

PeR: Designing for perceptive qualities

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PeR: Designing for perceptive qualities

Abstract

The design PeR was created as part of our research on how to design for perceptive qualities in objects. PeR, or perception rug, is capable of showing perceptive activity related to actions from a subject and related to other events. The integration of conductive yarns makes PeR sensitive to the touch of a subject. Furthermore the use of nylon threads enables a body of light to behave within its surface.

Keywords

Designing for Interaction, Perception Theory, Perceptive Qualities, Design Platform

I Introduction

PeR integrates conductive and optic fibres, which respectively are used to sense the touch of a subject and to let a body of light act within the surface of the rug. The design is part of a research project that investigates how to design for perceptive qualities in objects.

I.1 Theory

The starting points for this research are considerations of the phenomenology of perception [1] and the ecological psychology [2]. Based on these notions, perception, in this case, is described as inherently active. Perception is the result of actions we undertake and the consequent sensory feedback we experience. This

makes perception a very bodily and, therefore, personal matter. What I perceive depends on what I can act upon with the body I have. [3] Perception, being inherently active, also brings forward the idea that there is a pre-conceptual meaning of the world. In other words; the world means something to us before thinking and recollection. [4]

Merleau-Ponty's approach of the phenomenology of perception, in which perception is described as inherently interactive, is important for this research. Perception is an interplay between the perceiver and the perceived. [1] These notions have been recently operationalised by researchers at the University of Compiègne, France. The French researchers conclude that 'there are two kinds of perceptions over time: perceiving the other as part of the environment, versus perceiving the activity of the other perceiving me. It is by switching between these two kinds of perceptions that it becomes possible for one subject to understand the position from which the other subject perceives the scene.' [5] To make a feeling of sharing a common space between subjects possible, this constitution of the other subject's perspective or 'point of view' is essential.

Our main focus of investigation is if and how it is possible to design for perceptive activity in an object, in order to create perceptive interplay between it and the subject. As the working hypothesis for our ongoing research we state that this perceptive interplay, of

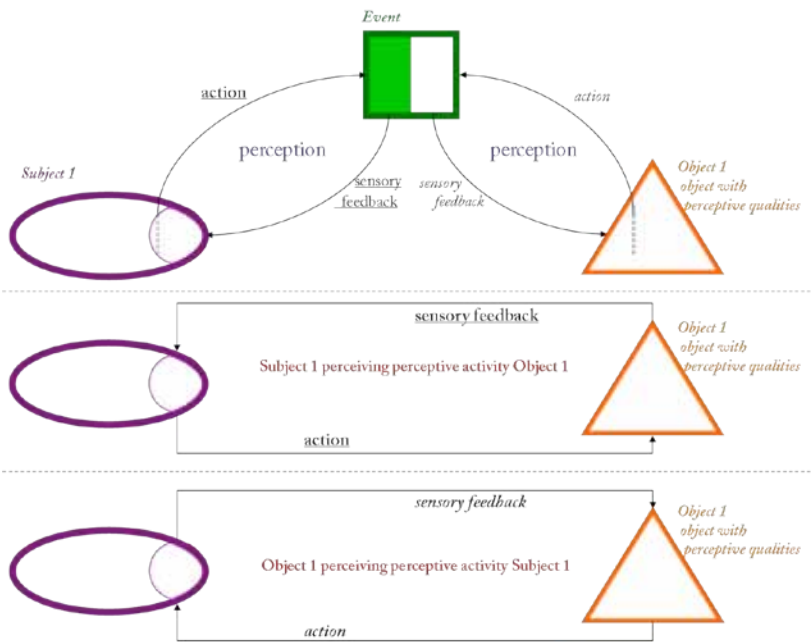


Fig. 1. Subject 1 is a person with normal perceptual capabilities. The subject perceives the object and an event as result of his or her actions towards them and of the sensory feedback gained by these actions. Note that sensory input can also evoke actions by the subject. Next to the subject 'Object 1' is presented. This object is an object with perceptive qualities (like PeR). This object is also able to perceive the subject and the event.

perceiving an object as part of the environment versus the object perceiving the self, results in a greater feeling of involvement of the subject [6] The next diagram (figure 1) gives an overview of the perceptive connections between a subject and the designed object with perceptive quality. Part of this scene is also an event. Both subject and object with perceptive qualities could perceive this event.

