demand less cognitive effort for their use, which operate in the background, far from our main focus of attention, especially due to the fact that today we live in environments of constant connection and interaction, surrounded by electronic devices in every moment of our days. Indeed, we have become completely dependent on our collections of cell phones, computers, tablets and even less tangible systems such as email and social networks.

By allowing these to devices take over our lives, we are opening doors to a new dimension of existence in which we extend into them. It is up to us to develop the means to allow the transition into this new dimension to represent something new, useful and above all, something that expands our own nature, but does not draw us away from it. The implementation of affect in human-machine interactions could be a great facilitator of this process.

References

1. Antonelli, P.: Talk to Me – Design and Communication between people and objects. MoMA, New York (2011)
2. Norman, D.: Emotional Design: Why We Love (or Hate) Everyday Things. Basic Books (2003)
3. Picard, R.: Affective Computing. MIT Technical Report #321 (1995)
4. Damasio, A.R.: Descartes' Error: Emotion, Reason, and the Human Brain. Harper Perennial (1995)
5. Weiser, M.: The Computer for the 21st Century. Scientific American (1991)

6. Pinheiro, M., Spitz, R.: Design de interação e computação pervasiva: um estudo sobre mecanismos atencionais e sistemas de informação ambiente (Interaction Design and Pervasive Computing: a study on attentional mechanisms and ambient information systems). Rio de Janeiro, 212 p. Tese de Doutorado – Departamento de Artes e Design, Pontifícia Universidade Católica do Rio de Janeiro (2011)
7. Spinoza, B.: Ethics. Penguin Classics, original 1677 (2005)
8. Deleuze, G.: Cours Vincennes (1978-1981), http://www.webdeleuze.com
9. Antonelli, P.: Design and The Elastic Mind. MoMA, New York (2010)
10. Dunne, A.: Hertzian Tales: Electronic Products, Aesthetic Experience, and Critical Design. MIT Press (2005)
11. Houde, S., Hill, C.: What do Prototypes Prototype? In: Herlander, M. (ed.) Handbook of Human-Computer Interaction. Elsevier (1997)