

Wolkenkuckucksheim: Art as Metaphor of the Mind

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Abstract

Wolkenkuckucksheim is a site-specific, interactive computer installation for the Cognitive Systems Group at the University of Bremen, Germany. It was conceived and implemented by the authors: an artist interested in the syntax of space and the semantics of materials, and a cognitive scientist investigating cognitive implications of ubiquitous computing. The project unites the artistic approach of creating metaphors and the scientific approach of theoretic inquiry. In this essay artist and scientist develop in a dialogical manner how art and science gain complementary insights by working with the same cognitive tools.

Introduction: Run-Up Story

Wolkenkuckucksheim is an interactive computer installation for the Cognitive Systems Group at the University of Bremen, Germany. In his famous play *The Birds*, Aristophanes, the ancient Greek playwright of comedies, invented *Nephelokokkygia*, German *Wolkenkuckucksheim*, as a city between earth and sky, free of human needs and divine interests (Aristophanes, 2003). Everyone wants to be there: humans and gods alike. Aristophanes constructed a deeply ironic social space. However, over the centuries, German *Wolkenkuckucksheim* has turned into a synonym for daydreaming. Artists and scientists are often seen as daydreaming and such as retreating to a place where no one else seems to be permitted. In the eyes of those not permitted this place takes on the shape of a container suspended above their heads. Voluntary inaccessibility is often targeted when artists and scientists attempt to refrain from practical demands of the day and engage in untargeted manipulation of things and in introspection – then they are often blamed for “doing nothing”.

Nonetheless the scientists of the Cognitive Systems Group unanimously maintain that they cannot stand their ground in their professional field without unexpected ideas, and random observations. As they research cognitive systems as part of calm technology (Weiser & Brown, 1997), they have their premises furnished with all kinds of electronic gadgets. It is the interconnection of user and machine that makes the focus of their interests.

When it ultimately came to suggesting art for their department, which appears to the visitor as a busy beehive in a building designed to enhance scientific productivity with the paradoxical demand of uncommitted play time and its equally paradoxical reproach of doing nothing attached to it, an investigation of the paradoxical location where nothing is done forced itself into view as a theme.

Description: *Wolkenkuckucksheim*

The premises of the Cognitive Systems Group comprise small offices around social meeting spaces in the *Cartesium* building of the University of Bremen. Instead of door plates touch screens display the inhabitants' names. The screens offer connection to the internet and are a playground for investigating ubiquitous computing. People passing through can utilize the numerous screens always in easy reach.

Additionally, two larger screens are positioned in an adjacent lobby space serving as waiting room for the nearby lecture theatre. These screens provide updated information on student and university issues.

Wolkenkuckucksheim inhabits both the small screens besides the office doors and the two larger screens in the lobby. When a person, approaching a door, looks at the screen as door plate, an image fades in and slowly transforms into successive images, carrying the observer into another world. This slow transformation makes intermediate images appear in the overlap between the original images. The images themselves are tonally rich black-and-white photographs of everyday scenes. They form an image bank which is organized in a two-dimensional array where each image has four neighbors with structurally similar features. Image transitions are randomly selected from one of the neighbors.

Thus the intermediate images acquire visual logic. The images appear seemingly without effort on the viewer's side, but they are controlled by face recognition technology. When the person turns away or touches the screen, the image flow stops and the screen returns to its normal functions.

The lobby screens host an ongoing image loop. Its images are constructed of two overlapped images respectively of the former image bank. Via an extremely slow transition of fade-ins, images emerge which derive from essentially four different originals, opening a surreal imaginary space. The changes within the displayed image are so subtle that observers have the impression of rather detecting than actually seeing something happening. Sometimes people only observe a change in the image if they turn away for a moment and, on returning to the image, notice that it looks slightly different than before. When they transfix their gaze to the screen it draws them into an ambiguous image cosmos where they cannot distinguish between actually observed and imagined shapes.

Artist's Approach: Using Scientific Theory as Artistic Metaphor

To perceive "doing nothing" as an activity, and to furthermore expect a particular location for that activity appears paradoxical. The implied inconsistency points to something that is not there, but nevertheless, is being addressed and phrased. By doing so, something that is not within the range of our perception acquires sensual presence. Obviously it is the mind which creates this experience, a process called *conceptual blending* (Fauconnier, 1994). Conceptual blending is seen by many disciplines as the theoretic concept behind turning perception into cognition (Lakoff & Johnson, 1999).

