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### Articulating Atmospheres

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# Articulating Atmospheres Through Middle Ground Experiences in Interaction Design

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## ABSTRACT

This paper presents an architectural approach to designing computational interfaces by articulating the notion of atmosphere in the field of interaction design. It draws upon the concept of kinesthetic interaction and a philosophical notion on atmosphere emphasizing the importance of bodily experience in space, presented as middle ground experience. In the field of HCI, middle ground experiences complete the unarticulated spectrum between designing for foreground of attention or background awareness. When “*Articulating Atmospheres through Middle Ground Experiences in Interaction Design*” implications and qualities of the approach are identified through concrete examples of a design case, which also investigates the qualities and implications of addressing atmospheres both as design concern and user experience.

## Keywords

Interaction Design, Atmosphere, Background Awareness, Middle Ground Experience.

## INTRODUCTION

The emergence of new technologies has throughout history reshaped our built environment and thus, our way of inhabiting space. Within interaction design, researchers have an increased focus on the inherent qualities of the physical environment; qualities that previously have been overlooked in the intersection between physical architecture and technology. In his book *Digital Ground*, McCullough [19] stresses, that pervasive technology does not obviate the human need for physical place and shows that context not only shape usability but ideally becomes the subject matter of interaction design [ibid]. In line with this, Fogtman et al [9] emphasize that an architectural notion of bodies in space can offer much to the design of

collective interaction in pervasive environments [ibid]. The notion of atmospheres, as a means of engaging the sensing subject in its spatial surroundings is one of the architectural qualities, which within interaction design is a neglected dimension of spatial experiences [4]. This is quite paradoxical according to at least three perspectives: First of all, related fields as architecture and performance art have long traditions of working with atmospheres [ibid]. Secondly, the use of technology has shifted from being task-oriented to be experience driven and the focus is on the interaction between people and products including sensual, emotional and aesthetic qualities [11]. Thirdly, there is an increasing interest within theory, as well as practice, in physio-spatial and social aspects of interactive systems [4][9][13][19]. Drawing upon a number of disciplines including philosophy, architectural theory and human-computer interaction this paper discusses the notion of foreground attention - background awareness [30]; which has dominated the view on spatiality within interaction design [14]. The claim of the paper is, in line with [5] that the design of current interfaces seem to be build on the assumption that interaction can be captured in schemata and that the body is merely a mechanical executor. This view, does not justice our embodiment in the world [ibid] The primary concern of this paper is to bring attention to the overlooked potential of designing atmospheres to the field of interaction design research, addressing how bodily felt experience of shared and socio-cultural space may influence the interaction. The paper is outlined as follows: first the current notion of designing for background awareness is introduced and exemplified by the work of Ishii and others [14][15]. Then the notion of atmospheres is presented based on the German philosopher Gernot Böhme [1][2] this leads to the section of introducing *middle ground experience* denoting bodily experience of space. The design case “Color the Atmosphere” exemplifies through a working prototype a design approach to atmospheres and discusses the relation between foreground, middle ground and background both as design concern and user experience.

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## 2. RELATED WORK

It is apparent that atmospheres are always present even though we are unable to unambiguously measure the existence of them, we all agree to the fact that they exist. Atmosphere denotes the quality of being present in space and we are not positioned opposite to or outside the atmosphere; but enclosed by and steeped in it [16]. Throughout history we have acknowledged the existence of atmospheres and they have actively been designed for e.g. within architecture and performance art [16][31]. Few interaction design researchers have addressed the topic of atmospheres [4][17][24] but without articulating it as design concern and user experience.

