Empowerment: a strategy to dealing with human values in affective interactive systems

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Abstract

Affective computing systems are potentially problematic from an ethical viewpoint as they aim to isolate, measure, interact with and influence our emotions. This means that they may infringe on values such as privacy or autonomy. We propose that an interactional perspective on the design of affective systems as well as on how to enable negotiations of privacy or autonomy is a viable route to better cater for these values. An interactional design perspective may make use of design elements such as open-ended, ambiguous, yet familiar, tools that users may use as a basis to make sense of their own emotions and their emotional interaction with one-another. With such tools, users are provided with power over their own data and the interpretation of it.

Introduction

Affective computing systems are potentially problematic from an ethical viewpoint as they aim to isolate, measure, interact with and influence our emotions. This means that they may infringe on values such as privacy or autonomy.

According to Boehner et al, (2005) the predominant view of emotion is an informational one. Emotions in this view are seen as informational units that are internally constructed and then transmitted. Interface paradigms based on the informational view focus on helping systems to better understand the signals that users are transmitting.

Here we would like to provide an alternative approach to design that is relevant to certain kinds of affective interactive systems – not all of them. We shall try to argue that this alternative approach, named the *interactional view* (Boehner et al., 2005, Höök, 2006) has some power in preserving aspects of users' privacy and autonomy in interaction. The interactional view underlies both our way of understanding how these values are enforced in the real world, but also how to build systems that promote similar processes.

Values

There are a range of values that are important to deal with in the context of affective computing. Here we shall focus on privacy and autonomy as important values that are particularly interesting in affective computing systems that aim to infer users' emotions and then make use of such information to support the user or improve communication between users. There is a range of applications in this area, let us just mention a few to illustrate what we will later name the "information view" on affective computing.

EmpathyBuddy is an email agent that looks at each sentence the user writes and uses cognitive-based affective user modelling to extract the emotional value of each sentence (Liu et al. 2003). EmpathyBuddy uses a common-sense filter to infer the goals and needs of the writer.

Affective Learning is another domain where Picard and her group believe that affective computing can be applicable. It is well known that students' results can be improved with the right encouragement and support (Kort et al. 2001). In the area of learning, Kort and colleagues have proposed an emotion model built on Russell's circumplex model of affect relating phases of learning to emotions. The idea is to build a learning companion that keeps track of what emotional state the student is in and from that decide what help they need.

Another application in the learning area from the same group is a leap chair with pressure sensors (Mota et al. 2003). The chair classifies nine postures a student can have. The postures are related to affective states associated with a student's interest level.

All of these applications regard emotion as something that can be measured, isolated and then used as a basis for how to make a system respond. This makes these kinds of systems very vulnerable to privacy protection issues. Users may not want systems to know of their emotional states, perhaps store them and build profiles of them. Overall, these systems also threaten users autonomy since they do not hand over any control to users, but instead decide what to communicate to others (be it friends or teachers or the system itself) about the end-user's emotional state.

Privacy as a negotiated, social process

Privacy is often referred to as "the right to be left alone" and in general that you are in control of what information is known about you. In affective computing applications, the system might be attempting to recognise and log users' affective processes, mood or personality traits. This makes users' position vulnerable and might even stop some users from making use of the system. Especially if users are not left in control of how this information about them is processed.

Initially we may naively perceive privacy as a matter of protecting end-users from violations of various kinds. But in the real, everyday problems that users typically encounter, protection turns out to be the wrong conceptual stance towards privacy. A protective view on privacy removes possibilities for the good applications that people want and are willing to use – despite their potential of violating their privacy, such as blogging tools or in other web 2.0 applications. In those tools, privacy is instead seen as a negotiation of rights. You can see my Flikr-photos if I can see yours. In those systems, privacy is often coupled with accountability: I can see that you have tried to access my private information, and you know that I can see that. This allows for balancing the power between users.

There are various different definitions of privacy, but very few studies of how privacy actually unfolds as a process between people. A source of inspiration in this work is the analysis and perspective on privacy introduced by Palen and Dourish (2003). Building upon Altman (1975; 1977), they reject the idea that privacy can be defined as a set concept from which we can derive a set of rules for when we have enough privacy and when there is too little. Instead, as it turns out, privacy is negotiated between parties, influenced by the culture they are in and regulated in interaction between people. They "outline a model of privacy as a dynamic, dialectic process" and show how this can be used to analyse a range of IT-applications.