A very basic example one can consider is an ordinary outdoor lamp. The lamp (Object 1) is capable of detecting the presence of an intentional subject as well as the outside lighting conditions (event). Also, the subject is able to perceive this event, as well the perceptive capability of the lamp when it reacts to its dark surroundings and the presence of the subject by turning on the light.

2 Description PeR

PeR is an exploration of how the theory mentioned above is applicable in design. The structure and open form of PeR allows for the exploration and the design of different behaviours. This allows it to become a platform for design.

In between the threads of the basic rug, conductive yarns are integrated. These conductive yarns are connected to several capacity sensors. An electric capacity change is detected when the rug is touched by

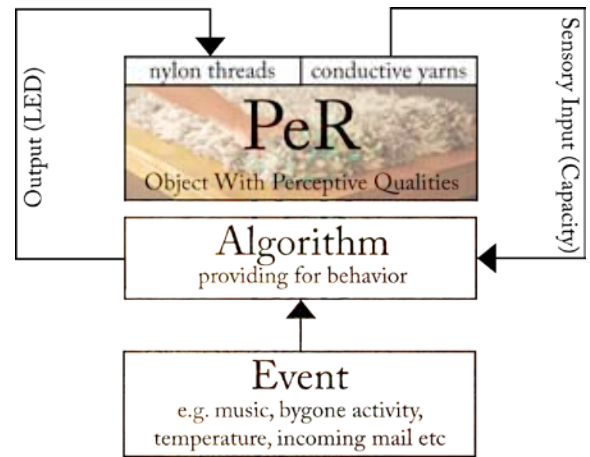


Fig. 2. Overview PeR, the perceptive action (the touch) of the subject results in perceptive actions by means of light.

the subject. This difference in capacity is converted into an electric signal by the capacity sensor, which, in turn, is read by means of an Arduino (electronics prototyping platform). The detection of touch makes PeR sensitive to the perceptive activity of the subject. PeR is capable of reacting to and evoking these perceptive actions of the subject by the behaviour of its integrated body of light. In addition to the conductive yarns, nylon threads were integrated in the rug. This thread has similar properties as glass fibre as it is able to transport light. The soft feel, transparency, and flexibility of the nylon thread make a smooth integration in the carpet possible. A grid of LEDs is mounted under the nylon threads. This enables PeR to show behaviour by means of light. The electric signals gathered by the use of the conductive yarns are used as sensory input by the algorithm behind PeR. Based on this sensory input the position of the body of light is adjusted. The algorithm allows for a smooth and natural-like behaviour as the position of the body of light is adjusted gradually. This body of light is reflected within the rug through the light of the LEDs spread by the nylon threads.

3 Platform for design

Through the integrated nylon threads, a body of light behaves within the carpet. The behaviour of this body is dependent on an underlying algorithm. The design can



Fig. 3. Impression of the light body following the touch of the subject

be used as a platform for the exploration of perceptive behaviour. For example the body of light can follow the subject's touch directly or on a humble distance.

In figure 3 an impression of the light body following the subject's touch is given.

Behaviour towards an event such as, reacting to music, to the dynamics of people, to incoming mail or to activity in time and over distance etc. is also possible. In this case PeR is the object with perceptive qualities. The behaviour of the body of light shows the perceptive capabilities to the subject.

Different design characteristics, like the size of the light body, the speed by which the body moves, its shape, focus and direction, can be adjusted in order to design behaviour. These characteristics could also adapt over time. This means that the light body could get notion of ongoing perceptions. For example, PeR gets bored, irritated or happy depending on its perception of the subject and the event. Notion of ongoing perceptions implies that PeR is sensitive to the dynamics by which it is touched. Hence PeR could show different reactions to, for example, stroking and hitting.

The design of perceptive behaviour is essential to our research and to our design of PeR. As static images don't show this behaviour we provide a movie at <http://dqi.id.tue.nl/per>.

4 Further research

PeR is a first example of why and how to design for perceptive qualities in objects. Next to PeR we have been working on a second research design PeP, short for perception pillar. This installation is specifically designed for research purposes. The integration of the theoretical notions in design is more closely investigated. Next to functioning as a platform for the design of

perceptive qualities PeR also adds value in building relations between the textile industry, high tech industry and design. The current prototype of PeR is handmade but the used techniques allow for some parts to be manufactured by means of existing production techniques like tufting and weaving.

Creating PeR by means of these manufacturing techniques also would improve the quality of the prototype. This is necessary for PeR to really function as a platform for design. Our research will benefit from a solid and easily accessible prototype.

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