### 2.1 Designing technologies for background awareness

In the late 90's a new paradigm for interacting with computers was introduced by Ishii and Ulmer to the field of HCI [13]. Criticizing the conventional GUI model for its "painted bits" Ishii and Ulmer presents a TUI model where "tangible bits" gives physical form to digital information [ibid]. One of the aims of "tangible bits" pointed towards designing interactive systems enabling users to be aware of background bits in the periphery of their attention using ambient media displays [ibid]. The notion of designing technologies for background awareness, the periphery of a users attention, is opposed to foreground interaction, denoting the center of a users attention [30]. The spectrum between foreground and background awareness is yet to be articulated. When Ishii et al envision turning architectural space into an interface between people and online digital information [30] they draw upon two design cases [14][15] both concerned with presenting information to the periphery of human attention. The case of AmbientROOM [14] will in the following be used to exemplify the conceptual design idea. AmbientROOM was conducted in a freestanding office room and augmented with several interfaces exploring a multi-modal approach to ambient displays. One of the design concepts is made to inform the number of unread email messages through subtle but audible soundtrack of birds and rainfall, whose sound volume and density are modulated in the conjunction with variation in room lighting [14]. In line with [9] a critique on Ambient Room is raised according to their insufficient ideas on spatiality. Ishii et al refer to "*a personal interface environment designed to provide information for background processing*" [14, p.173] and the use of space is confined to a personal interface. Yet the room is understood as a 3 dimensional space, but the value of the room, as a social and atmospheric space is completely neglected.

### 2.2 The notion of Atmospheres

Atmospheres constitute our first sensation on entering a space and enable a specific experience of spatiality. It seems fairly easy to name a range of different atmospheres e.g. warm and uplifting or tense and hectic atmospheres. It is less easy to point out what constitutes the atmosphere of a specific space. The concept of atmosphere is by nature a background aesthetic and when we bring it to focus of our

attention it becomes weak and maybe transforms character. To sense atmospheres we utilize a combination of all our senses and by our physical presence in space we experience the form, volume and dimension of objects (or constellation of objects) in space and all these qualities influences the manner in which we experience the atmospheres of space which for example affect our behavior [16]. As atmospheres are indeterminate above all as regards their ontological status we are not sure whether we should attribute them to the objects or environments from which they proceed or to the people who experience them [1]. However, atmospheres are affected both by people being present in it, and by the surrounding space. Alongside with sociality; materiality, light, color, sound and odor are some of the well-known parameters that transform the qualities of space and as such the atmospheres. The German philosopher Gernot Böhme introduces the concept of atmosphere in 1993 [1] as a basic concept for a new aesthetic without having a point of departure in art. Böhme defines atmospheres as "spheres of presence". He neither locates them in the objects that extrude them, nor in the subjects that physically sense them but in between them and in both of them at the same time [1][4]. This notion is in line with aesthetic pragmatism [22] [25] and as pointed out by Dalsgaard et al [4] there is a lack of dimensions in Böhme's subject-space relation. Turning to the field of HCI it is not sufficient to define atmospheres as multi-sensorial experiences and qualities inherent in an environmental setting as the subjects relation to atmospheric interaction also encompasses a situated action and experience in temporal, social and technological relations [ibid].

### 2.3 Different approaches to spatiality

According to the notion of atmosphere the relation between space and bodies emphasizes that a phenomenological approach has much to offer the design of pervasive environments [9]. The current concept of space is approached differently within HCI and in order to embrace atmospheres, the concept of space must be grounded in the body. Böhme present two concepts of space as "space as medium of representation" and "space of bodily presence" [2] which forms the basis of the following:

In European thinking the concept of "space" is often thought of in two mathematical ways: one, origination from the Aristotelian understanding of "topos": a place constituted by the relations that cannot be measured and opposed to this; the notion of "spatium" where distances and intervals can be measured as the tradition of Decartes [3][4]. These two distinctions have a profound comparability with the notions of space and place, being introduced by to the field of interaction design by Harrison and Dourish [12][4]. Where "space" denotes geometrical arrangements, that enable certain forms of movement and interaction, "place" evolves as real people fill the space with meaning, practices and interaction. Hence, space is the opportunity, place is the (understood) reality [12]. Yet the notion of our cultural background, which strongly influences our behavior and values and as such our felt

experience of space, is missing here but articulated in Yi-Fu Tuan distinction between space and place[26]. In order to investigate the notion of atmosphere, Böhme emphasize that we need to approach the concept of space as “Space of Bodily Presence” taking a phenomenological approach of being physically situated in the world: *“Bodily space is the manner in which I myself am here and am aware of what is other than me, it is the space of actions, moods and perceptions”*. This notion is in line with the insights claimed by [5] [9] appreciating the centrality of our bodily engagement in spaces within human-computer interaction.