A model of design for these kinds of systems is that of "social translucence" (Erickson and Kellogg, 2000). Users' actions are made visible, which makes us aware of their activities, and thereby they can be held accountable for what they do.

As it turns out, people in different cultures are more or less sensitive to privacy violations. In a comparison between video surveillance in the US and in Sweden, it was found that the Swedish participants were significantly more privacy sensitive than the US participants (Eidmar and Sallmander-Prien, 2005). Important to remember here is that our views on privacy

are shaped by the culture we live in. This in turn is influenced by the kinds of technologies we introduce into the society. If it is possible to have video surveillance everywhere without any special permission, then people will get used to this and behave differently in public spaces. In Sweden, this is not allowed, and people get worried if this principle is violated. The field of affective computing has a great responsibility in deciding what can and should be known about users emotional processes in different kinds of applications and settings.

Autonomy

Autonomy refers to "a person's ability to make independent choices". Some affective computing systems are pro-active, that is, they try to infer your needs without you telling them what they are, and then act before you may even know you have a need. Sometimes this can make a lot of sense, especially if the situation at hand happens in a context that is limited enough to be modelled in all its details and consequences. This is true for some time-critical tasks, such as flying an airplane in certain situations, or in health threatening situations, such as falling asleep when driving your car. But for most applications, the tool-based view putting the user at core still holds: systems should be designed as tools that users can make use of in ways that suit with their tasks and needs. Thus, the user needs to have more power and the system needs to make any assumptions it makes about the user clear and also allow for various kinds of appropriations.

Overall, it may be that we should avoid creating applications that will gradually change our perception of what can and should be known about us. Statements such as "systems should address users emotional states so that they do not increase stress levels or fail to address users real needs" (Picard, 1997) carries an underlying assumption that it is possible to know about users' emotional states. In a sense, we might convey a reductionist idea – that it should be possible to understand human thinking and sense-making if we only model enough of the signs and signals we transmit. Technology has the power to change our behaviours, our values and even the way we see ourselves, and thus a reductionist position risks enforcing a machine-like view on our minds and bodies.

The Interactional View: Design examples

The interactional view sees emotions as processes spread over people and situations – constructed in a moment-to-moment fashion (Boehner et al., 2005, 2006). Designs that are built from this perspective assume that the *meaning* of an emotional process is created by people and that affective interactive systems should be such that users are encouraged to negotiate these meanings themselves.

Let us start with two examples from our own work on how to design from an interactional view, where empowerment of users is put in the foreground, and where it is assumed that meaning is created by users. We shall then come back to and discuss what design elements make for an interactional view on affective interaction.

eMoto: a communication service

Our first example deals with personal communication in general and communication of emotions in particular in a mobile setting – an extended SMS-service for the mobile phone. If we had deployed an informational view on this design problem, we might have tried to figure out how to increase the bandwidth between two users through recognising their emotional states, packaging them in some representation (e.g. as anthropomorphic faces) and then adding those representations to the messages. Our starting point was instead to find an open-ended representation of emotions in which users could read their own interpretation and negotiate the meaning over time. Let us provide some background to our design process.

In our view, the integration of bodily, cognitive and social/cultural interactions into a design is key when dealing with design for emotional interaction. Emotions are not only cognitive phenomena, but are also experienced as physical, bodily processes, and are in turn influenced by our bodily experiences (Davidsson et al., 2003, Damasio, 1994). They way we experience emotions is shaped by the culture we live in and the specific social setting they occur in (Katz, 1999). Emotional processes are crucial in our interactions with others and we all spend extensive amounts of time figuring out our own emotional reactions as well as interpreting those of others (sometimes highly individual reactions and expressions). The subtle nuances of our experiences that we want to express in interaction require interpretation and meaning-making, rather than crude simplifications. Designing for emotional communication that addresses bodily, cognitive and social aspects is therefore a true challenge.