As arousal of the nerves unfurls signals travel from one part of the brain to another. Thus thinking unfolds as a process in time and space within a physiological substrate. Because of its connection to thinking and its accessibility by shared observation (i.e. by reading), language became a major field of investigation for cognitive theory (Fauconnier, 1994; Turner, 1996). The study of texts via reading has offered an approach to cognitive processes, and poetic structures like metaphors, parables and narratives can be analysed as mirrors of conceptual blending.

Art is always made of perceptible material. Thus, experiencing art can also be described as a reading process; hence, cognitive theory linked with Reader Response Theory (Iser, 1978), helps to understand

how cognition turns perceptions into art metaphors. As cognitive research has not distinguished between everyday and artistic expression and Reader Response Theory has not referred to cognitive processes we will combine the two to trace how *Wolkenkuckucksheim* uses a particular environment to turn scientific theories into experiential metaphors in the viewers' minds.

The mind connects to the environment via conceptualizing experiences (Lakoff & Johnson, 1999). When Aristophanes describes *Wolkenkuckucksheim* as a city between earth and sky this city is neither obliged to sacrifice to the gods nor is it forced to subordinate to mundane politics. Therefore everyone wants to get in. However, anyone permitted turns into some kind of fool. The primordial experience of "container" (Lakoff & Johnson, 1980) gives rise to metaphors of imagination as "box high above ground", "full of content". The suspended box can be watched by those "outside" who in their own right inhabit the surrounding space. Such, "seeing" becomes "entering the box", and "imagination" can turn into content that can only be assumed by watching those who "come out" again.

Wolkenkuckucksheim (Fig. 1, Fig. 2): People in a science department are not meant to idle. They are active and they express their activity. They move, they talk, and they manipulate their computers and gadgets. However, sometimes people find themselves unexpectedly daydreaming in front of a computer screen beside an office door and they begin watching the screen absent-mindedly where unforeseen images appear. For a little while they "enter" *Wolkenkuckucksheim* ("container"), then, possibly with mixed feelings for having been held up by random images, they "leave" the place of distraction ("content in the box") and "return" to their ordinary department life ("larger container").

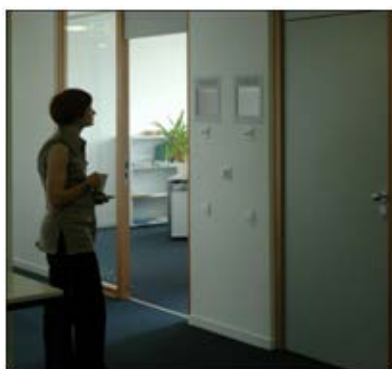


Figure 1: Daydreaming in front of a computer screen.



Figure 2: Watching the screen while unforeseen images appear.

Anything the body identifies and recognizes as entities the mind will endow with meaning. This comprises not only the kind of matter of objects but also their spatial and temporal relationships. As the mind generates meaning in a comprehensive way, it sets up a body of meaning - a narrative: Perception turns into cognition via a reading process

However, images do not carry fixed meanings. Although our mind creates a narrative when we perceive something, other perceivers create different narratives. In order to successfully employ the produced meaning, several minds have to agree upon what they understood rather than about what they perceived. Therefore certain elements of the narrative are kept constant – basic conceptual metaphors in the process of constructing complex blends. These are rooted in our physical nature and ultimately constitute common knowledge of a community (Lakoff & Johnson, 1980, 1999), with other words meaning needs literacy (van Fraassen, 2002). The fundamental literacy is determined by our bodies. It is rooted in the human senso-motoric endowment. Furthermore literacy grows by social connection through space and time. Accordingly meaning is also rooted in the agreement upon certain conditions. The philosopher of

science van Fraassen expands conditions of valid interpretations of texts (e.g., Eco, Rorty, Culler, & Brooke-Rose, 1992) by applying them on research in the natural sciences. He shows how looking at the perception of natural phenomena can be understood as text interpretation, and how the relative validity of interpretations is determined by the literacy of the observers (van Fraassen, 2002).

Wolkenkuckucksheim (Fig. 3): Viewers agree that there are images on a screen, which keep changing. But they do not agree on the product of this change. It is solely their conviction that everyone has seen something transform on the screen that unites viewers, which is the basic conceptual metaphor of movement, i.e. change of perceptions.



Figure 3: Viewers agree on the basic metaphor of movement, i.e. change of perceptions.