**MIDDLE GROUND EXPERIENCE**

In this paper the concept of middle ground experience is presented as our bodily experience of spaces embedded with technologies. Middle ground experience specifically points towards understanding how atmospheres mediate our felt experience of a social world. The claim of this paper is, that middle ground experience is missing in the distinction of designing computational artifacts and interfaces to either foreground focus or background awareness [14][15][30]. This dichotomy is insufficient as it neglects our embodied perception and actions in our relation to the physical and socio-cultural world. Middle ground experience is registered in a continuum ranging from foreground focus through middle ground experience to background awareness. The continuum comprises the seamless transitions between the different states of awareness, as we constantly mediate impressions through our senses and bodily motor skills. The notion of middle ground experience is yet unarticulated within the field of interaction design and rests to a large extent upon the concepts of embodied interaction [7] and kinesthetic interaction [10] that term how we experience the world through our embodied actions and in line with McCullough’s notion of “embodied predispositions” [19] and [5] who state the importance of designing interactive technologies for bodily engagement in space. Building upon [10] the middle ground experience conditions the manner in which we experience the world in framing our embodied perception and actions by providing a sense of spatiality in our relation to the physical, social and cultural world.

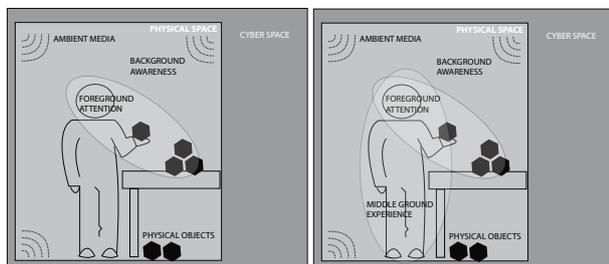


Figure 1 Left; Ishii et al.’s notion of spatial awareness as presented in [29] Right; same model illustrating middle ground experience

To position the argument of the paper, Ishii et al.s model on background awareness, see figure 1, left, is discussed in the perspective of the middle ground experience, see figure 1, right, emphasizing how form, volume and materiality of the table and physical objects affect the bodily experience of space. Ishii et al [30] accentuate the relation between foreground attention and background awareness as: *“Subtle, background ambient displays are meant to co-exist with, and complement, foreground tasks. Also, background displays can be moved into foreground, and vice versa. Users control this through their personal state of awareness and sometimes, through physical controls”*[30:6].

The relation between foreground attention and background awareness is opposed, yet transitional to each other, as illustrated in the left side of figure 2. Instead of a belief in mental models that successfully steer our actions in the world, we need to approach the design of interactive products from the understanding of the world springs from our bodily engagement with it [5]. We need to address human beings as sensing bodies in a complex world and not just subjects gifted with consciousness and self-consciousness [4].

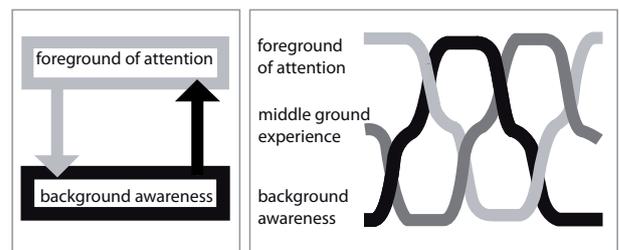


Figure 2 Left; Illustration of Ishii et al.’s notion of the relation between foreground and background [30] Right; “The threads of experience” understood as seamless transitions between foreground, middle ground and background awareness.