From an interactional perspective communication of emotions is not simply an information transfer problem; it is about physically and intellectually experiencing the whole range of emotions that make up a conversation. We name them *affective loop experiences*, experiences where it is not possible to separate the intellectual from sensual experiences, nor to single out what is my individual experience from the overall experience arising in a dialogue with a friend, from previous friendship, and deep physical and emotional communication with one-another.

Based on these notions we designed a personal communication system called *eMoto* (Ståhl et al., 2005, Sundström et al., forthcoming).

In eMoto, users send SMSs between mobile phones, but in addition to text, the messages also have colourful shapes and animations in the background (see examples in Figure 1). The user writes the text-message and then chooses which expression to have in the background from a big palette of expressions mapped on a circle. The expressions are designed to convey emotional content along two axes: arousal and valence. For example, aggressive expressions have high arousal and negative valence and are portrayed as sharp, edgy shapes, in strong red colours, with quick sharp animated movements. Calm expressions have low arousal and positive valence which is portrayed as slow, billowing movements of big, connected shapes in low-energy blue colours.

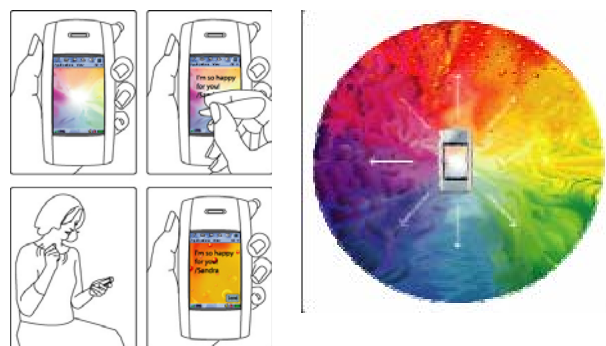

Figure 1 eMoto usage

To move about in the circle the user has to perform set of gestures using the stylus pen (that comes with some mobile phones) which we had extended with sensors that could pick up on pressure and shaking movements. Users are not limited to any specific set of gestures but are free to adapt their gesturing style according to their personal preferences.

Studies of eMoto showed that the circle was not used in a simplistic one-emotion-one-expression manner, mapping emotions directly to what you are experiencing at the time of sending an emoto. Instead the graphical expressions are appropriated and used innovatively to convey mixed emotions, empathy, irony, expectations on future experiences, surrounding

environment (expressing the darkness of the night) and in general a mixture of their total embodied experiences of life and in particular, their friendship. We also saw that emotions are not singular states that exist within one person alone, but permeate the whole situation, changing and drifting as a process between communicating friends. The results confirm that emotional communication is something more than transferring 'information plus emotion' from one person to another in a truly interactional sense.

As one of the users in the study expressed it:

Mona: "I leave out things I think are implicit due to the colour… the advantage is that you don't have to write as much, it is like a body language. Like when you meet someone you don't say 'I'm sulky' or something like that, because that shows, I don't need to say that. And it's the same here, but here it's colour."

Affective Diary: a personal logging system

Our second example deals with personal logs in general and in our case a diary in particular. Again, with an informational view on how to save memorabilia from users' daily emotional and bodily experiences, we might have ended up with a tool that would have classified users' emotions and told the user what s/he was experiencing. Similar to the design of the eMoto system, we instead wanted to allow the diary writers to themselves make sense of the scraps and bits of data collected from their life.

A diary provides a useful means to express inner thoughts and record experiences of past events. It also provides a resource for reflection. In the Affective Diary we wanted to explore reflection that goes beyond the purely intellectual experiences and aids users in remembering, and reflecting on, their embodied emotional experiences (Lindström et al., 2006).

According to an interactional view emotions are constructed in interaction, where the system supports people in understanding and experiencing their own emotions. The aim is not to detect the "right" emotion, but rather to make emotional experiences available for reflection. That is, to create a representation that incorporates people's everyday experiences that they can later reflect on.

Hence our aim was to provide users with material to be used as a starting point for interpreting and reflecting on situations, with an emphasis on the material working as a bridge to the embodied emotional experience.