Thus people may easily agree on identifying a narrative, but they struggle to agree on a conclusive meaning. As conceptual blending unfolds over time and in space, it follows a particular syntax of perceived objects. What kind of perception enters the process, when this happens, and where it happens in the narrative, is therefore crucial for the content of the ensuing conceptual blends. Therefore the syntax controls the costs of building parables. As minds are individually different in spite of the common structure of their brains, it depends on the individual mind to deal with the costs. For one person it can be a challenge to understand what for another person is joyfully imagining. Cognitive theory describes this activity of the individual mind as pattern completion (Turner, 1996), and Reader Response Theory speaks of places of indeterminacy which have to be filled by the reader (Ingarden, 1973; Iser, 1978). As people's literacy enables shared knowledge it seems to be the degree of deviance to basic conceptual metaphors – indeterminacy – that triggers the development of individual metaphors. Therefore strategies of avoiding basic conceptual metaphors force viewers into their own personal worlds of narratives. This opens up creative freedom for the artist. By creating and then organizing perceptions in space and time she can deliberately play not only with meanings but also with viewers' experiences. This means she can put viewers to action.

Wolkenkuckucksheim: The artist determines that the screens at the office doors are objects to be looked into at certain times. But it is not the images that shall attract the viewer's attention but the viewer's attention shall attract the images. Webcams with face recognition technology note when a face is turned towards a screen and lingers for a specified amount of time (Fig. 4). Unpredictable images emerge thus referencing conceptual blending. The screens as office doorplates are in a place where many people have to stop for some reason or other. This time slot is used to display images (Fig. 5). Thus physical objects, computer programs, theories, image structures, color schemes, display modes, and time slots get organized in a new syntax – the syntax of Wolkenkuckucksheim. Viewers are urged to build up conceptual blends based on familiar mental spaces but have to evolve complex blends that are new to them.



Figure 4: Webcam with face recognition technology.



Figure 5: Unpredictable images emerge thus referencing conceptual blending.

Viewer activity has been debated among artists since the beginning of the 20th century. As technology advanced, artists' interest in viewer participation ultimately turned into fascination with interactivity (Daniels, 2008; Weibel, 2008) and related critical reflection. The information artist Rokeby points out that the interface “inherently constructs a representation of the user. The interface becomes a distorting mirror...” (1998, p. 37). Narrative theory also finds the implicit reader as image of the intended reader in the narrative structure (Iser, 1974, 1978). The narrative structure is set up in a way that requires the reader to produce a certain emotional behavior (Iser, 1970). Such This structure of interactivity can be revealed and analyzed with the tools of narrative theory (Ryan, 2001). Like authors write their texts the information artist draws the interface of the machine – both structures of perceived objects. Both make readers' or viewers' minds produce various conceptual blends. This makes the artist believe to be in charge of the viewers' minds. Viewers immerse themselves in visual art as readers loose themselves in fiction. Just by constructing the interface, the viewer could be made to do what the artist intends. Digital technology lends itself in a particular manner to orchestration. Digital technology as artistic material is not based on body experience but nevertheless can be employed in perceptible narratives. It can be incorporated in spatial and temporal arrangements of objects and become an effective tool in disorienting viewers' basic conceptual metaphors.

Wolkenkuckucksheim (Fig. 6): Viewers idle in front of a screen finding they relate to a computer. They expect interactivity, as they are computer users. But they are not invited to do anything. They linger for a while. Unexpectedly images appear transforming slowly into each other. Viewers may turn away from the screen, but when turning back the screen is empty. Viewers cannot revisit any of the images. Every time a new series emerges. Thus, some viewers feel that they are urged to hold the picture by attending the screen. Their experience is that their gaze must not let go. This again calls upon a basic metaphor: Attention as holding on to something with your bare hands. However, as there is no request sent out by the art work, there is no confirmation of the viewer's conclusions.