In the right-hand side of figure 2, the dichotomy of foreground and background awareness is expanded to encompass middle ground experience and the relation between them are seen as dynamic transitions. The dynamics between them is approached as journey from one state of awareness to another. All these journeys, or “threads of experiences” are woven into the fabric of atmosphere and it forms the bases of our daily life. Hence, several threads of experiences are present simultaneously and the seamless transitions from one state to another characterize our being in the world. The privilege of the foreground is that only one activity occupies it, whereas several activities exist as middle ground experiences and background awareness’s at the same time. Lets give an example; “Maria is reading a book sitting in her sofa. The text is foreground of attention, her sitting- position, holding the book is middle ground experience. Other sensuous inputs as the texture of the book and the temperature of the room are also middle ground experience. The surrounding space, the living room where she is sitting and the

apartment as such is in her background awareness. The rainy weather outside the window is also background awareness. When Marias mobile suddenly starts ringing, her awareness changes. The sound of ringing becomes foreground of attention and the text she just read differs into background awareness. When she gets up, the middle ground experience changes according to her bodily motor-skills. She reaches her mobile and accepts the call from a good friend. The conversation is now in foreground of attention, and standing next to the table is middle ground experience. While she talks, she notice the increasingly bad weather outside the window, the background awareness has turned through foreground, and then middle ground, as she realizes, that she feels cold. While she is having a convivial chat, Maria walks back to the sofa and wraps herself in a rug. This influences her focus of attention till she again is settled in the sofa, purring some tea and enjoying the cozy atmosphere while chatting with her friend”.

As illustrated in the scenario Marias middle-ground activities are made more or less conscious. Our acting in the world is constantly mediated by what Merleau-Ponty refers to as *praktagnosia*, a “motor-memory” which includes motor skills and the kinesthetic memory of performing them [10]. An example of this can be fingering in playing a musical instrument, in which the use of the fingers and hands are fitted to the players physical abilities as well as characteristics of the instrument [5]. Our bodily experience of the world is however not just a developed skills as Tuan emphasizes: “*A rich an deeply structured background of environmental patterns exist not only in the individual but also in the culture and the spices*” [26 p28]. According to Merleau-Ponty human subjects are primary engaged in answering a motor question with a motor response by searching through a catalogue of movement memories or gestural routines [10]. As such, the motor memory is both composed naturally and culturally appropriated motor skills guiding our actions in the world [ibid].The perspective of socio-cultural values is also highly relevant to the notion of atmospheres but left unarticulated by Böhme. As argued by [4] the notion of

socio-cultural values expand Böhmes notion of atmosphere, but seems sufficient as we carry with us a repertoire of knowledge from earlier experiences, as well as expectations and anticipations of what we are about to experience, into our encounter with atmospheres is space [ibid]

Arguably, the spectrum between focus of attention and peripheral awareness is lacking and an attempting discussion occurs in accordance with Heidegger’s philosophical notion of readiness at hand / present at hand [27] and whether his distinction has been dominating the dichotomy of designing to foreground and background spaces. According to Heidegger’s philosophy humans do not focus on the tool or the equipment that there are using; but on the work in which they are engaged. While writing we do not draw attention to the pen or keyboard, but to the text. He states, that only when a tool breaks down, it demands attention and what he denotes as “referential structures” e.g. the material of the tool appears only when the tool brakes down. Hence, the Heideggerian notion of foreground attention is opposed to the referential structures, understood as the background.

### CASE: Color the Atmosphere

“Color the Atmosphere” is an initial exploration of how technology can be used to create settings where people actively and playfully engage in the creation of atmospheres in domestic environments. An interdisciplinary team consisting of designers, architects, programmers and computer scientists in 2009-10 develops the concept and functional prototype “Color the Atmosphere” which in the following is introduced and discussed with an emphasis to foreground focus, middle ground experience and background awareness.