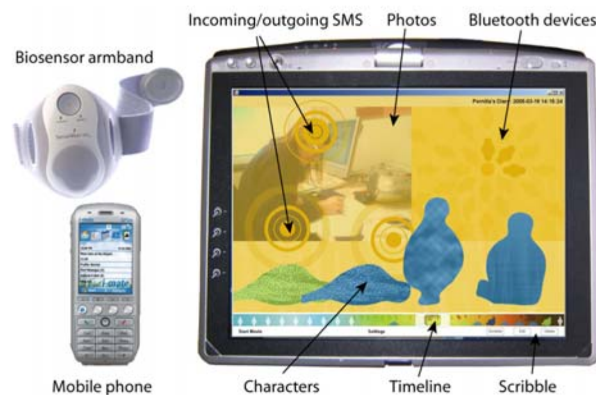

Figure 2 The Affective Diary

The Affective Diary consists of a mobile phone (with camera), body sensors (indicating *movement* and *arousal*), and a Tablet PC (see Figure 2). As a person starts her day she puts on the body sensor armband and activates the Affective Diary logging system on her phone. During the day, the system collects sensor data picking up movement and arousal and activities

on the mobile phone: SMSs, photographs and Bluetooth presence. Once the person is back at home she can transfer the logged data into her Affective Diary. The collected sensor data is presented as somewhat ambiguously shaped and coloured characters placed along a timeline.

The abstract, ambiguous, body postures symbolize users' state in a shape that directly connects to sensor data. The system maps sensor data (pulse, pedometer, accerolometer picking up whether standing or lying down) into two dimensions: movement and arousal. *Movement*, represented in terms of how upright the 'body' is, is derived from pedometer and other sensor data. *Arousal*, represented by colour of the 'body', is picked up from subtracting movement from the sensor readings and thereby finding peaks in pulse, sweat, etc., that cannot be explained by physical movement.

The representation of the data can be played as a movie, animating the body over time. To help them reflect on the day, the user can interpret and alter the representation: changing the posture or colour of the characters, scribbling diary-notes onto the timeline or manipulating the photographs and other phone-related data.

Initial studies indicate that users were able to make sense of the diary material and relate it to different events in their life. There was also evidence that they were able to recognise their bodily experiences through seeing the representation in the diary. By recognising and reliving some experiences (and on occasion and somewhat paradoxically by not recognising their own bodily reactions), they sometimes even learnt something about themselves that they did not know before. Two of our participants went even further and started to reflect on their lives and used Affective Diary to change aspects of themselves – in this way it became a learning tool.

By using the diary, Erica, one of our participants discovered that certain events affected her mood, e.g. a meeting with her boss that made her very agitated. This was mirrored by the shape of the "body" in the diary and she could see that this mood persisted for a long time after the meeting.

She says: "We had a discussion about having vacation in July although I really didn't want to have vacation then, because I had nothing to do. That made me a little annoyed."

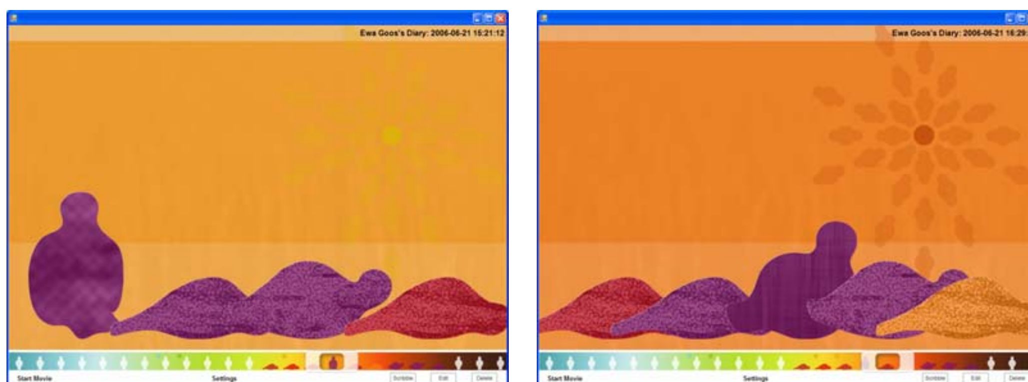

Figure 3 Erica's meeting with her boss

When Erica became aware of this she used it to change her own behaviour in stressful situations and even monitor how well she was doing. For instance on midsummer's eve, a holiday which usually made her very stressed, she had decided to take it easy. For that day/night the diary showed blue low energy shapes, which she interpreted as having succeeded in being calm and just enjoying the day.