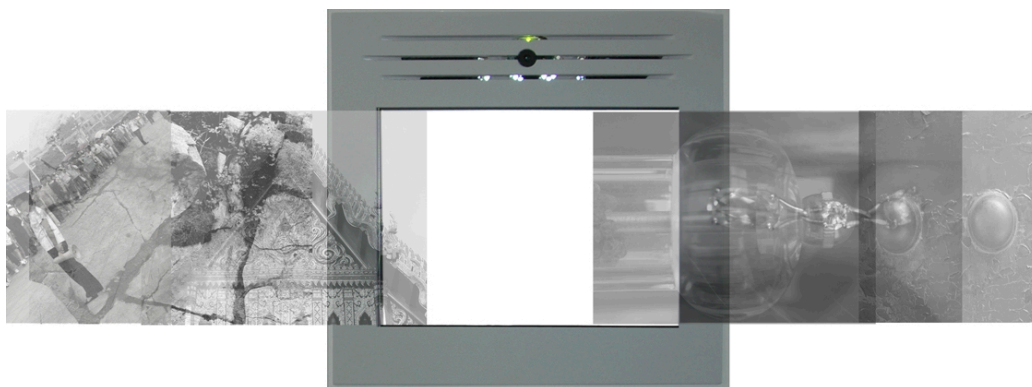


Figure 6: Viewers cannot revisit any of the images.

A gap remains between the artist's interest in being understood and her interest in making people generate new meaning. Duchamp once described this gap as “the personal ‘art coefficient’” which “is like an arithmetical relation between the unexpressed but intended and the unintentionally expressed” (1959, p. 78). As understanding rests on conventionalized conceptual metaphors and on the literacy of the viewers, a narrative consisting solely of conceptual metaphors would prohibit any discourse. Nevertheless, if a narrative would not contain any basic conceptual metaphors at all, viewers would probably not even realize that it is a syntactic structure. To develop new conceptual metaphors the challenge of a deviance to basic conceptual metaphors is needed. This makes the artist interested in staging an arrangement of perceptions that triggers as many new conceptual metaphors as possible while not losing viewers (Wilson, 2002; note that Wilson refers to the use of technology as metaphors, however, he does not mention the connection to cognition). There is no single or optimal determination of the personal art coefficient; every art work calculates it anew.

Wolkenkuckucksheim (Fig. 7): In the lobby viewers watch two larger screens. Images displayed on these screens transform extremely slowly. When an image has emerged from the misty background, no other change is detected, at first. After a while, however, changes in a multi-layered image are noticed. But what kind of pictures appear cannot be agreed upon. Every viewer perceives a very personal image. As viewers continue to discover ever new images on the screen which cannot be confirmed, even the connection to the machine as generating agent of pictures may become unbinged as viewers cannot distinguish any more whether their perceptions are pure imagination or depictions on the screen.

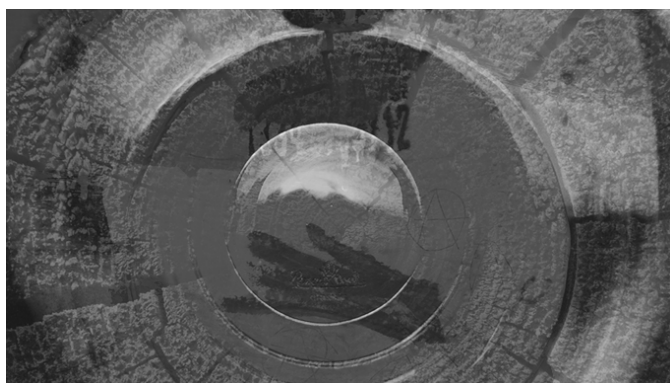


Figure 7: The lobby screens show extremely slow transitions.

Scientist's Approach: Using Artistic Metaphor for Scientific Inquiry

The *Wolkenkuckucksheim* installation has become an object of curious inquiry about the interaction between perception and cognition in a changing environment. The unusual art installation has led to a number of observations that may give rise to interesting insights into cognitive processing including perception, conceptualization, memorization, and knowledge retrieval.

Most visitors to the *Cartesium* at the University of Bremen notice the unusual photographic compositions in the lobby as an art installation, but most people rushing through the building do not notice that this is a dynamic installation. Upon return to the lobby visitors sometimes notice that a different image is displayed on the screen than the one they have seen before; but they rarely notice that slow changes take place in front of their eyes. Only when they take time and actively inquire the content of the images, they notice something strange about them besides the unusual blend of photographs. Usually it requires that observers turn away from the screen for a short time before they notice that the image has transformed. The interesting aspect, however, is that – unlike at the smaller screens at the office doors – the dynamics of the visualization at the screens in the lobby is not influenced by the presence or attitude of the observer. It is the mind of the observer that appears to hold on to the stability of the image, as it cannot determine any particular entity that has changed (Fig. 8).

Conversely, visitors who have been informed about the slow transformations of the images in *Wolkenkuckucksheim* have reported seeing changes in the images even when the computer behind the installation has stopped transforming them. Due to the blend of a total of four original photographs, each having an interpretation on its own, the observer looking for change will find it in attending different motives in the different overlapping image components.