#### Design concept

We have designed a space where we on the basis of colors, images and music can make atmosphere transformations. The system is designed to transform current information on a smart phone differently on the stereo, lighting, wall screen, picture frame and screen. The concept draws upon

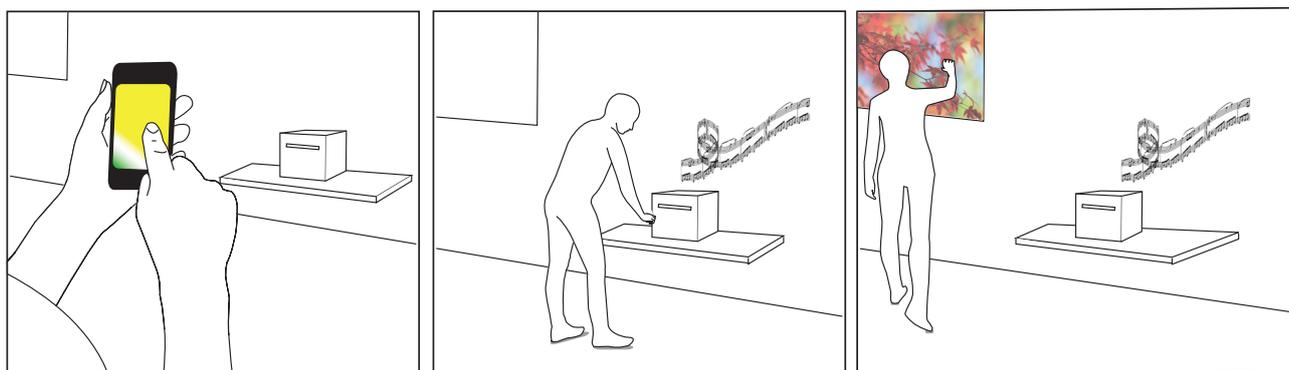


Figure 3: The design set-up: Exploring the concept of creating atmospheres through media transformations in a living room. Through explicit interaction, the gesture of “daubing” yellow color on the stereo turns it into classical music and on the wall yellow appears a naturalistic images.

an analogy of coloring space by using *paintbrush*, *palette* and *canvas*. Through the gesture of daubing color on each of the *canvas* surfaces the expression of space transforms according to the *paint* being used. “Color the Atmosphere” is, however, not committed to color transformations but explores the concept of atmospheres by embracing different modes of expression. If you pick a color e.g. *yellow* it determines different outcome according to what kind of media interface it is applied to and every piece of interface respond to *yellow* in its own idiom, see figure 4. It refers to the exploration of hidden layers. How does *yellow* express itself being a pattern? And what does *yellow* sound like? The transformation is done individually, which means that you can also do fights about that *yellow* mean. It aims to be a language by which we can articulate atmospheres in the making, as all media interfaces can be used to challenge the character of the atmospheres. The current set-up consists of smart phone with a RFID tag hidden underneath a cover. Next to each of the media interfaces a plexiglass box is placed hosting both a RFID reader and a touch sensor. Two different ways of manipulating the system is made possible by adding information to the media interface using smart phone or to erase current information by touch. To be more specific, the reader registers the RFID tag when the smart phone is hold near the plexiglass box. The current information is then uploaded to a server, responding by giving feedback on the linked media interface being next to the RFID reader.

### Some informed design choices

The following section discusses how the design team approached to make operational our knowledge of creating atmospheres. During the design process several experiments formed our investigation of how to interact with the system in a meaningful way. Whereas traditional brainstorming technique exclude perceptual motor skills, we ascertain video prototyping [18] and video brainstorming [ibid] to be useful methods as it give latitude to explore bodily experience of space in the manner of; how does it feel to be standing here, while the wall corresponds my gesture? Some informed design choices were useful guidelines in the design process and are in the following shortly introduced:

#### Physical anchoring

To be able to investigate bodily experience of space one of our design constraints was physical anchoring in space and as such a very explicit interaction. We draw upon the notion of how we traditionally strive to accommodate a certain atmosphere by addressing kinesthetic perception. The RFID technology was useful to physically anchor digital media interfaces in space.