How to design from the interactional view?

Given these two examples, we can now come back to what we mean by the interactional view on design and discuss what it entails, and why (whether?) it leads to empowerment for users, thereby protecting their privacy and autonomy.

Design aims

First, the interactional view can be described as a set of design aims (as done by Boehner et al, 2005). Their ontological view on emotion is that it is "culturally grounded, dynamically experienced, and to some degree constructed in action and interaction". Emotions are created in a co-constructed, co-interpreted fashion. Hence the focus should be moved "from helping computers to better understand human emotion to helping people to understand and experience their own emotions". Boehner et al provide the following list of design aims for an interactional approach:

- The interactional approach recognizes affect as a social and cultural product
- The interactional approach relies on and supports interpretive flexibility
- The interactional approach avoids trying to formalize the unformalizable
- The interactional approach supports an expanded range of communication acts
- The interactional approach focuses on people using systems to experience and understand emotions

The interactional approach focuses on designing systems that stimulate reflection on and awareness of affect. For instance eMoto does not extract emotional information from users, but lets users directly express emotions to the system, a process over which they have control. Users can express emotions that they are not feeling. However, the affective loop of eMoto is set up to reinforce whatever emotion the user expresses by reacting to the expressive gestures performed by the user. Hence, in the end users will likely come to feel the emotion that they are expressing. A system like eMoto is not concerned with transmitting emotion as simply another piece of information but instead focuses on experiencing and constructing emotion.

To Boehner et al.'s set of aims, we also want to add some of the pure physical, bodily experiences that an interaction with an affective interactive system might entail – as in the eMoto and Affective Diary examples above. The design ideal in both systems is to provide a means to represent *embodied emotional experiences*. The phenomenological definition of embodiment offers a way of explaining how we create meaning from our interactions with the world (Dourish, 2003). Our experience of the world depends on our human bodies, not only in a strict physical, biological way, through our experiential body, but also through our cultural bodies (Fallman, 2003). Fallman provides an example of a basic human activity, such as sitting on a chair. Since our physical bodies are erect, have two arms and legs, get tired, can bend forward at the hip and so on, chairs lend themselves to being sat on. However, it is only when we have acquired the skill of sitting we are able to do so. Thus we need to live and act in a culture where sitting on a chair makes sense.

Likewise, embodiment of emotions depends both on our experiential (physical) and cultural bodies. Emotions are experienced through the constitution of our experiential body. Primal emotions, such as fear or anger, make our autonomic nervous system react, change the hormonal levels in our body, change our facial expressions and focus our senses and cognition, preparing us for flight or fight behaviour (Davidsson et al., 2003). Secondary or social emotions, such as shame or pride, crucial to our ability to maintain social relationships, also have associated corporeal processes affecting our body, facial expressions, body posture, and cognition (Tangney and Fischer, 1995). But we do not make sense of our emotional reactions as

biological processes nor are we predetermined to react in only one way to a particular circumstance. Emotion is a social and dynamic communication mechanism. We learn how and when certain emotions are appropriate, and we learn the appropriate expressions of emotions for different cultures, contexts and situations. The way we make sense of emotions is a combination of the experiential processes in our bodies and how emotions arise and are expressed in specific situations in the world, in interaction with others, coloured by cultural practices that we have learnt. Designing for embodied representations of emotional experiences should thus ideally relate to and build upon both the experiential and cultural body.

Design solutions

Translating these design aims into actual designed systems is of course a difficult process, but there are some lessons learnt on how to do it. We can be guided by, for example, design elements such as:

- Leaving the interpretation to the user through ambiguous design elements (Gaver et al., 2003)
- Designing open familiar surfaces that can be appropriated by users (Höök, 2006)
- Involving users in affective loop experiences (Sundström et al., forthcoming, Sundström, 2005)

Let us just briefly explain each of these and how they have similar purposes in leaving open for users' own creativity and ability to negotiate meaning.

Ambiguity

Most designers would probably see ambiguity as a dilemma for design. Gaver and colleagues, however, look upon it as "a resource for design that can be used to encourage close personal engagement" [Gaver et al.]. They argue that in an ambiguous situation people are forced to get involved and decide upon their own interpretation of what is happening.