Another stunning observation was that after more than a year of routinely encountering the images on the screens in the lobby, the image sequences hardly got boring, even though they are composed of only a few hundred originals. We would have expected that the images become familiar to the inhabitants of the building such that they no longer are interested in looking at them. This, however, apparently is not the case.

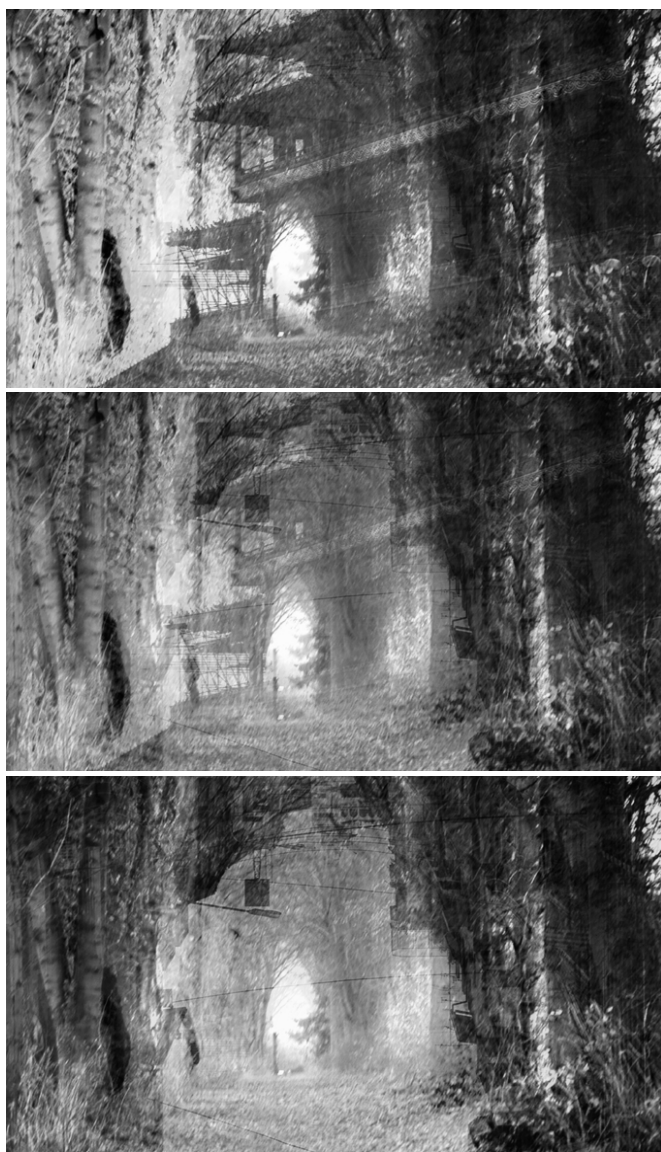


Figure 8: Three moments of a Wolkenkuckucksheim image sequence.

In the following, we will attempt to provide explanations of the observed phenomena in terms of underlying cognitive processes.

‘Cognitive agents’ – as we may collectively call human and artificial cognizers from a cognitive science point of view – are highly trust-dependent systems. For example, a person who cannot trust the persistence of the floor that he saw just before putting his foot down would be hopelessly lost in his environment, because he would feel insecure. People who experienced an earthquake know what we are talking about. Cognitive agents depend on the validity of most of their memories of an environment; they will focus their perceptual attention on aspects of the environment where they expect changes against the stable background. For example, whereas we expect the ground on which we walk to be stable, we expect vehicles to possibly move; thus, as traffic participants we focus our perceptual attention on vehicles while we assume that the roads will stay where they were when we last saw them. Because of safety we develop ways of mentally registering the movements of one or few traffic participants even when we do not actually look at them. These movements are only relevant to us if they take place at a speed that might lead to a close encounter or collision while we are around.

Extremely slow changes in our environments are cognitively irrelevant, for the most part, and we neither notice nor register them. Accordingly, we usually do not expect them either; it is a cognitively economical assumption to believe that objects in our environment do not change unless we have specific reasons to believe so. In *Wolkenkuckucksheim*, changes are very subtle and very slow; they take place across the entire image simultaneously comparable to changing lighting conditions in the environment that we typically do not notice. The change acts as a background phenomenon that our perceptual system attempts to compensate rather than a foreground phenomenon that our perceptual system would attempt to interpret. When we observe the transformation of a *Wolkenkuckucksheim* image, from one blending stage to another, everything that was in the image a little while ago is still there – only a bit stronger or weaker; but this is a very common experience even with static images: we do not recognize all objects in an image simultaneously. Image understanding is a gradual process, and an object that we did not see at first, becomes more prominent to us once we recognized it. We are so familiar with such perceptual experiences that it is simpler to attribute them to the nature of our perception than to an ever-changing environment.