#### Freedom of interaction

We encourage a playful approach to the exploration of atmospheres through five different media interfaces that allow for creativity and fluctuations in expressions. A matrix helped us to link the medias, see figure 4, in the

current set-up referring to stereotypes e.g. linking jazz with smoky animations and pictures of New York. According to the fact that each individual may interpret the expressiveness differently we emphasize the importance of letting the users create their own matrix. The flexibility of the system offers users a myriad of ways to achieve a certain atmosphere and is in line with the concept of “Freedom of interaction”[29].

#### Controllability

We have investigated the relation between users and system, in the manner of control. We tested how it felt when media spread “in ever-widening circles” when the user just approached one media, like when the user adds color to stereo other media interfaces would slowly follow by turning into the same idiom. As this would give the user a lack in control we finally chose to approach atmospheres being in full control with the media emphasizing lucid feedback between input and output.

### Some research challenges

To approach the notion of atmospheres as design constraint one need to be aware that the nature of it relies on different circumstances all very much related to a specific place, specific people and a specific situation. The designer will never be able give an exact prescription of the atmosphere as it is constituted not only by the subjects or the objects but also in the relation between subjects and objects [1]. “Color the Atmosphere” revealed a range of challenges according to design concerns and design heuristics and has indeed suffered the initial hardships of designing atmospheres. The following paragraphs present a clarification emphasizing how the notion of foreground, middle ground and background are valuable to articulate the difficult aspects of designing atmospheres.

#### Design concerns

The most prominent notions of designing atmospheres through interactive technology ranges from the means of technologies to the paradox of designing for the background awareness and in line with this; how the increased user involvement challenges the notion of atmospheres.

#### *Constituting atmospheres through digital media*

When we approach the design of atmospheres we should not consider the senses as separated impressions but rather emphasize that they work interdependently of each other to form a consistent experience. Technologies as means of changing atmospheres have different qualities according to input and output. As input, the utilization of multi-modal senses has gained increasingly significance in the HCI context and they are capable of sensing everything from how loud one can yell or how we squeeze and object [16]. As output technology can also produce different outputs, but in practice light and sound play significant roles in the creation of atmospheres, as they are able to bring about changes instantly [16]. The imbalance of designing for the