As Gaver and colleagues point out, the everyday world in general is inherently ambiguous and most things will have multiple meanings depending upon how we see them. This has been exploited in the arts where ambiguous meanings contribute to the aesthetic experience. Gaver and colleagues created a range of systems where the meaning of the IT-artefact was not obvious. Their goal was to be evocative rather than didactic and mysterious rather than obvious. Through this attitude, they broke with the tradition in HCI (Human-Computer Interaction) to rely entirely on understanding as the basis for interaction. Instead, their focus was on the interpretative relationship between people and artefacts. Ambiguous design does not mean fuzzy or inconsistent design – simply that it may give rise to multiple interpretations. This is what the characters in the Affective Diary system allows for and what the colours, shapes and animations in eMoto portrays: a surface for multiple (but not random) interpretation.

Open familiar surfaces

What an ambiguous design may entail is to leave certain surfaces in the interface 'open' to users so that they can fill them with their own meaning and patterns of behaviour. But such surfaces might be very hard to understand unless there are elements in them that make them familiar to us. Thus, an alternative to very ambiguous designs are those building on design elements that feel familiar to people, but not entirely ready-made for interpretation and thereby 'closed'.

With Affective Diary and eMoto, we have attempted to integrate our ideas of bodily experience with the interactional approach. We have explored designs that interact with users' physical bodies but leave room for interpretation. Technically, we have considered how this can be done through technologies that sense our corporeal, physical and sensual bodies. Our

position is that such sensed data should be represented in ways that feel *emotionally familiar* (Höök, 2006). For instance, there are systems that capture users' facial expressions or body postures in real-time and represent emotional states using avatars or robot behaviours (Lisetti et al., 2003, Psik et al., 2003). A more abstract design that builds on the dynamics of emotions as experienced by our physical bodies, is adopted by the eMoto system. Here colours, shapes and animations attempt to mirror users' physical gestures addressing their inner experience of emotions (Ståhl et al., 2005).

Users should also be empowered with the rights to shape the systems that are put into their hands. From a user perspective, a system designed along the lines outlined above, is not only a tool for completing a task, but an open surface It is up to users to fill the surface with content themselves (actively or passively) and thereby shape its functionality and meaning. Some of these systems will allow the functionality and content to drift over time and are flexible enough to allow for different norms, practices and behaviours to arise.

Finding the right degree of openness when it comes to possible interpretations of the design or possibilities to shape the system is a tough challenge for designers. A too 'closed' design leaves little room for interpretation and appropriation while a too 'open' design runs the risk of becoming meaningless.

Importantly, the approaches that have based their designs familiarity do not discount the learning that is needed to interpret and interact with their systems. It simply means that once they start interacting with the systems, they can relate to their own physical, bodily practices and emotional reactions in order to make sense.

Affective loop

In some cases, the affective interaction systems have been designed not only to 'read' off the body and display representations, but also to encourage users to act – make gestures, new postures, etc. In what has been referred to as the affective loop (Ståhl et al., 2005, Sundström, 2005, Sundström et al., forthcoming) subsequent actions are meant to invoke further reactions and emotional experiences. This loop can be in real-time with immediate feedback and less reflection, as in eMoto, or a long-term process that invokes a deeper reflection and more lasting change, as in Affective Diary.

To clarify what we intend by an affective loop we see it as an interaction process where:

- the user first expresses her emotions through some physical interaction involving the body, for example, through gestures or manipulations of an artefact,
- the system (or another user through the system) then responds through generating affective expression, using for example, colours, animations, and haptics,
- this in turn affects the user (both mind and body) making the user respond and step-by-step feel more and more involved with the system

This means that the system is not trying to infer users' emotional states, but instead involve users in emotional interactional process. In particular, into those processes that involves the body. Users may then choose to be involved or not – it is up to them to make the interaction unfold in ways that make sense to them. The system is just staging the scene for the activity.

Methods to tap into social and bodily practices

An interactional approach also entails a commitment to a set of methods that in turn allow for open-ended interpretation of emotion processes as interactional over people, culture, and settings.