When we turn away from the screen and turn back, however, we apparently engage a somewhat more involved perception and cognition process: we re-affirm whether the world is still the same that it was when we last saw it and we may see the global change in the appearance of the image in comparison to the first imprinting of the image in our mind. Why can we be led to believe that something changed in an image even if it didn't? Again, our gradual recognition process does not allow us to distinguish between changes in the image and changes in our knowledge about it; thus, if we have good reasons to believe that there are changes in the image, we happily attribute our changing insights into the image to changes in the world rather than to our perception processes. In other words, our own actions in the environment strongly influence our expectations and perceptions.

What may be the reason behind the observation that the images in *Wolkenkuckucksheim* do not appear very familiar to frequent observers of the art work even though in the lobby there is a fixed sequence of a limited number of images? The reason may lie in the fact that our memory of images is largely categorical rather than continuous. Photographical memory is very storage-intensive and it is impossible for people to remember correctly the details of images that have left important impressions on them over a lifetime. However, it is very important for us to recognize scenes and situations that we have seen before in order to make intelligent decisions.

Human cognition has developed a smart approach to dealing with this dilemma: Although photographic memory persists only for a very short time (less than a second) in our perception system, people have a stunning capacity to recall and identify images they have been presented with (Standing, Conezio, & Haber, 1970). The brain needs the image information to calculate stable images as base for interpretation. Then there are much more economical ways of representing: the recognized objects and their spatial arrangement can be categorized, generalized, and connected with previous knowledge.

Therefore most of us cannot correctly reconstruct detailed images of what we have seen. This is well exemplified by change blindness experiments (Simons, Franconeri, & Reimer, 2000), which show how participants overlook elements in a series of perceived events. Furthermore change detection research differentiates between concepts of change and shows that focused attention is needed to identify change. This strengthens the assumption that the calculated image representations only consist of selected features (Rensink, 2002).

What does all this have to do with our perception of *Wolkenkuckucksheim*? As we do not remember a detailed image but rather some interpretation of the specific blend of images we may see at any given

time, we may actually see a much larger variety of scenes than we would expect on the basis of the constituent originals. Due to the gradual blending between the original photographs, at any given time some objects in the resulting image may be more prominent than others and the scene perceived may be categorized differently than when the blend of the same photographs is seen in a different blending stage. As a result, a large number of scenes may be perceived and the overall repertoire of images becomes more varied and interesting.

This latter effect appears on the smaller screens (Fig. 9) next to the office doors to a lesser extent than on the large screens in the *Cartesium* lobby. The reason is that on the small screens only two-fold image blends are generated while on the large screens, the blended images are (static) blends of two images in themselves. As a consequence, it is considerably easier to recognize the depicted entities on the smaller screens. The interestingness of the small screen image sequences results from the variability in transition, as the image sequence is not completely pre-determined. Thus, while at the large screens the moment of encounter may have an imprinting influence on the scene that is seen, on the smaller screens the fascination partly results from the indeterminacy of subsequent transitions.



Figure 9: Two-dimensional array of constituent images and their neighboring candidates for image transition.

Conclusions: Calculating the ‘Art Coefficient’

Wolkenkuckucksheim uses components of the spatial, temporal, and theoretic environment of the Cognitive Systems Group in the *Cartesium* building at the University of Bremen to stage a narrative. This narrative is fitted within the familiar narratives of their every day scientists’ lives. Because it both reorganizes and alienates elements of the perceptual habitat of the group it triggers indeterminacy. As new narratives cannot be forced onto the viewer’s mind but can only be suggested, it triggers very personal narratives

which cannot be confirmed, only discussed. Thus cognitive theory, as part of the artistic inventory, becomes an individual metaphor; literary theory in turn, provides elements for the syntactic structure, and technology turns into an enhancer of the deviance to basic conceptual metaphors. Such, *Wolkenkuckucksheim* acquires its own individuality and avoids becoming a model for a cognitive phenomenon. Instead it guides the viewer into uncertain, self-driven, interpretational imagination and thus provides a space for creative experience.

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