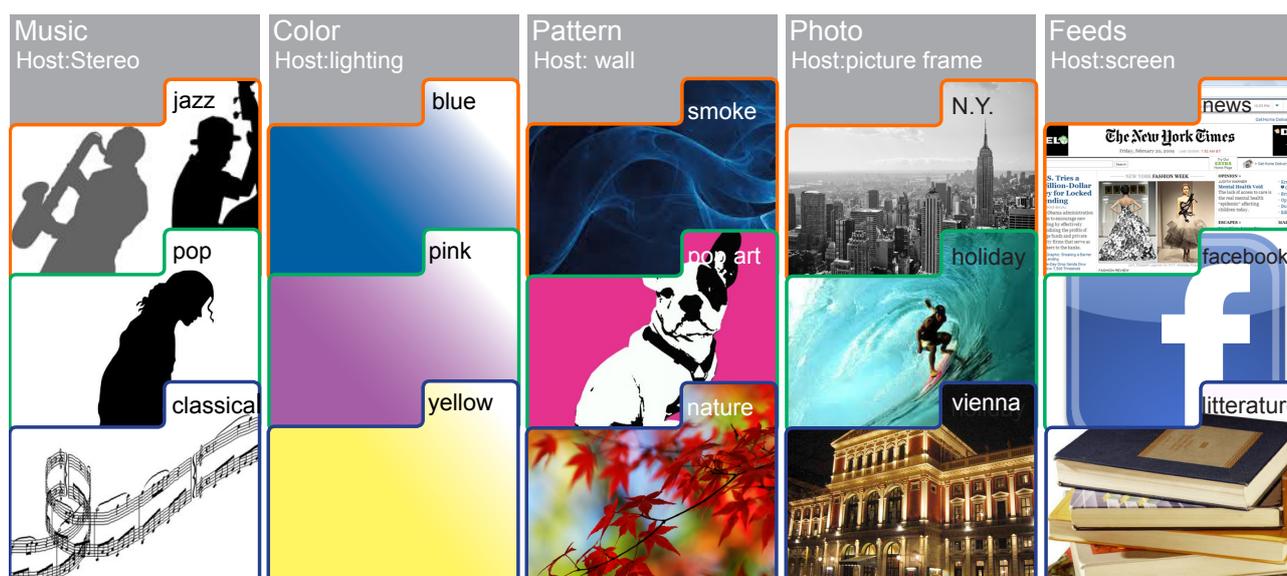


Figure 4 illustrate an extract of the matrix, which forms the basis of the prototype. Here, 3 rows are shown and seven rows are left out according to the limited space. Whereas the rows e.g. the orange illustrate how the media interfaces correspond to each other, the columns denotes the different shapes a media interface can take.

senses is addresses by Pallasmaa, who sees vision and hearing as our sociable senses; whereas others are considered addressing merely private functions being suppressed by the code of culture [21]. In the current design case we did not succeed in embracing more senses, than visual and hearing; although we were flirted with the tactile sense for quite a while. To encompass all senses through technology at the same time (or at least vision, hearing, smell and touch) it should be articulated as design constraint according to the complexity of it.

*The paradox of designing for background aesthetics*

The claim is, that the main challenge of designing atmospheres within interaction design is the dynamic relation between foreground of attention middle ground experience and background awareness, as it constantly influences on each other and as such the atmospheric experience. To give an example; imagine the situation where somebody tells a great joke. People are laughing and the atmosphere is convivial. As soon as somebody says, “Aren’t we having fun?” the uplifting atmosphere changes. An atmosphere cannot be put into foreground of attention without changing character. The journey between foreground, middle ground and background is an essential design parameter, as we constantly make adjustments in the foreground, and then leaves it into middle ground or background awareness. This dynamics between the different kinds of awareness influences both the design process and user experience and we have to acknowledge this to be able to design for atmospheres.

*Atmospheres and user involvement*

Drawing upon the established traditions of architecture [31] and performance art [8], designing atmospheres within

interaction design distinguishes in the manner of user involvement. Arguably, traditional scenography and interaction design approach the creation of atmospheres from each end of a spectrum. The following quote made by Fischer-Lichte [ibid] clarify how atmospheres is approached as a background aesthetic within theater:

*“The atmosphere comes from the general impression and it becomes part of what influences the perception of the audience through out the performance. Thus in theater productions they usually form calculated parts of the productions”*[ibid,p114-115][16].

The interaction designer is however not concerned with staged productions but with the activity of using of technology whereas the foreground attention and middle ground experience play central roles whereas the atmosphere lives in the journey between foreground attention, middle ground experience and background awareness. Further, we have to also acknowledge, that more atmospheres exist side by side: think of a football match, where the players on each team will have different experiences of the atmosphere. The audience will have another experience. All through they all have the ball in focus of attention, their middle ground experience and background awareness are different. To encompass all humans being involved in an atmosphere in interactive environment, the notion of “user” may instead approached this as spect-ators [16] as it embraces both the passive observer and an active participator taking action in a situation. The term comprises not only the extremes of passive and active but also the continuum in between. When we experience interactive systems in spaces with other people, we cannot be active all the time, sometimes we “only” look at other people being “users” in the traditional sense [16,p110]

### Design heuristic

“Color the Atmosphere” exists in a constructed living room at the Interactive Spaces lab. The set-up has only to a limited degree been tested on users, whereas a design heuristic is presented emphasizing how user tests should be approached in future set-ups.

### *Stuck between design rationale and feeling*

The general response to the design concept, linking the expressions of different media interfaces, turned out to be “difficult to understand”. This points to the fact that focus of attention overshadows background awareness. And as the foreground also affects our background awareness (e.g. frustration) this is important notion according to atmosphere. When the users of the system seek for explanation it can be questioned whether they are concerned with either the idea of constituting atmospheres using existing media as both input and output; or if they are concerned with the actual design of the system; where the feed-forward and feedback of the system is unclear [29].