In our experience, to find the applications and situations in which there is a potential for these kinds of design solutions to make sense – where a familiarity interpretation process can arise

in and from the interaction – we need to look for the everyday experiences where the presence of others, their choices and their meaning-making processes are crucial to our own sense-making.

It can therefore be very important to study the everyday practices and everyday physical, bodily, encounters we have with the world (Dourish, 2001, Fallman, 2003). But another, sometimes equally fruitful path is to instead start from the design material: the technology available to us. The properties of the material itself raise a number of limiting conditions and possible openings. Only when experiencing the possibilities that this gives and how it *feels* when interacting with it, we can really see what makes sense. The problem is getting the technology into such a state that it can be experienced for the specific purpose at hand. Here we can be inspired by "Situated and Participative Enactment of Scenarios" by Iaccuci and colleagues (2002), that is, setting up situations with half-working systems that resemble the real situations in which they will be used.

Once the system is designed, it needs to be evaluated. In a forthcoming paper by Kaye and Sengers (2007), the history of evaluation in HCI is discussed. Their perspective is that today, evaluations of experience-focused HCI are typically more open-ended and often encourage multiple, perhaps conflicting interpretations. This is the case with, for example, the Sensual Evaluation Instrument developed by Isbister et al. (2006) in HUMAINE. The aim is not to classify users' reactions to interfaces into a pre-set list of emotion labels, but instead allow users to express their experiences through manipulation of a set of ambiguously designed clay-figurines with different body-like shapes, as they are interacting with the system being evaluated. This can be contrasted with methods such as Nielsen's heuristic evaluation where it is assumed that there are bugs in the interface that can be found, diagnosed and fixed.

Thus, the methods that will lead to a system design that encourages an interactional perspective on design of affective interaction need to be founded on the same interpretative, open-ended, multiple interpretations basis. Putting experience and interpretation at core, has to penetrate the whole design cycle.

Summary

The main thesis of this paper is that it is possible to address human values such as privacy and autonomy through designing affective computing systems from an interactional perspective and that this interactional perspective will lead to empowerment for end-users to create meaning and alter the system over time to fit with their needs, ideas and dreams. Through handing over open-ended, ambiguous, yet familiar, tools to users that they may use as a basis to make sense of themselves and their interaction with one-another, we provide them with power over their own data and the interpretation of it.

The underlying theoretical perspective is that of embodied interaction (Dourish, 2001). From studying social and affective communication practice as it unfolds between people in the world, we gain the basis for designing systems and artefacts that can serve as extensions of ourselves in interacting with others and ourselves. Our viewpoint is that emotions are embodied processes that we are deeply involved with and that cannot be separated from the context in which they are experienced (cf. Katz, 1999). Instead, we are trying to make emotional communication, as in eMoto, open for users own expressivity and personality. The intention behind a sent eMoto can only be understood in the interpretation between the two communicating friends. The choice of gesture to express an emotion will vary with the user's own body language (even if our artefact only supports a small range of gestures).

In Affective Diary, the interpretation is more or less entirely open to users because of the simplistic mapping of sensors to the body shapes and colours. They read the representation

almost like we read a horoscope. Through the combination of mobile and sensor materials, the diary is designed to invite reflection and to allow the user to piece together their own stories.

Leaving some surfaces open in the design, or in general providing a tool-based view on affective computing does not mean that we design tools that are empty to start with and where the whole content is given by the user. Instead, we try to design the systems based on our daily social, emotional and bodily interactions with the world, making them feel familiar to users. But the applications we build will not make sense or have any meaning until users pick them and make them parts of their own practice, their own familiarity with their emotional, social, and bodily encounters with themselves and the world.

The way privacy is protected by systems like this is by handing over the power of the tools to the end-users to negotiate what they want to share with one-another – making them create for the delicate balance that social relationships entail. We also privilege users to be the ones who interpret and create meaning from the emotional aspects of the system. They may even be allowed to tinker with and alter the emotional representations over time.

Apart from making users negotiate privacy with one-another this system design perspective also respects users' autonomy and ability to know themselves what they want to do through the system.

Obviously, this does not mean that we can set aside demands on security solutions in the system or be watchful about introducing bias into the system design that will force users to behave in certain ways in order to comply with the design. But we do place the power in the hands of the end-users instead of in the hands of designers or the system.

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