### *It takes time!*

To be able to evaluate atmospheric experiences in future set-ups we acknowledge, that the system both has to be experienced in foreground, middle ground and background of awareness. In our initial user tests, the setup was tested for about 20 minutes, which is insufficient according to atmospheric experiences, as the constructing means dominated their focus of attention. We propose that the set-up is tested over a longer period of time, and preferably in home environments. This would embrace how the user approach the set-up in daily life due to the factors of e.g. different social settings, mood changes and motivation. Another perspective we may consider for future tests is that users define the matrix themselves in order to acknowledge the linking between the medias. This could demystify the surprising and overwhelming jumps from one state to another.

### *Keep the atmosphere unarticulated while testing*

We acknowledge, that users should not articulate atmospheric qualities while they are in the middle of testing as the atmosphere changes character when it is forced into foreground of attention. Drawing upon the notions of performance art where *atmospheres are the general impression that influences the perception through out a performance* [8,p.114-115] users should instead be interviewed after testing the set-up and reflect upon their general impression of the atmosphere.

### Discussion

The design case has demonstrated the central design concerns and research challenges underlying atmospheres. It is argued, that the notions of foreground, middle ground and background awareness are essential according to both designing and articulating atmospheres within the field of interaction design. Admittedly, the design case has suffered

the initial hardships; it has however, been fruitful according to articulate some of the difficulties of designing atmospheres. On the face of our approach “Color the Atmosphere” dissociates itself from other research projects [23][24] within the field of interaction design by acknowledging two essential qualities of atmospheres; first of all the importance of the bodily experience in space, middle ground, which is illustrated in the gesture of daubing *color* on each of the interior media surfaces, by physically moving around space. Other projects [23][24] neglect the bodily approach by sculpting atmospheres through stationary interfaces. Secondly, the constitution of atmosphere is not understood as predefined scenery like e.g. festive atmosphere [24] but approaches with respect the its mutable qualities and designed with a large degree of adaptability.

To advance middle ground experience further a discussion is raised according to the data-centered approach to background awareness and this being opposed to a bodily motor-centered approach. Admittedly the two different aims of technology do not eliminate each other, but they represent two different traditions within HCI. When Ishii et al.[14] are designing for background awareness, the space serves for carriers or control of virtual data as in AmbientROOM [ibid] and the purpose of the informational data is placed above all regards [ibid]. Although they use classical means for affecting the atmosphere e.g. sounds from the rainforest, the focus is not on the perceptible body, but how to increase the information load. As argued in the paper the concept of middle ground experience the efficiency-focused technologies may no longer suffice and need to be complemented by knowledge on the aesthetic aspects of user experience [5]. Drawing upon aesthetics of interaction [22] we should seek to affect all senses in the way we interact with technology [ibid]. By these comments the attention must be directed toward what is valuable for future work as the notion of atmosphere gives a nuanced view on interaction design.

### CONCLUSION AND FUTURE WORKS:

Broadening the concept of spatial technologies to embrace the philosophical notion on atmospheres, the importance of bodily awareness in space is pinpointed and presented as middle ground spaces into the dichotomy of foreground-background spaces. The notion of middle ground experience conditions the manner in which we experience the world in framing our embodied perception and actions by providing a sense of spatiality in our relation to the physical, social and cultural world. Through a design case, explicit interactions investigate how we *Articulate Atmospheres through Middle Ground Experiences in Interaction Design*. The case revealed a range of design concerns and design heuristic according to user experience. The most prominent concerns points at the paradox between foreground attention and background awareness – as an atmospheres most likely changes character when it dragged into foreground attention. Therefore we claim, that

to atmospheres shall be approached as a journey between foreground focus, middle ground experience and background awareness. As different forms of sensations constantly mediate middle ground experience the temporal concern must be acknowledged. Finally the discussion point towards the notion of middle ground experience emphasizing that the previous data-centered approach to background space is opposed to a perceptible motor-centered approach acknowledging that aesthetic interaction has much to offer middle ground and background aesthetics in the field of interaction design.

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